60% DESIGN SUBMISSION
NYC 2016 Green Schools Rating System

P.S. 347X Bronx Annex at PS33X **& Lot 8**
2400 Jerome Ave, Bronx, NY, 10468
LLW# 107340
Architect: Mitchell Giurgola Architects, LLP
7 May 2018, 15 June 2018 Revision**, 18 September 2018 Revision, 15 October 2018 Revision**

Street View without MTA massing

Contents

Project Checklist

Project Checklist - page 1 of 2

SCA School Construction Authority

NYC Green Schools Rating System 2016

Project: **PS347 Bronx Annex at PS33X**
Address | Zip Code: **2424 Jerome Ave, Bronx, NY, 10468**
LLW #: **107340**
Design #:
Architect: **Mitchell/Giurgola**

Reviewer :
Reviewer Sign Off:

	SD	DD	60%	100%	Const
Submission (Check one):			X		

Submission Date: **7May2018, revised 21Aug2018**

Credit Names	BD&C Reference LEED for Schools 2009	CHPS Reference	NYC GSG 2016	Credit Description and Relevant Information and Drop-Down Menus	RPC (check project zipcode in GSG) [5]	Required For all Projects	Required if Feasible [1]	Optional Credits [2]	If Anticipated, or if Documented: [3] Enter point value, or leave blank if Not Feasible or if Not Pursued		Auto Filled: Blank if Pursued, No. of Points if Not Pursued or if Not Feasible or Additional Credit Not Pursued
									Design Phase	Construction Phase	
Site			**27%**	**of Total Points**			**Points:**		**14**	**out of**	**19**
	SS Pr 1		S 1.1P	**Construction Activity Pollution Prevention**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
	SS 1		S 1.2R	**Site Selection**		1			1		
		1.1.7	S 1.3R	**Sustainable Site & Building Layout**		NP	☑ YES		Indicate Pursuit		☐ NO
Site Selection	SS 2		S 1.4	**Development Density & Community Connectivity**	RPC		4		4		
	SS 10	1.1.2	S 1.5R	**Joint Use of Facilities, Community Access**		1			1		
	SS Pr 2		S 1.6P	**Environmental Site Assessment**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
	SS 3		S 1.7	**Brownfield Redevelopment**			1			NF	1
	SS 4.1		S 2.1	**Alternative Transportation,** Public Transportation Access	RPC		4		4		
Transportation	SS 4.2		S 2.2	**Alternative Transportation,** Bicycle Storage & Changing Rooms			1		1		
	SS 4.3/4.4		S 2.3R	**Alternative Transportation,** Fuel-Efficient Vehicles/Parking Cap.		2			2		
Minimize Impact on Site	SS 5.1		S 3.1	**Site Development,** Protect or Restore Habitat	RPC		1			NF	1
	SS 5.2		S 3.2	**Site Development,** Maximize Open Space			1		NF		1
Stormwater Design	SS 6.2		S 4.1	**Stormwater Design,** Quality Control			1		NF		1
Heat Island Effect	SS 7.2		S 5.1R	**Heat Island Effect,** Roof		1			1		
Outdoor Lighting	SS 8		S 6.1	**Light Pollution Reduction**			1		NF		1
				Site Category Sub-Total:		5	14		14	0	5
Water			**4%**	**of Total Points**			**Points:**		**2**	**out of**	**8**
Outdoor Systems	WE 1.1		W 1.1	**Water Efficient Landscaping,** Reduce by 50%			2		NF		2
	WE 1.1		W 1.2	**Water Efficient Landscaping,** Reduce by 100%			2		NF		2
	WE Pr 1		W 2.1P	**Minimum Water Use Reduction,** 20% Reduction		NP	☑ YES		Credit Req'd - Confirm Pursuit		
Indoor Systems	WE 3		W 2.2R	**Enhanced Water Use Reduction,** 30% Reduction		2			2		
	WE 3		W 2.3	**Enhanced Water Use Reduction,** 35% Reduction			1		NF		1
	WE 3		W 2.4	**Enhanced Water Use Reduction,** 40% Reduction			1		NF		1
				Water Category Sub-Total:		2	6		2		6
Energy			**6%**	**of Total Points**			**Points:**		**3**		**5**
Commissioning	EA Pr 1		E 1.1P	**Fundamental Commissioning**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
Refrigerant Management	EA Pr 3		E 2.1P	**Fundamental Refrigerant Management**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
	EA 4		E 2.2	**Enhanced Refrigerant Management**			2		NF		2
Verification	EA 5		E 3.1R	**Measurement & Verification**		1				1	
		3.3.5	E 3.2R	**Energy Management System Controls,** HVAC & H. W. Systems		NP	☑ YES		Indicate Pursuit		☐ NO
Energy Efficiency	EA Pr 2		E 4.1P	**Minimum Energy Performance**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
		3.1.2	E 4.2R	**HVAC System Sizing,** Avoid Oversizing		NP	☑ YES		Indicate Pursuit		☐ NO
Power	EA 6		E 5.1R	**Green Power**		2				2	
				Energy Category Sub-Total:		3	2		0	3	2
Materials			**13%**	**of Total Points**			**Points:**		**7**	**out of**	**10**
	MR Pr 1		M 1.1P	**Storage & Collection of Recyclables**		NP	☑ YES		Credit Req'd-Confirm Pursuit		
	MR 1.1		M 1.2	**Building Reuse,** Maintain 75% of Existing Walls, Floors & Roof	RPC		1			NF	1
	MR 1.1		M 1.3	**Building Reuse,** Maintain 95% of Existing Walls, Floors & Roof			1			NF	1
Efficient Material Use	MR 1.2		M 1.4	**Building Reuse,** Maintain 50% of Interior Non-Structural Elements			1			NF	1
	MR 2		M 1.5R	**Construction Waste Management,** Divert 50% from Disposal		1				1	
	MR 2		M 1.6R	**Construction Waste Management,** Divert 75% from Disposal		1				1	
	MR 2		M 1.7	**Construction Waste Management,** Divert 95% from Disposal			1			1	
	MR 4		M 2.1R	**Recycled Content,** 10% (post-consumer + ½ pre-consumer)		1				1	
	MR 4		M 2.2	**Recycled Content,** 20% (post-consumer + ½ pre-consumer)			1			1	
Sustainable Materials	MR 5		M 2.3	**Regional Materials,** 10% Extracted, Processed & Manufactured			1			1	
	MR 5		M 2.4	**Regional Materials,** 20% Extracted, Processed & Manufactured			1			1	
		4.1.1	M 2.5R	**Wallboard & Roof Deck Products,** Mold Resistance		NP	☑ YES		Indicate Pursuit		☐ NO
See Notes on Page 2 of 2				Materials Category Sub-Total:		3	7			7	3

Project Checklist - page 2 of 2

School Construction Authority

NYC Green Schools Rating System 2016

		SD	DD	60%	100%	Const
Project: PS347 Bronx Annex at PS33X	Submission (Check one):			X		
Address | Zip Code: 2424 Jerome Ave, Bronx, NY, 10468	Submission Date:	7May2018, revised 21Aug2018				

LLW #: 107340

Design #:

Reviewer :

Architect: Mitchell/Giurgola

Reviewer Sign Off:

If Anticipated, or if Documented: 3 Enter point value, or leave blank if Not Feasible or if Not Pursued

Credit Names	BD&C Reference LEED for Schools 2009	CHPS Reference	NYC GSG 2009	Credit Description and Relevant Information and Drop-Down Menus	RPC (check project zipcode in GSG) [5]	Required For all Projects	Required if Feasible [1]	Optional Credits [2]	Design Phase	Construction Phase	Auto Filled: Blank if Pursued, No. of Points if Not Pursued or if Not Feasible or Additional Credit Not Pursued
Indoor Environmental Quality		25%		**of Total Points**			Points:		13	out of	16
IAQ Post-occupancy	IEQ Pr 1		Q 1.1P	**Minimum IAQ Performance**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
	IEQ 1		Q 1.2R	**Air Flow Stations**, Outside Air Intakes		1			1		
IAQ Pre-occupancy	IEQ 3.1		Q 2.1R	**Construction IAQ Management Plan**, During Construction		1				1	
	IEQ 3.2		Q 2.2R	**Construction IAQ Management Plan**, Before Occupancy		1				1	
Low-Emitting Materials	IEQ 4.1		Q 3.1R	**Low-Emitting Materials**, Adhesives & Sealants [4]		1				1	
	IEQ 4.2		Q 3.2R	**Low-Emitting Materials**, Paints & Coatings [4]		1				1	
	IEQ 4.3		Q 3.3R	**Low-Emitting Materials**, Flooring Systems [4]		1				1	
	IEQ 4.4		Q 3.4R	**Low-Emitting Materials**, Comp Wood & Agrifiber Products [4]		1				1	
Pollution Source Control	IEQ 5		Q 4.1R	**Indoor Chemical & Pollutant Source Control**		1			1		
		5.3.5	Q 4.2R	**Electric Ignition Stoves**		NP	☐ YES		Indicate Pursuit		☑ NO
		6.2.4	Q 4.3R	**Post Construction Indoor Air Quality**		NP	☑ YES		Indicate Pursuit		☐ NO
Controllability of Systems	IEQ 6.1		Q 5.1R	**Controllability of Systems**, Lighting		1			1		
	IEQ 6.2		Q 5.2R	**Controllability of Systems**, Thermal Comfort		1			1		
Thermal Comfort	IEQ 7.1		Q 6.1R	**Thermal Comfort**, Design		1			1		
Lighting and Views	IEQ 8.1		Q 7.1	**Daylight & Views**, Daylight 75% of Classrooms			1		1		
	IEQ 8.1		Q 7.2	**Daylight & Views**, Daylight for 90% of Classrooms			1		NF		1
	IEQ 8.1		Q 7.3	**Daylight & Views**, Daylight for 75% of Other Spaces			1		NF		1
	IEQ 8.2		Q 7.4	**Daylight & Views**, Views			1		NF		1
		5.2.1	Q 7.5R	**Visual Performance**, Artificial Direct-Indirect Lighting		NP	☑ YES		Indicate Pursuit		☐ NO
Acoustics	IEQ Pr 3	5.5.1	Q 8.1P	**Minimum Acoustical Performance**		NP	☑ YES		Credit Req'd - Confirm Pursuit		
	IEQ 9		Q 8.2	**Enhanced Acoustical Performance** & Sound for Special Spaces			1		1		
		SCA	Q 8.3R	**Acoustic Windows**		NP	☑ YES		Indicate Pursuit		☐ NO
				IEQ Category Sub-Total:		11	5		7	6	3
Regional		0%		**of Total Points** Use pull-down menus ↘	RPC Claimed		Points:		0	out of	4
Regionally Appropriate [5]	RP 1.1		R 1.1	**Regionally Defined Credit Achieved**	**WEc2 (NF/SCA)**		1		0		0
	RP 1.2		R 1.2	**Regionally Defined Credit Achieved**	**Blank**		1				1
	RP 1.3		R 1.3	**Regionally Defined Credit Achieved**	**Blank**		1				1
	RP 1.4		R 1.4	**Regionally Defined Credit Achieved**	**Blank**		1				1
				Regional Category Sub-Total:		0	4	0	0		3
Additional Credits		25%		**of Total Points** For A 3.1 Use pull-down menu ↓			Points:		13	out of	33
Innovation in Design	ID 2		A 1.1R	**LEED® Accredited Professional**		1			1		
	ID 1		A 1.2	**Innovation or Exemplary Performance**				1			1
	ID 1		A 1.3	**Innovation or Exemplary Performance**				1			1
Optional - Site Impact	SS 7.1		A 2.1	**Heat Island Effect**, Non-Roof				1			1
	SS 6.1		A 2.2	**Stormwater Design**, Quantity Control	RPC			1			1
	ID 1		A.2.3	**Active Design in a School Environment**				1	1		1
Optional - Energy	EA 3		A 3.1	**Enhanced Commissioning**				2			2
	EA 1		A 3.2	**Optimize Energy Performance** [6] **lew 20%, Renovation 18%, 11 pt**				16	11		5
	EA 2		A 3.3	**On-Site Renewable Energy** **If NOT Approved, 0 pts**				7			7
		3.3.5	A 3.4	**Enhanced Energy Management System Controls**, HVAC & H.W.		NP	☐ YES		Indicate Pursuit		☑ NO
Optional - IEQ	IEQ 4.6		A 4.1	**Low-Emitting Materials**, Ceiling and Wall Systems [4]				1			1
Optional - Education	ID 3		A 5.1	**The School Building as a Teaching Tool**				1			1
				Additional Credit Category Sub-Total:		1		32	13	0	21
				Column Totals:		25	38	32	36	16	43
				LEED® Equivalent Point Total[7]**:**					52	out of	95

SCA Credit Name :

Letter prefix indicates credit section (S, W, E, M, Q, R, A)

First number indicates the category within the section

Second number indicates the specific credit within the section category

Suffix "P" is added for credits that are LEED® prerequisites and therefore required of all projects

Suffix "R" is added for credits that are required of all projects

School Construction Authority

NYC Green Schools Rating System 2016

Credit Compliance Narratives

Project: 347X Bronx Annex at P.S. 33X Bronx Annex Date: 17 April 2018, 5 June 2018**, Revised 18 Sept 2018, 15 October 2018 Revision**
Address: 2424 Jerome Ave, Bronx, NY, 10468 Architect: Mitchell/Giurgola
LLW #: 107340 Submission: 60% Design
Design #:________________________ Reviewer:________________________
Reviewer Sign Off:________________________

Directions:

- Eleven of the Site narratives are submitted with the Schematic Submission as indicated below. All other required narratives are submitted with the Design Development submittal.

- Design Teams must submit narratives for all credits in the Site, Water, Energy, Materials and Indoor Environmental Quality sections. For the Additional Credits, all projects must include a narrative for credit A1.1R. Narratives for the other Additional Credits should only be provided when it has been determined with the SCA that the additional credit(s) are to be pursued for this project. Include explanation of why the additional credit is to be pursued on this project. For those credits subject to Regional Priority Credit, indicate whether based on the zip code that the credit is eligible to obtain the additional point.

- Narratives should summarize the design approach to credit compliance and identify the specific SCA standards (standard specifications and design requirements) to be incorporated into the design documents. Include any specific information requested under the “Credit Submittals” heading from the second page of credit text. Provide explanations and calculations where appropriate for credits that are determined to be “not feasible” for this project.

Site Credits

Site Selection

S1.1P Construction Activity Pollution Prevention

Credit anticipated

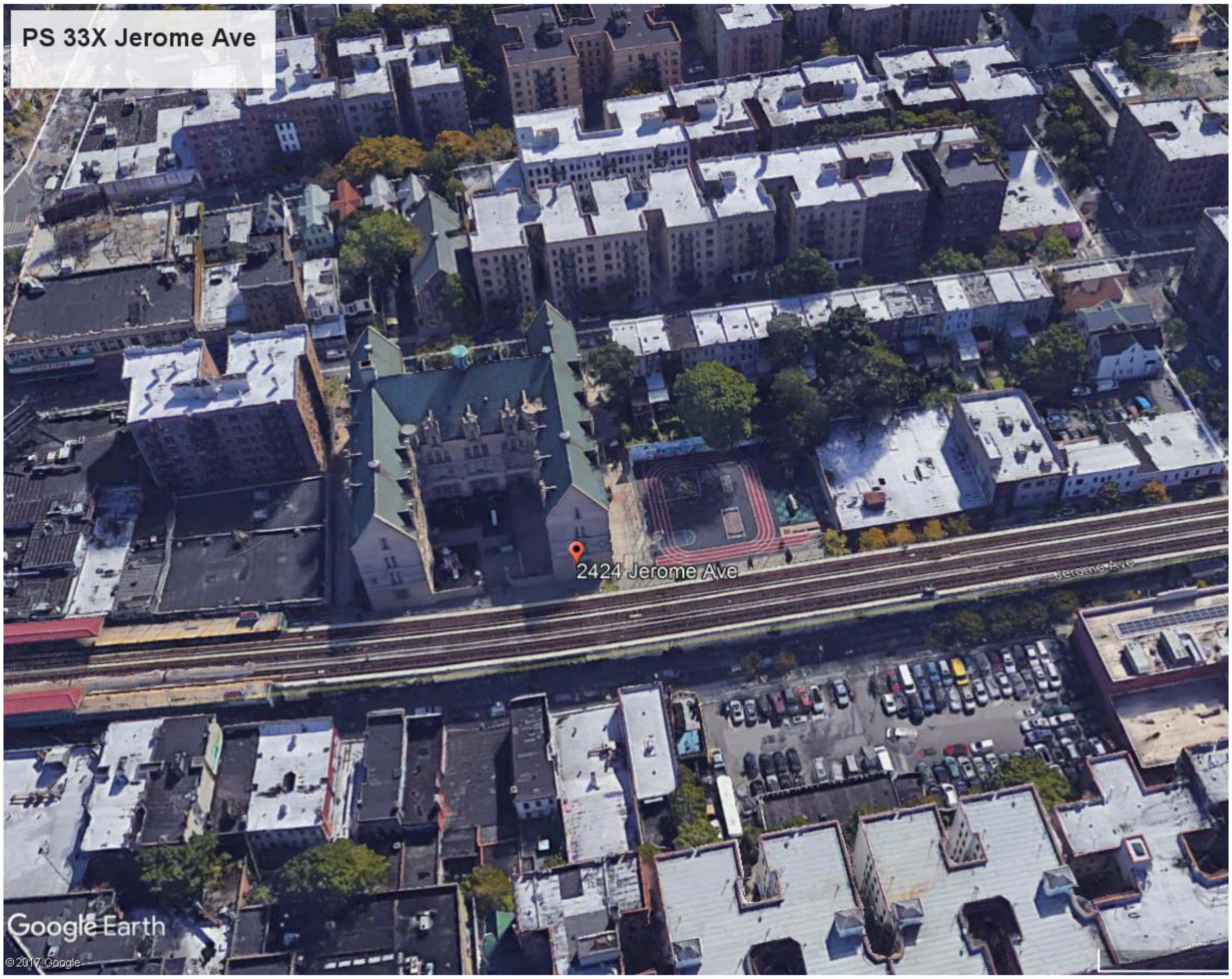
Due to the fact that the site area of disturbance that is contributory to a separate sewer system is expected to be less than one acre (**21,260sf including lot 8**), a NYS DEC SPDES General Permit (GP-0-15- 002) and preparation of a Storm Sewer Pollution Prevention Plan (SWPPP) is not anticipated to be required. However, as a Best Management Practice (BMP), a Soil Erosion and Sediment Control Plan shall be prepared and included in the Contract Documents.

This Soil Erosion and Sediment Control Plan will be created to satisfy the requirements of the SCA’s NYC Green School Guide. The plan typically involves notes, descriptions, and details of the necessary controls. We anticipate that dust control measures, silt fencing, storm drain inlet protection, protection of existing vegetation, and a gravel temporary construction entrance will be needed for this project. This Soil Erosion and Sediment Control Plan has been provided on drawing A043 **dated 9July2018 and A047 dated 9July2018** (see Appendix A) to satisfy the requirements of the SCA's NYC Green School Guide. The plan involves notes and descriptions of the necessary controls. Straw bale dike, storm drain inlet protection, and a temporary stabilized construction entrance is indicated for this project.

Applicable SCA Standard Specifications include:
S01352 Sustainability Requirements
S01900 Existing Premises Work
02200 Earthwork.
These specification sections included in 100% CD set dated 9July2018.

S1.2R Site Selection NARRATIVE AT SCHEMATIC SUBM.

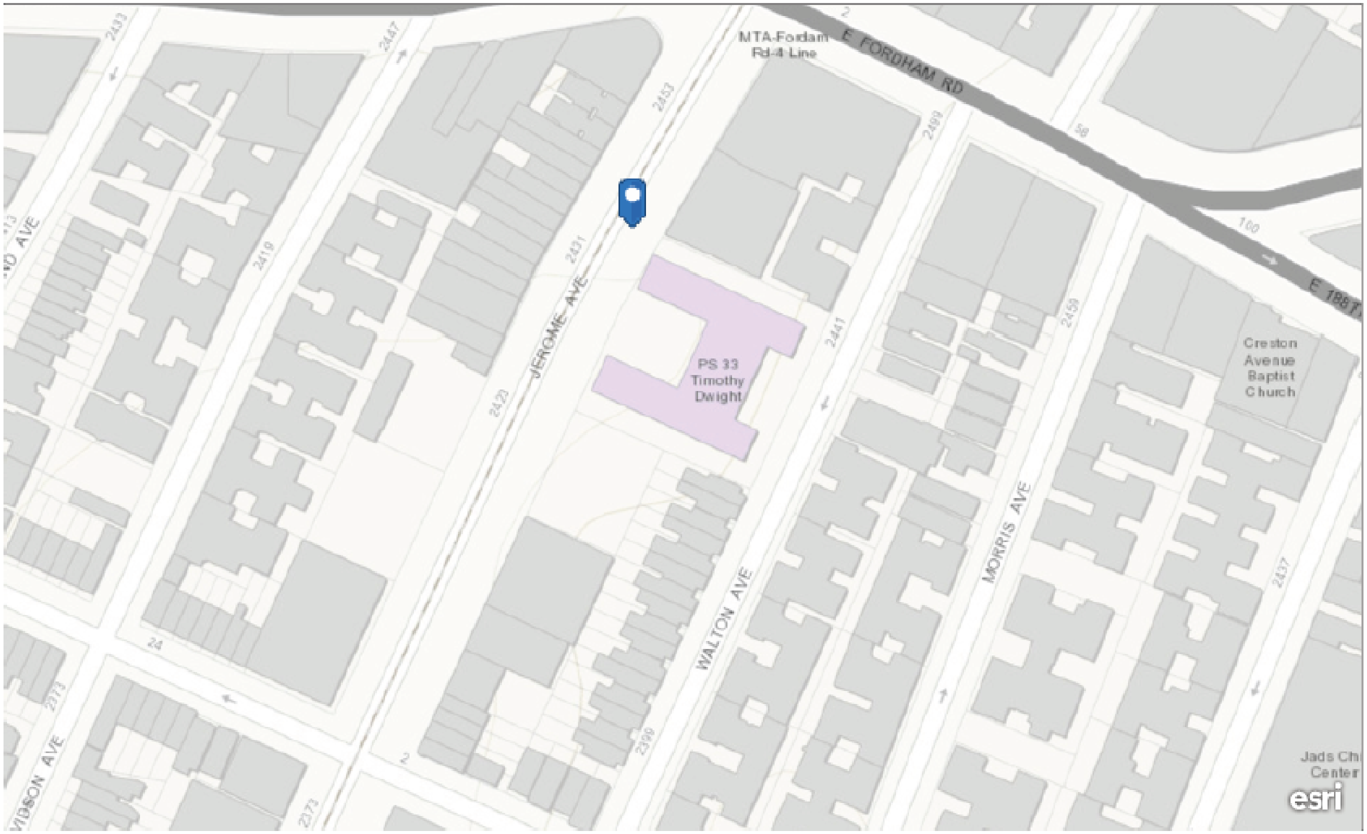
1. As can be seen in the Google Earth image below the project site was previously developed and thus meets the 1st requirement of this credit of previously undeveloped needing to be 5 ft above 100-yr flood.



2. The project site is Not identified as habitat for any species based on the following documents:

a. U.S. Department of the Interior, Fish and Wildlife Service map generated 13Apr2017 indicates there are no critical habitats within this project area.

Critical Habitat for Threatened & Endangered Species [USFWS]

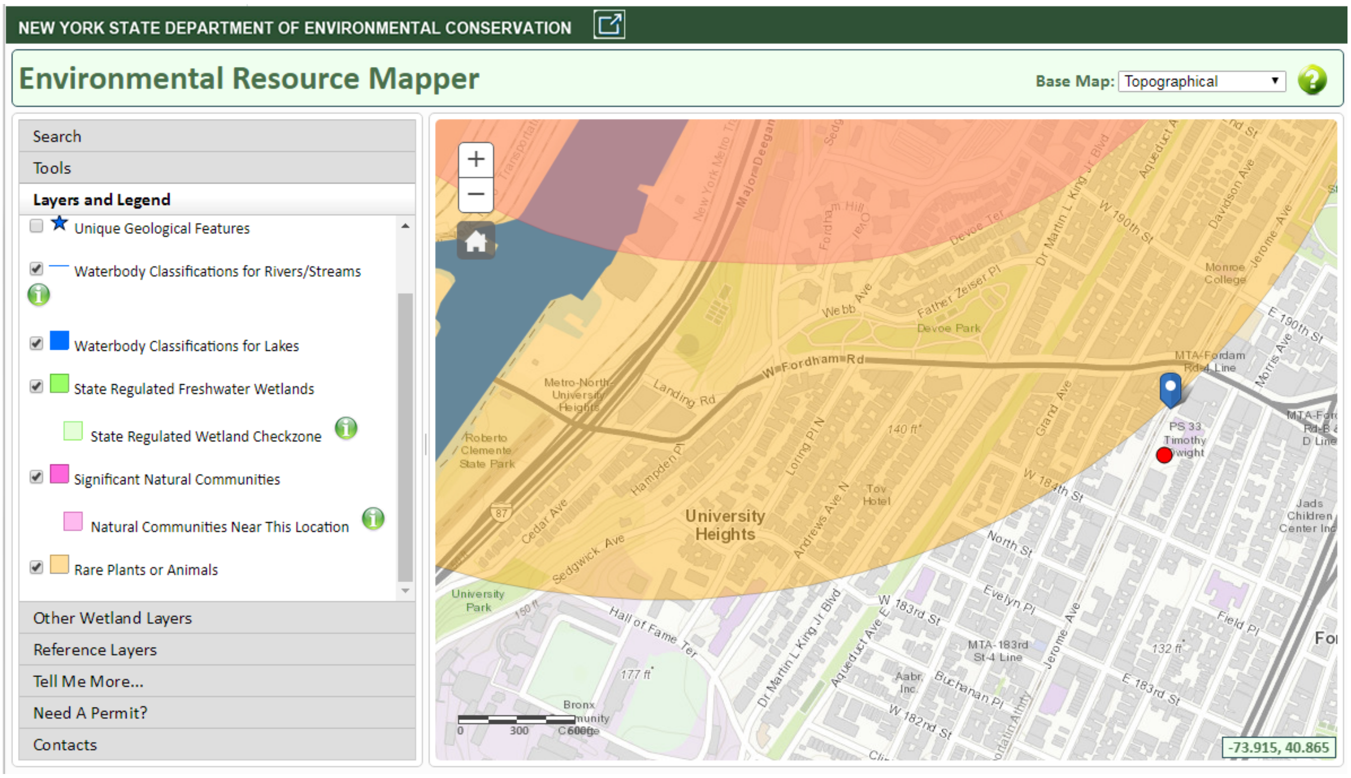


A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

U.S. Fish and Wildlife Service | NYC OpenData, State of New Jersey, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

b. New York Natural Heritage Program website indicates no plants or animals identified, thus references Environmental Resource Mapper in item #3 below.

3. The New York State DEC Environmental Resource Map below indicates the land is NOT within 50 feet of any wetlands.



4. The New York State DEC Environmental Resource Map above indicates the land is NOT within 100 feet of water body. In addition, the Google Earth image in S1.2R item #1 above indicates the project site was previously developed.

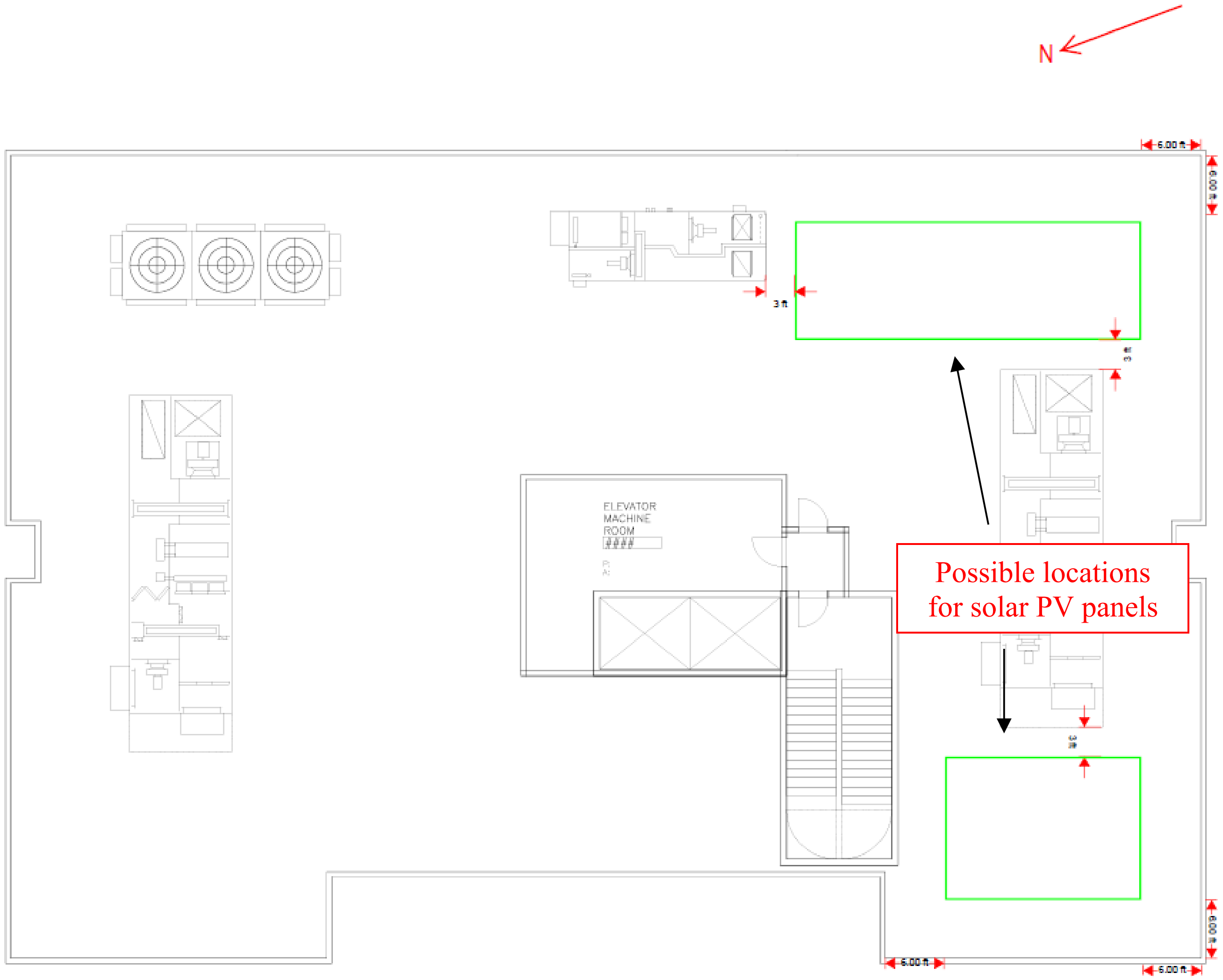
5. The project site is NOT public parkland as indicated in S1.2R item #1 above as per the included Google Earth image; the entire site consists of an existing public school.

S1.3R Sustainable Site & Building Layout .

Credit anticipated.

Credit Item #1: Identify viable locations on the roof(s) for potential renewable energy generation.

The design scheme has two areas on the South end of roof that has access to South sun and the potential for solar energy generation. The remainder of roof's southern exposure is blocked by mechanical equipment, building structure, and mechanical penthouses. If it is possible that the mechanical equipment on the Southeast portion of the roof move to a different location, the potential for solar power generation would increase significantly.



Possible locations for solar PV panels

Progress Plan 23Oct2017, little change in plans received 20&29Nov2017, or dated 11Dec2017.

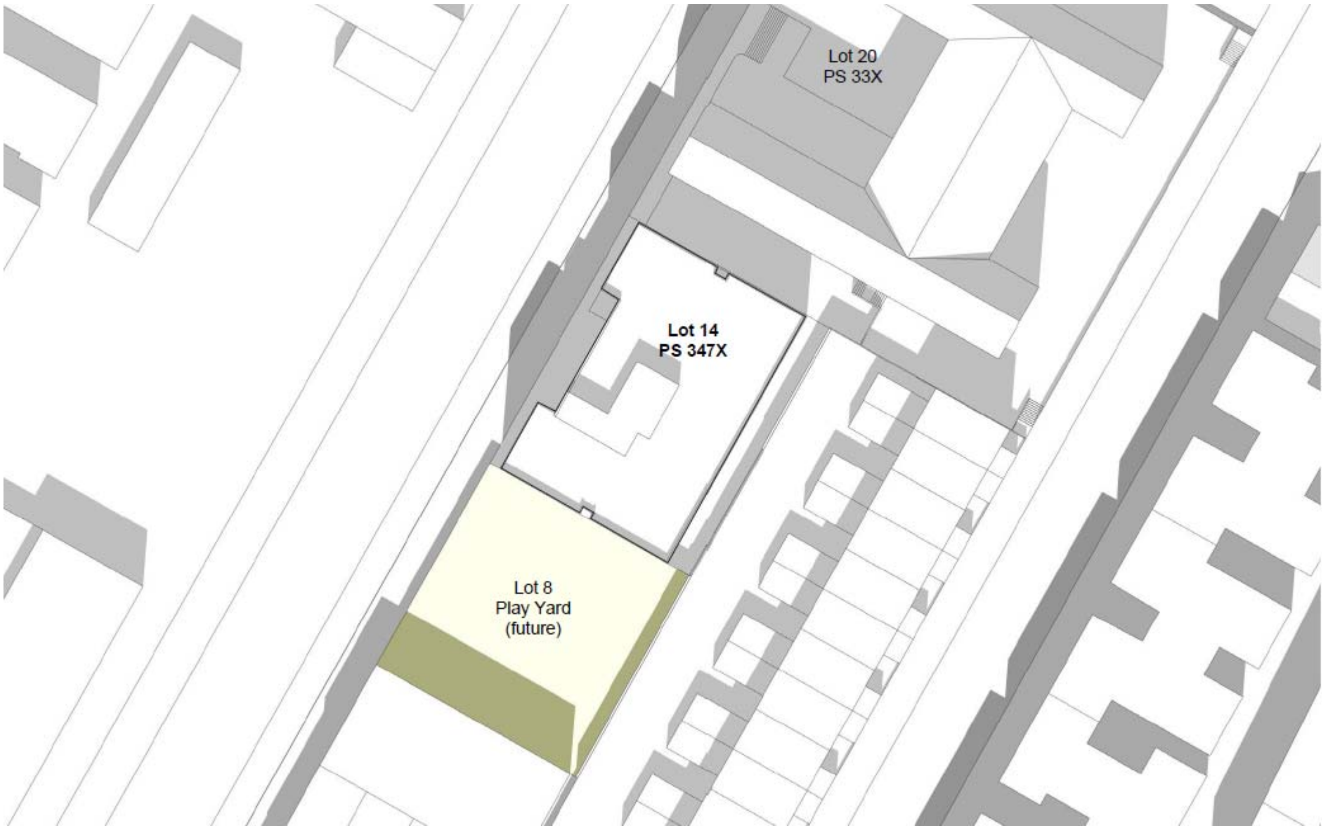
Credit Item #2: Plot shadow patterns from surrounding buildings onto project site to optimize access to daylight.

June 21st 9am

12pm

3pm

September 21st 9am


Lot 20
PS 33X
Lot 14
PS 347X
Lot 8
Play Yard
(future)

12pm


Lot 20
PS 33X
Lot 14
PS 347X
Lot 8
Play Yard
(future)

3pm

December 21st 9am

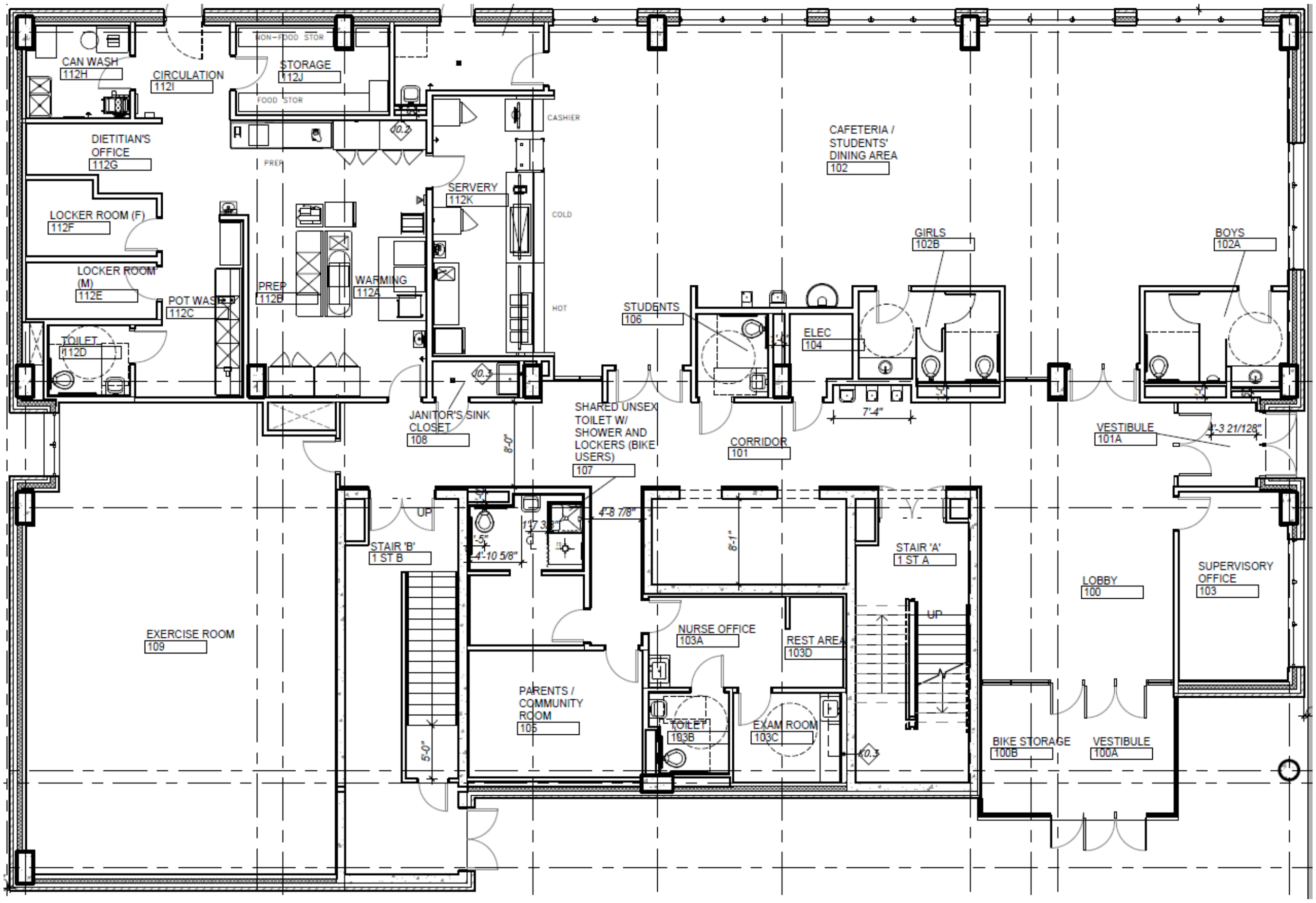
12pm

3pm

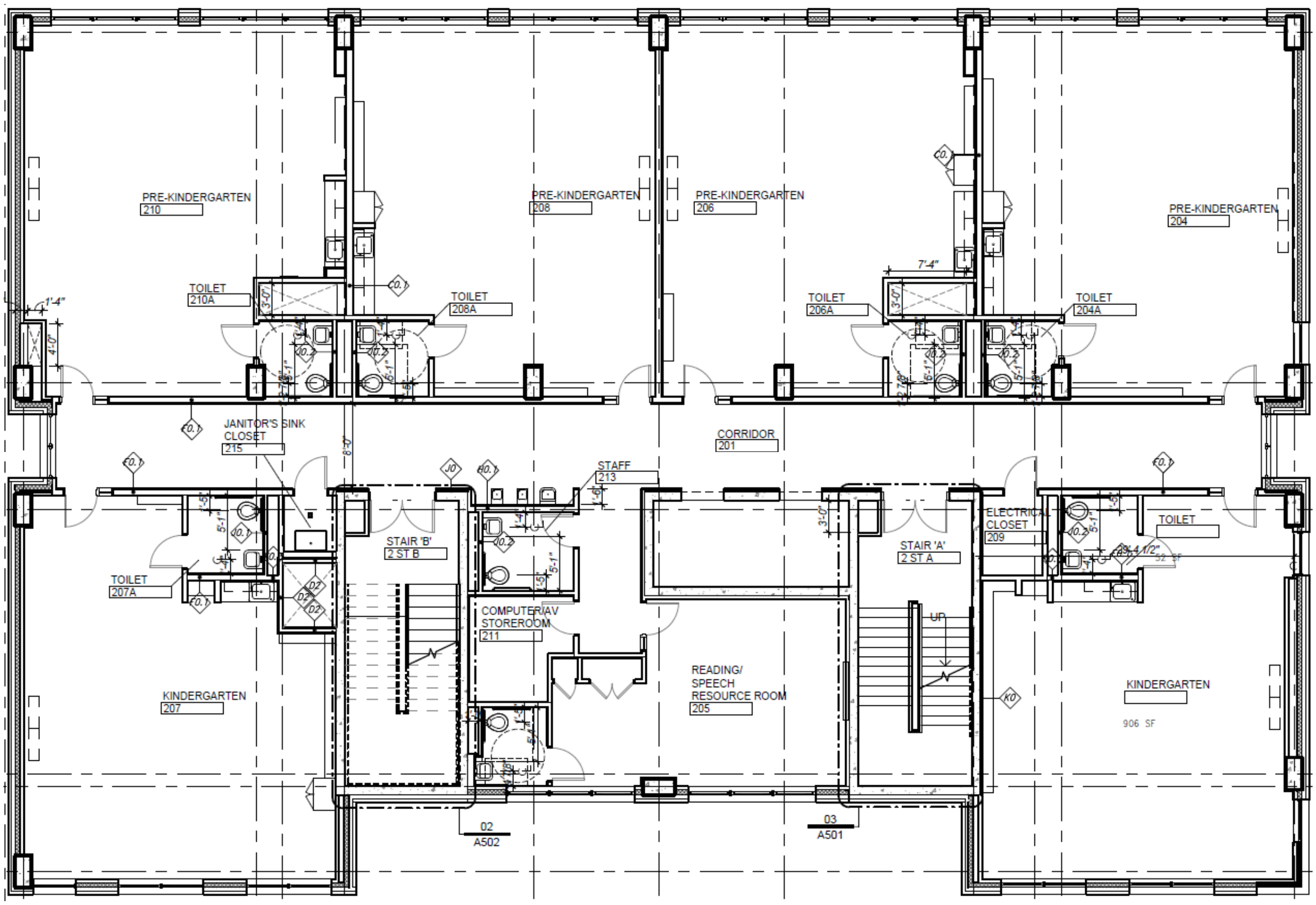
As can be seen from the above shadow plots the existing main school building does not shade the proposed addition. The neighboring 3-story buildings, along with the existing Southeast property line wall, to the Southeast will shade 1st and 2nd stories of the proposed building Southeast façade during the winter, spring, and fall in the morning.

Credit Item #3: Orient and compose the building to take advantage of natural daylighting.

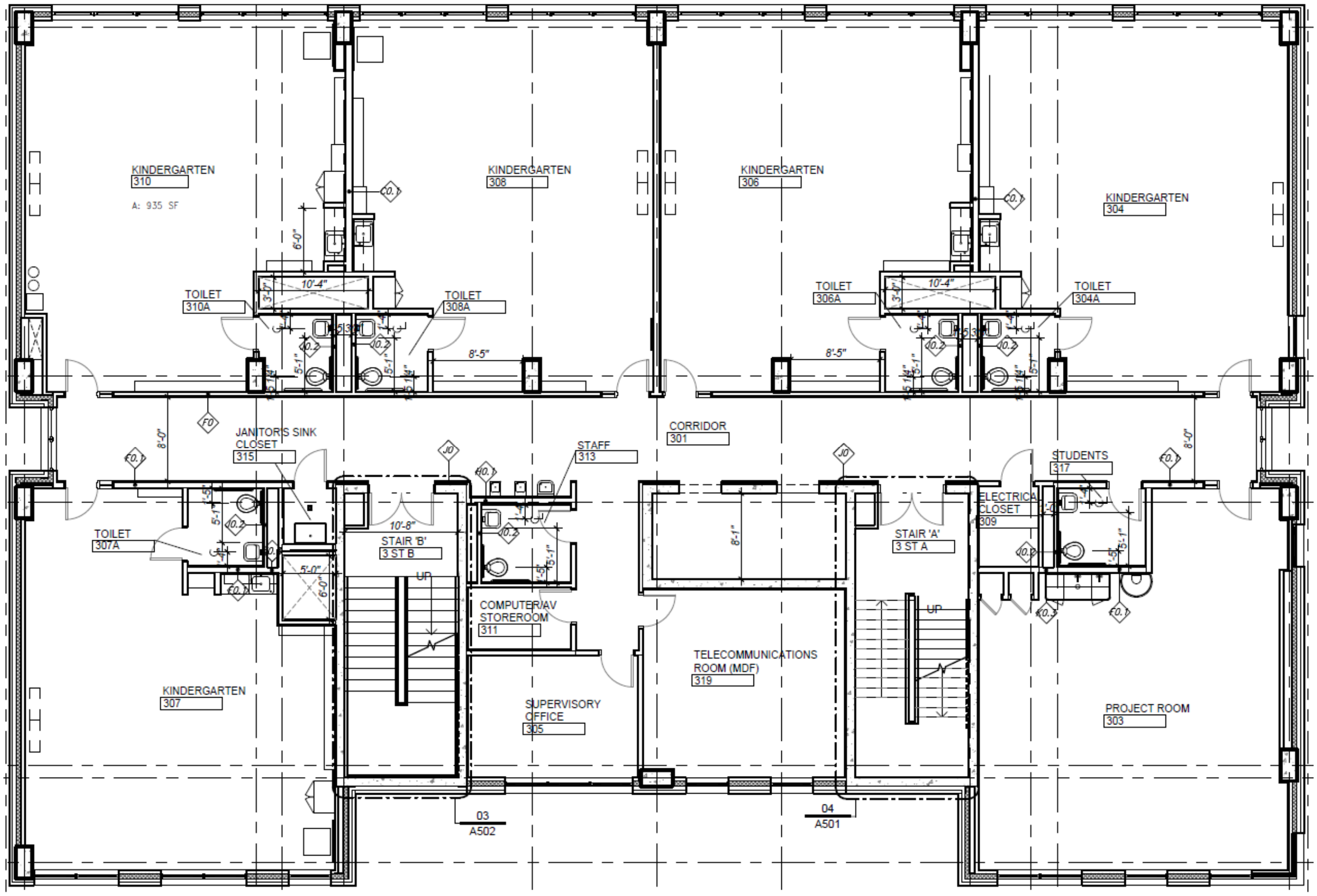
The design maximizes the daylight access to regularly occupied spaces through exterior windows.



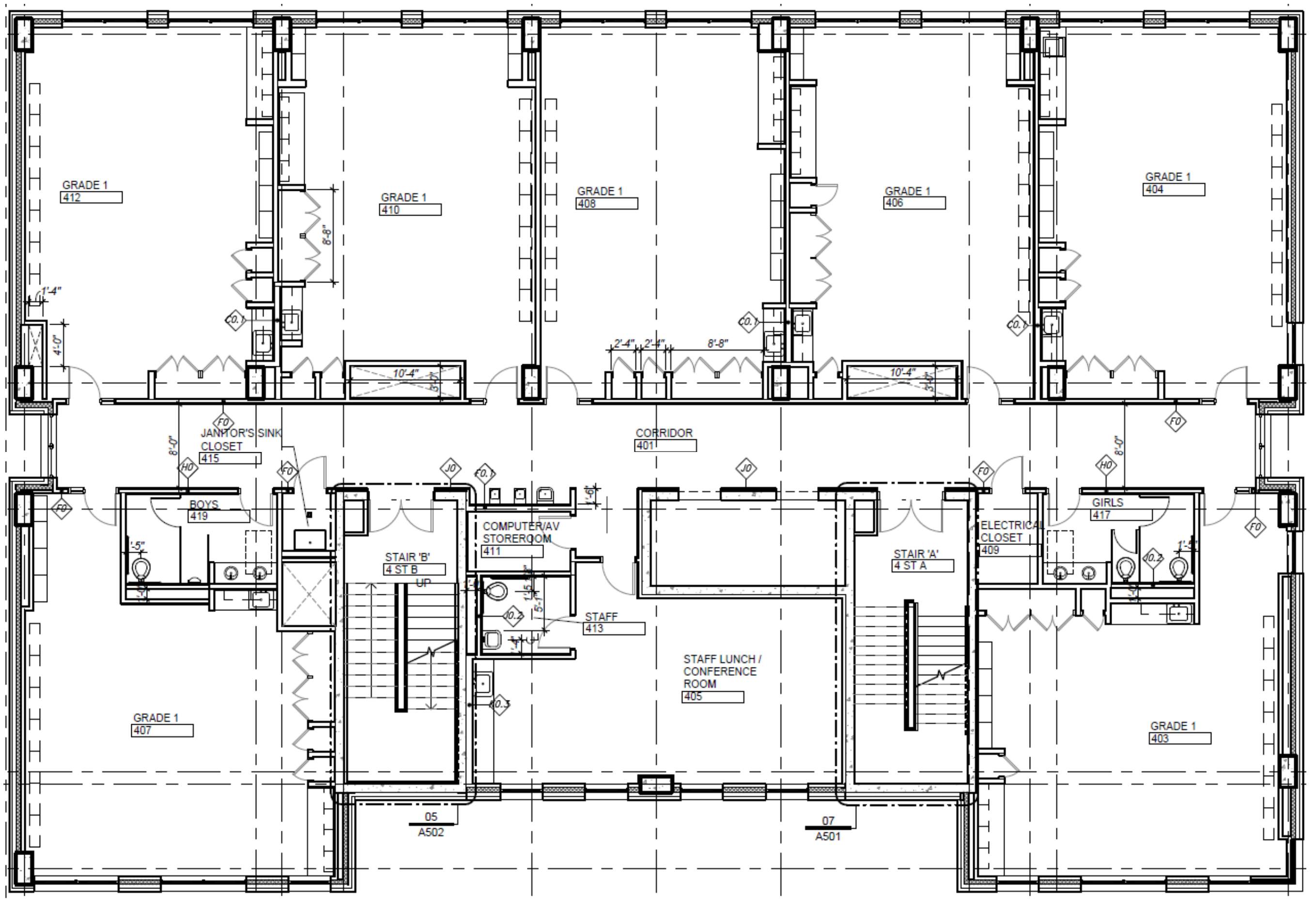
First Floor drawing dated 19Feb2018



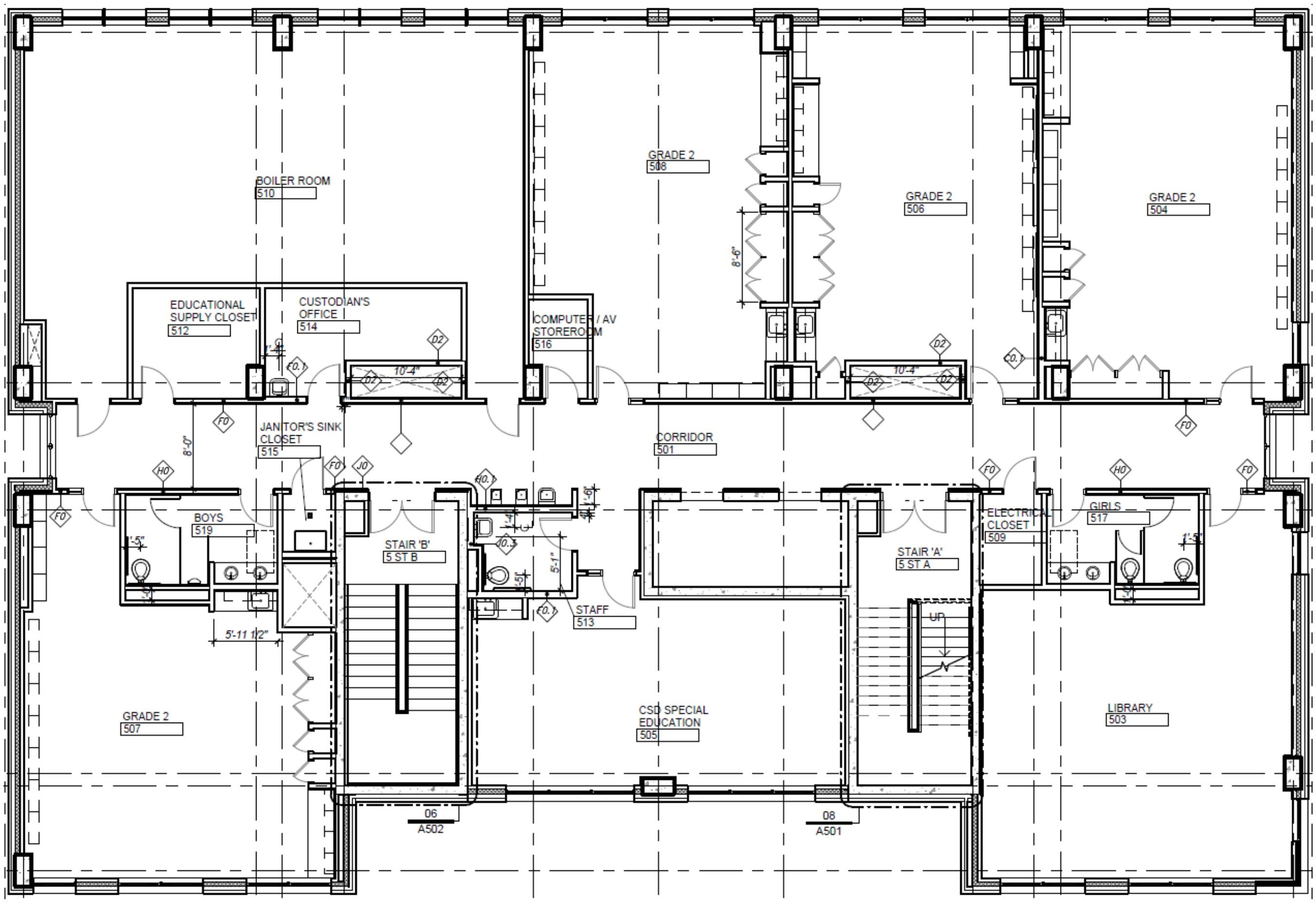
Second Floor drawing dated 19Feb2018



Third Floor drawing dated 19Feb2018



Fourth Floor drawing dated 19Feb2018



Fifth Floor drawing dated 19Feb2018

North South Section dated 11Dec2017, little change in section dated 19Feb2018

East West Section dated 11Dec2017, little change in section dated 19Feb2018

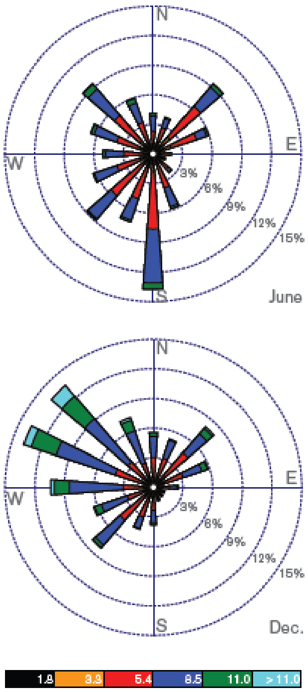
Credit Item #4: Plot shadow patterns from proposed building(s)/addition on adjacent properties and buildings and consider design options to address impact as necessary.

See above plotted shadow patterns for 9am, 12pm, and 3pm for June 21st, September 21st, and December 21st in credit Item #2 above.

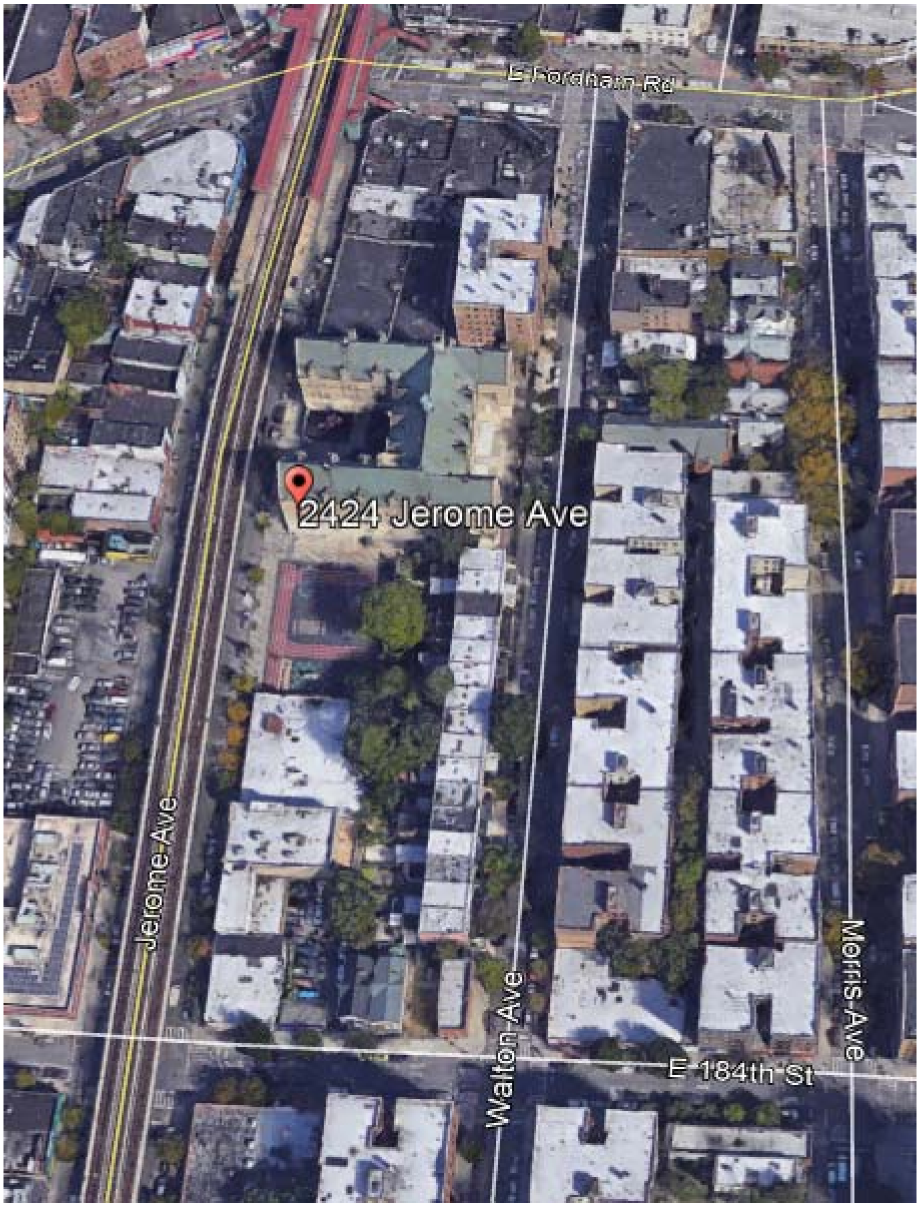
As can be seen from the above shadow plots the proposed addition will shade the Northwest façade of the existing main school building during the fall, winter, and spring with part of the first floor during the summer for the afternoon. The proposed addition shades the residential buildings to the East during the afternoons for most of the year.

Credit Item #5: The following is a windrose diagram for the site:

Windrose Data for New York City

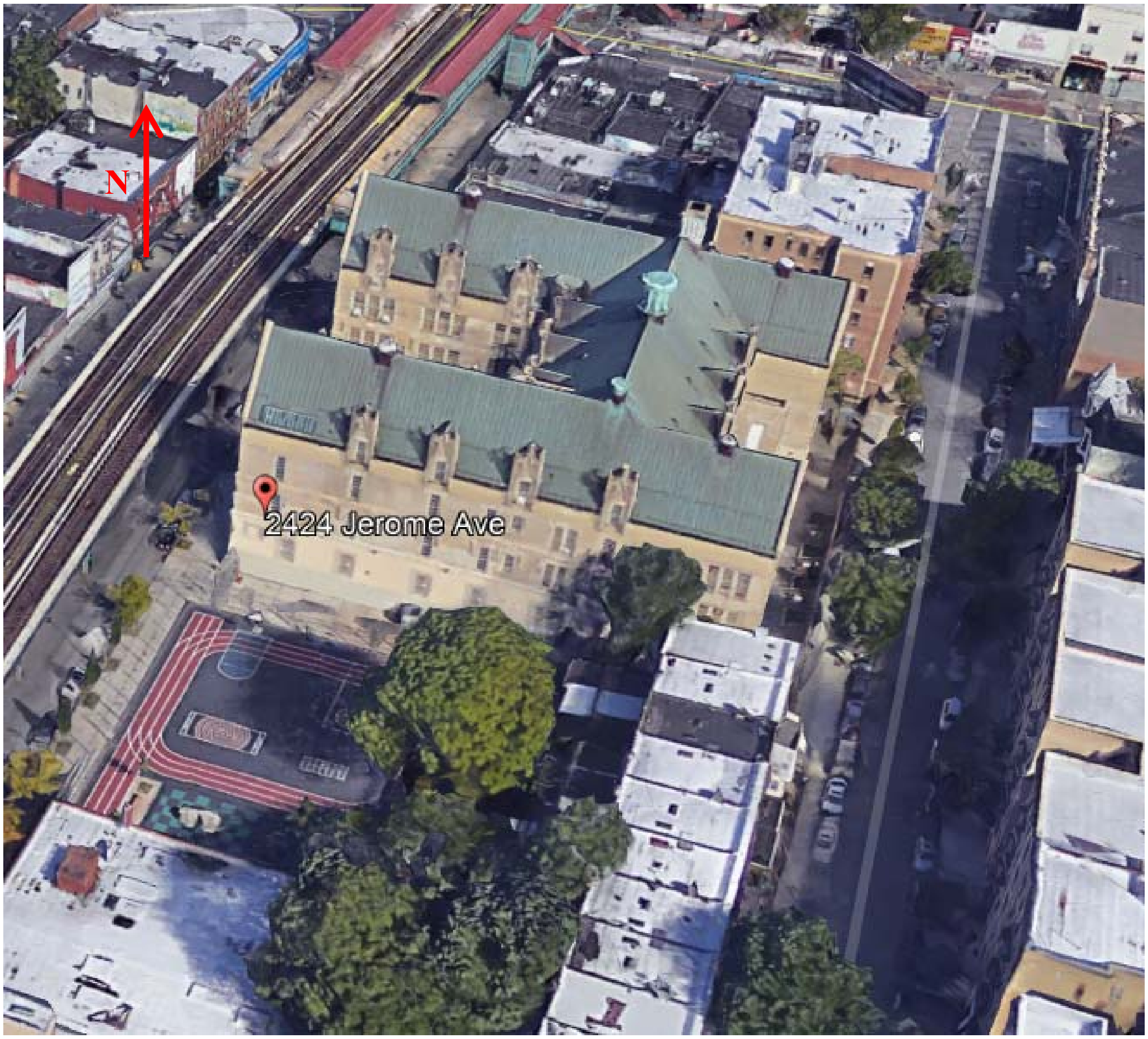


Wind velocity (m/s)
Source: USDA, National Resources Conservation Service 1961-1990



Operable windows on the South, West, and East facades will allow for natural ventilation of the spaces adjacent to these windows which include classroom and administration. The existing building will partially shelter the proposed addition from the prevailing Northwest winter winds.

Credit Item #6: Take advantage of existing adjacent building and natural land formations and vegetation to provide shelter from extreme weather or to deflect unwanted noise.

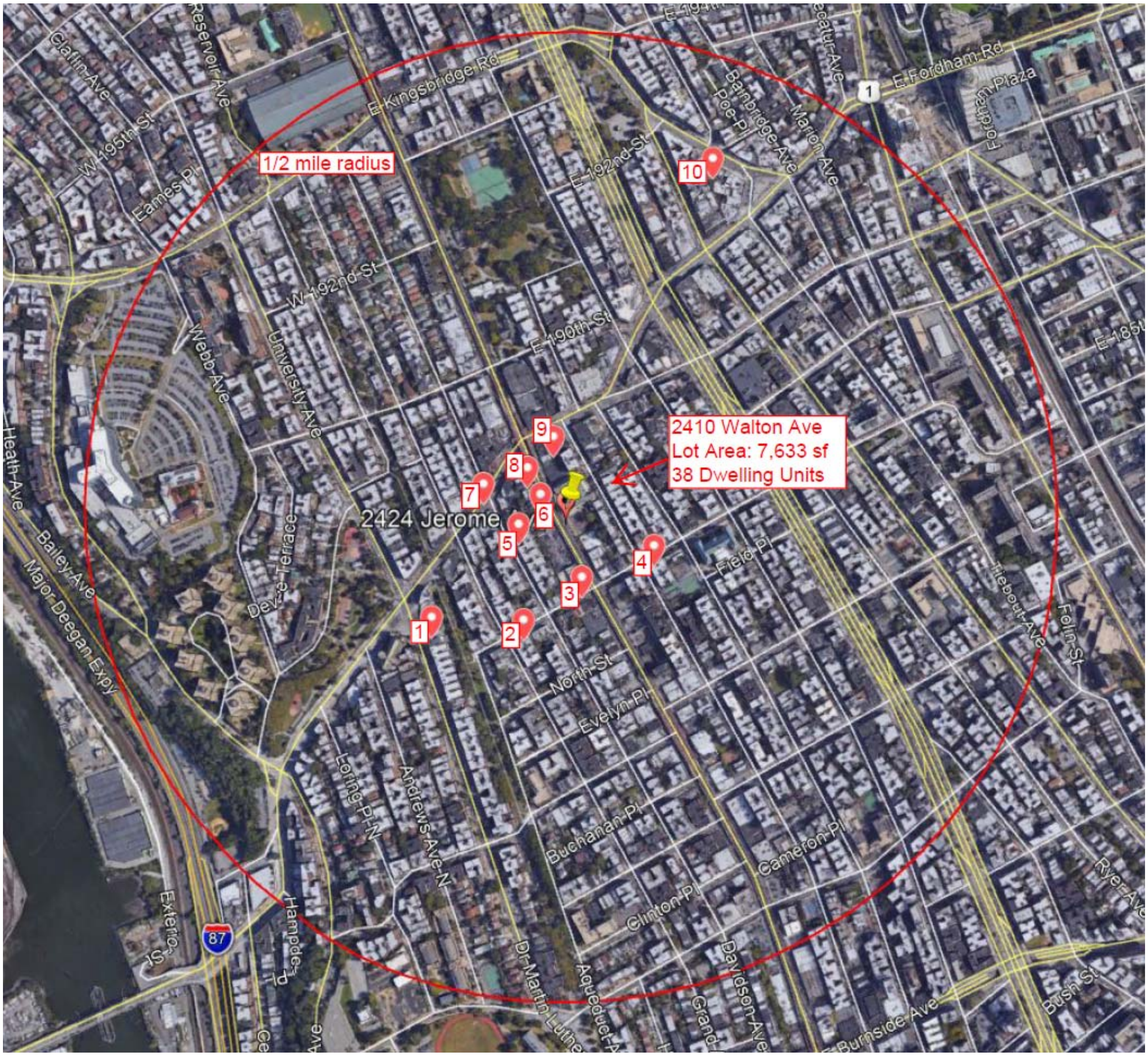


The existing school building to the will provide partial protection from the winter's Northwest winds to the building exterior; see 3-D Google Earth image above.

Credit Item #7: Landscaping mitigation: There are a small amount of existing deciduous trees to the West along Jerome Avenue which will provide some spring/summer/fall shading to the lower floors while allowing the warm sun in the winter (See 3-D Google Earth image above in Credit Item #6.

S1.4 Development Density & Community Connectivity NARRATIVE AT SCHEMATIC SUBM.
Credit anticipated.

The project easily complies with Option 1, Community Connectivity; as seen below in the Google Earth image and a copy of the Development Density & Community Connectivity Form. There is a 38-unit residential building on a 0.18 acre site at 2410 Walton Ave and many services within ½ mile of the project.



1/2 mile radius

2410 Walton Ave
Lot Area: 7,633 sf
38 Dwelling Units

DEVELOPMENT DENSITY & COMMUNITY CONNECTIVITY FORM

SCA **School Construction Authority**

Credit S1.4

NYC Green Schools Rating System

Project: P.S. 33X Bronx Annex
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW #: 107340
Design #:
Date: 23-Oct-17
Architect: Mitchell/Giurgola
Preparer: EME Group
Telephone: 212-529-5969

Fill in either Option 1 or Option 2

Option 1 - Community Connectivity (Submit site plan with basic service locations noted matching table numbering and separate plan verifying dwelling unites per acre)

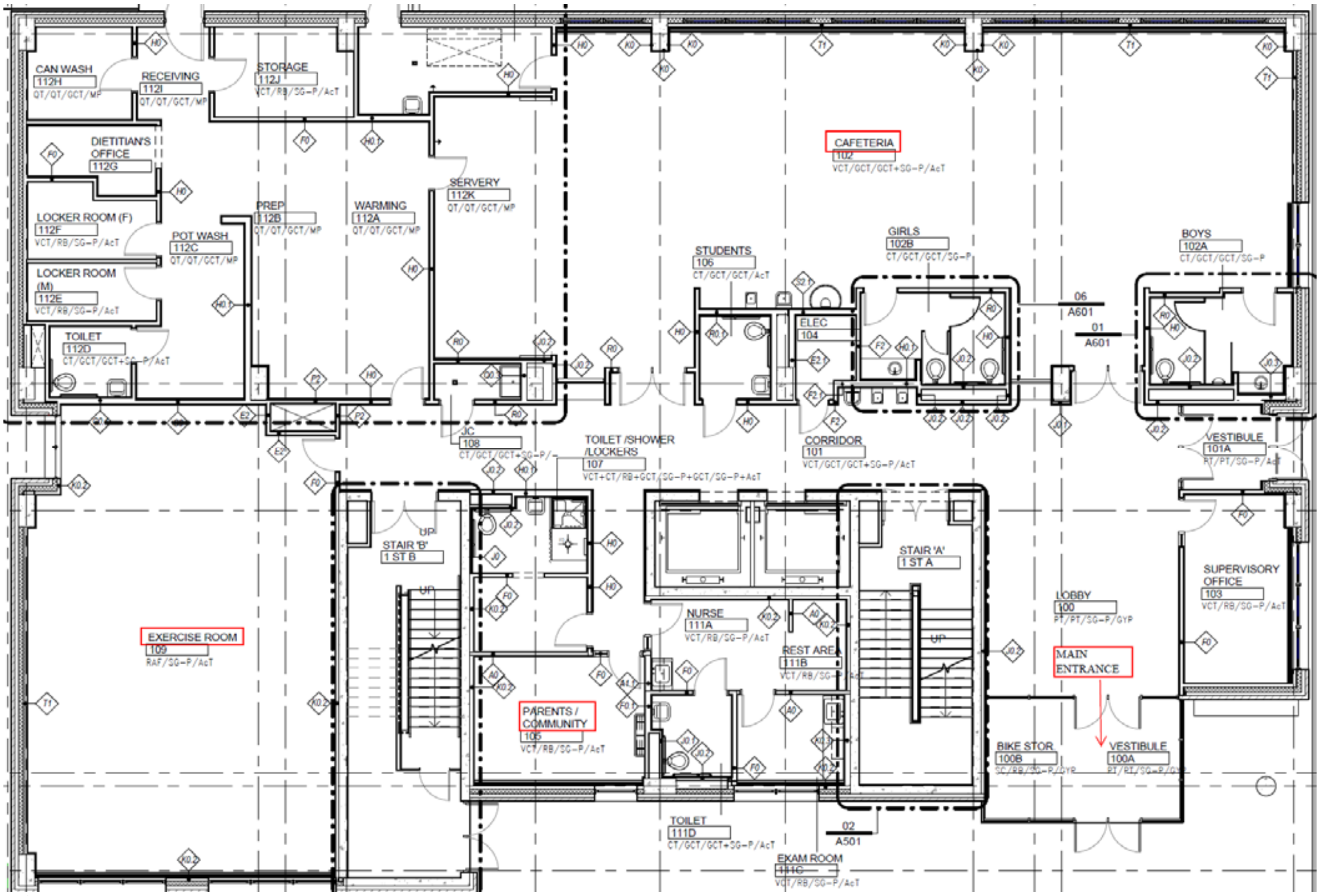
Plan Key Identification	**Business Name within 1/2 mile (2,640 feet) radius and accessible by pedestrian access**	**Service Type**
1	C-Town SuperMarkets	Grocery
2	Multicultural Music Group	Music Center
3	Ustin Hall Monroe College	College
4	Iglesia Estrella de Jacob	Place of Worship
5	Bronx Dental Center Inc	Dental Care
6	Diamonte Poblano Restaurant	Restaurant
7	Salon 25	Beauty Salon
8	Sammy's Fashion	Clothing Store
9	Forham Road Pharmacy	Pharmacy
10	Bronx Library Center	Library

S1.5R Joint Use of Facilities, Community Access

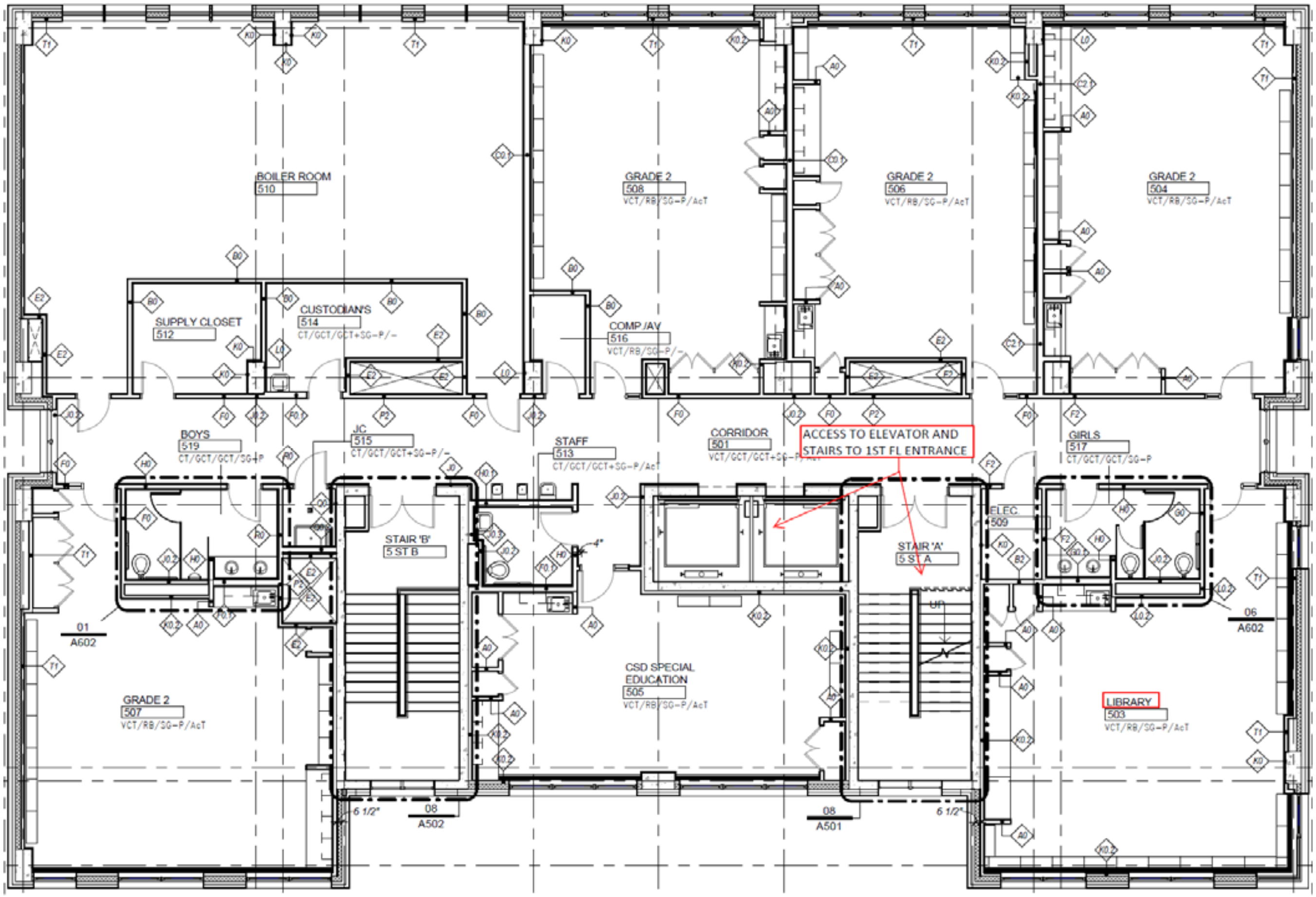
Credit anticipated.

The community will have access to the school for various public programs, performances, and events. The proposed designs allow for controlled access from the Jerome Avenue entrance to the 1st floor cafeteria, parents/community room, and exercise room. Additionally, members of the community may have access to the library on the fifth floor via the staircase and elevators located to the left of the main entrance door.

Applicable SCA design requirements that will be complied with include Cafeteria PK-8 and HS DR1.3.5.1, Entrances and Exits DR1.3.4.1, Vestibules and Lobbies DR1.3.4.2, Corridors 1.3.4.3, Interior Stairs DR1.3.4.4, and Elevators DR1.3.4.5.



1st Fl 60% Received 9Apr2018



5th Fl 60% Received 9Apr2018

S1.6P Site Assessment

Credit anticipated.

A Phase I Environmental Site Assessment (ESA) was performed by AKRF Engineering, PC on 26Jan2017. The Phase I ESA indicates the possible presence onsite of ACM materials and historical fill from historic building demolition, suspect LBP identified on painted surfaces and potential PCB-containing buried fill.

Please see the following Executive Summary from the Phase I ESA report lots 14 and 20:

1.0 EXECUTIVE SUMMARY

At the request of the Industrial and Environmental Hygiene (IEH) Division of the New York City School Construction Authority (NYCSCA), AKRF Engineering, P.C. (AKRF) conducted a Phase I Environmental Site Assessment (ESA) of the property located at 2400-2424 Jerome Avenue in the Bronx, New York 10468 (hereafter referred to as the "Site"). The Site property is located on Tax Block 3188 and consists of the Public School (P.S.) 33X building (Lot 20), play area (Lot 14) and the off-site P.S. 33X Annex (Lot 8). Due diligence was completed for Lot 8 in 2014 and the use of this lot has remained the same (school annex building), therefore this Phase I ESA only includes Lots 20 and 14.

The legal description of the Site is Block 3188, Lots 14 and 20. The approximately 12,300-square foot (SF) Lot 14 consists of a play area paved with a synthetic surface. The approximately 40,000-SF Lot 20 is developed with a four-story building with a partial basement on an approximately 10,000-SF footprint, and surrounding paved and landscaped areas. The building, constructed as a public school in 1900, serves as the Timothy Dwight Elementary School, also identified as P.S. 33X, for pre-kindergarten through 5th grade. A one-story building with a partial basement, south-adjacent to the Site (Block 3188, Lot 8), is occupied by the P.S. 33X Annex (not considered part of the Site for the purpose of this assessment). The Site is located in an area primarily characterized by commercial, residential, and institutional (educational) uses with some auto-related uses. The on-site play area and the Annex are being considered for the construction of a new addition to the existing P.S. 33X building by the NYCSCA.

The northern portion of the Site was historically vacant, and developed with the existing P.S. 33X building in 1900. Two additions were constructed on the eastern side of this building in 1928. The southern portion of the Site was historically vacant and developed with seven commercial buildings with backyards between 1900 and 1945. The commercial buildings were demolished between 1954 and 1962 and replaced by the existing play area.

The Site is bounded to the north by commercial and residential buildings; to the south by the P.S. 33X Annex, Lot 8 (not considered part of the Site for the purpose of this assessment); to the east by Walton Avenue, residential properties, and a church; and to the west by Jerome Avenue and elevated subway tracks, followed by residential and commercial properties, a construction site, and an auto repair shop.

AKRF previously conducted several studies of the Annex, Lot 8 [a Phase I ESA in January 2012, an Indoor Air Quality (IAQ) survey in September 2011, a Phase I ESA Update in July 2013, and a Subsurface (Phase II) Investigation in August 2014], and a Vapor Intrusion (VI) Assessment of the existing P.S. 33X building in August 2014.

The main objective of the Phase I ESA is to identify recognized environmental conditions (RECs) and environmental concerns that may affect the suitability of the Site for use as a school. RECs are defined in ASTM International (ASTM) Standard Practice E 1527-13 as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property. Note that controlled recognized environmental conditions (CRECs) are considered to be RECs and are listed in the Executive Summary and Conclusions of this Phase I ESA. Additionally, vapor encroachment conditions (VECs) were evaluated as per ASTM E 2600-10.

Other environmental issues and conditions that, in the opinion of the *environmental professional* conducting the assessment, would not be considered *RECs* are identified in this assessment. These may include *historical RECs and/*or *de minimis conditions*. The Phase I ESA also includes a preliminary evaluation of specific potential environmental issues or conditions that are, according to ASTM E 1527-13, considered non-scope considerations. These issues include radon, asbestos-containing material (ACM), polychlorinated biphenyl (PCB) - containing light ballasts and caulking materials, exterior lead-based paint (LBP), chemical storage, wetlands, regulatory compliance issues, dry cleaner and other industrial emissions, mold, biological agents, electromagnetic fields, and methane. The Phase I ESA included a review of federal, state, and local records, and historical documents; visual observation of the Site and adjoining properties; and interviews with selected Site representatives.

The assessment requested by the NYCSCA is intended to identify conditions that would have the potential to impact the value of the Site or the development and use of the Site as a public school facility. The assessment was also conducted for purposes of environmental due diligence in order to qualify for the innocent landowner, a bona fide prospective purchaser or a contiguous property owner defense under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Phase I ESA included evaluation of the following: current and historical Site usage; current and historical usage of adjoining properties; regulatory agency records review; on-site solid waste management and disposal practices; on-site hazardous materials and petroleum products management; chemical storage, ACM, PCBs and exterior LBP management; wetlands; regulatory compliance issues; dry cleaner and other industrial emissions; radon; mold and moisture intrusion; biological agents; electromagnetic fields; and potential for methane-generating materials.

AKRF has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E 1527-13 and the requirements of NYCSCA. Any additions to, exceptions to, or deletions from this practice are described in Section 2.0 of this report.

This Phase I ESA has revealed the following RECs, CRECs, and/or VECs associated with the Site:

Summary of RECs, CRECs, VECs, and Environmental Concerns

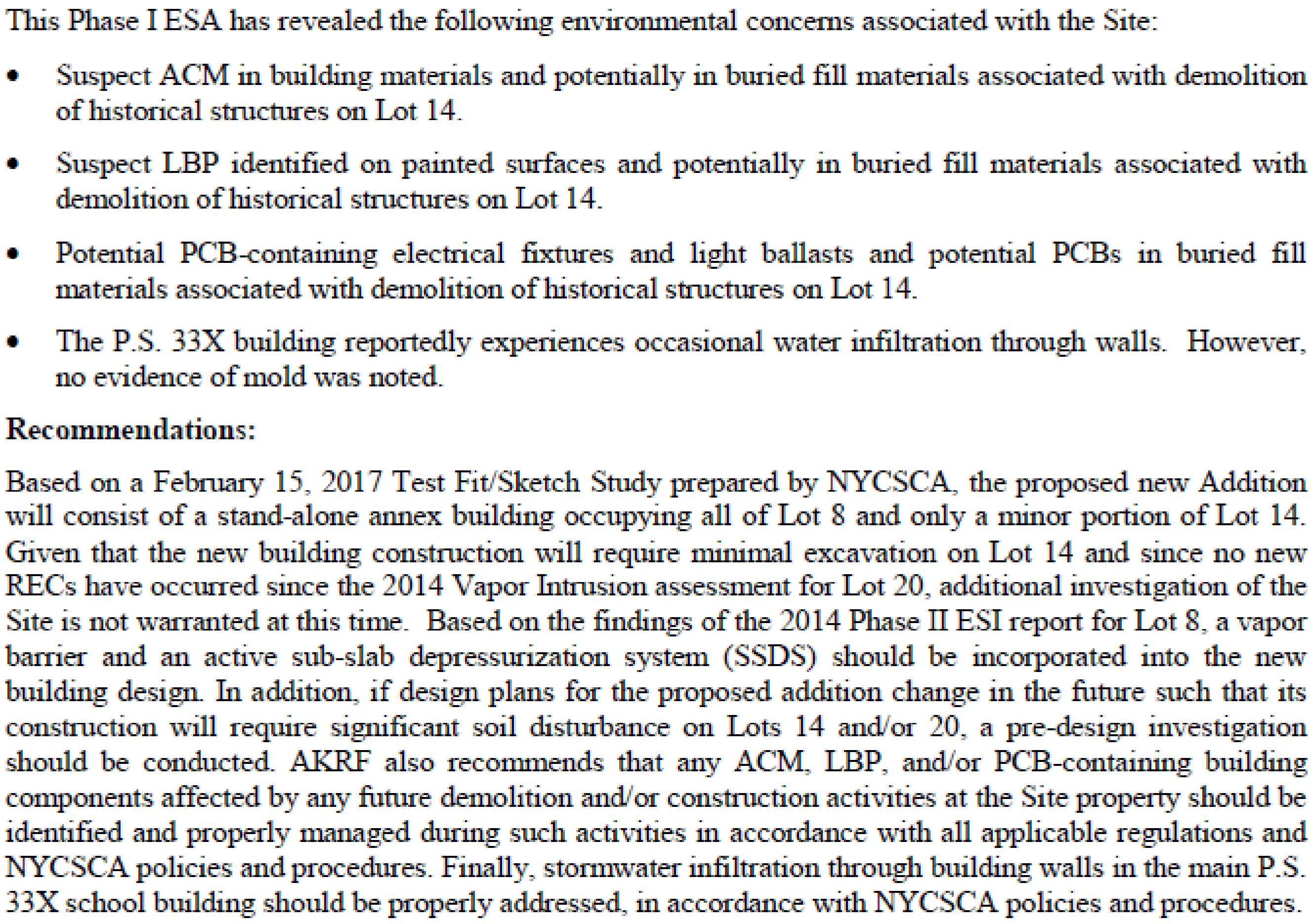
On-Site RECs/CRECs/VECs:

- A Vapor Intrusion (VI) assessment of the original school building was conducted by AKRF in 2014, following the detection of elevated volatile organic compounds (VOCs) in sub-slab at the PS 33X Annex. VOCs associated with chlorinated solvents (TCE and PCE) were detected above their respective New York State Department of Health (NYSDOH) Air Guideline Values (AGVs) in one sub-slab vapor and one soil vapor sample. However, TCE and PCE concentrations were below their corresponding AGVs and published background levels in all indoor air samples collected in both the building basement and slab-on-grade areas, and indicated no evidence of vapor intrusion into the original P.S. 33X building.
- Historic fill material of unknown origin and potential buried debris associated with the demolition of historical buildings on Lot 14, which could include possible underground storage tanks (USTs).
- The original P.S. 33X school building on Lot 20 was associated with Spill No. 9300750, reported at the Site in April 1993, and closed by the New York State Department of Environmental Conservation (NYSDEC) in August 2008. The listing indicated that the spill involved No. 2 fuel oil floating on top of the groundwater table, which was discovered during an excavation at the school. The source of the spill was associated with a leaking 275-gallon aboveground storage tank (AST) at an adjacent building (2413 Walton Avenue). Remedial activities included the replacement of the leaking AST, and removal of contaminated soil and groundwater.

- Historically, Lot 14 was developed with commercial buildings between 1927 and 1956 which included a possible painter or printer, plumbing and heating supply, a sign shop, a laundry (potential dry cleaner), a vacuum cleaner service, an electrical appliance business and a sign manufacturer. This lot is situated between the two previously investigated Lots 8 and 20.

Off-Site RECs/CRECs/VECs:

- The south-adjacent PS 33X Annex site historically contained a sign shop and a potential watchmaker or repair shop. A 2014 subsurface investigation and vapor intrusion assessment conducted by AKRF identified VOCs associated with chlorinated solvents and petroleum at concentrations above NYSDOH AGVs and/or the range of anticipated background concentrations in several sub-slab vapor samples. However, all VOC concentrations in indoor air were below the AGVs and vapor intrusion was not a concern.
- Historical uses of the Site block and adjacent blocks included manufacturing, appliance repair, dry cleaning/dyeing, auto-related uses (auto repair, filling station), paint shops, printers, and an exterminator. The regulatory database identified one Brownfield Cleanup site, six Spills sites, nine PBS sites, five RCRA hazardous waste generator sites, two registered drycleaners, as well as multiple historical dry cleaners and auto station in close proximity to the Site.



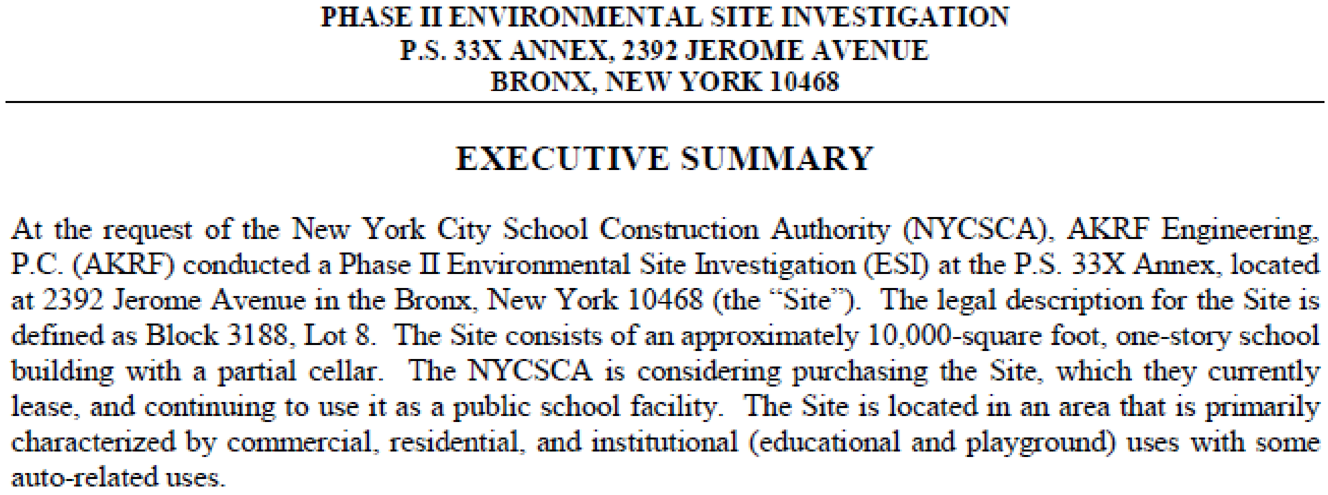
This Phase I ESA has revealed the following environmental concerns associated with the Site:

- Suspect ACM in building materials and potentially in buried fill materials associated with demolition of historical structures on Lot 14.
- Suspect LBP identified on painted surfaces and potentially in buried fill materials associated with demolition of historical structures on Lot 14.
- Potential PCB-containing electrical fixtures and light ballasts and potential PCBs in buried fill materials associated with demolition of historical structures on Lot 14.
- The P.S. 33X building reportedly experiences occasional water infiltration through walls. However, no evidence of mold was noted.

Recommendations:

Based on a February 15, 2017 Test Fit/Sketch Study prepared by NYCSCA, the proposed new Addition will consist of a stand-alone annex building occupying all of Lot 8 and only a minor portion of Lot 14. Given that the new building construction will require minimal excavation on Lot 14 and since no new RECs have occurred since the 2014 Vapor Intrusion assessment for Lot 20, additional investigation of the Site is not warranted at this time. Based on the findings of the 2014 Phase II ESI report for Lot 8, a vapor barrier and an active sub-slab depressurization system (SSDS) should be incorporated into the new building design. In addition, if design plans for the proposed addition change in the future such that its construction will require significant soil disturbance on Lots 14 and/or 20, a pre-design investigation should be conducted. AKRF also recommends that any ACM, LBP, and/or PCB-containing building components affected by any future demolition and/or construction activities at the Site property should be identified and properly managed during such activities in accordance with all applicable regulations and NYCSCA policies and procedures. Finally, stormwater infiltration through building walls in the main P.S. 33X school building should be properly addressed, in accordance with NYCSCA policies and procedures.

Please see the following Executive Summary from the Phase II ESA report for Lot 8 which is assumed to be same conditions at Lot 14:



PHASE II ENVIRONMENTAL SITE INVESTIGATION
P.S. 33X ANNEX, 2392 JEROME AVENUE
BRONX, NEW YORK 10468

EXECUTIVE SUMMARY

At the request of the New York City School Construction Authority (NYCSCA), AKRF Engineering, P.C. (AKRF) conducted a Phase II Environmental Site Investigation (ESI) at the P.S. 33X Annex, located at 2392 Jerome Avenue in the Bronx, New York 10468 (the "Site"). The legal description for the Site is defined as Block 3188, Lot 8. The Site consists of an approximately 10,000-square foot, one-story school building with a partial cellar. The NYCSCA is considering purchasing the Site, which they currently lease, and continuing to use it as a public school facility. The Site is located in an area that is primarily characterized by commercial, residential, and institutional (educational and playground) uses with some auto-related uses.

AKRF completed an Indoor Air Quality Survey for the Site on September 2011, a Phase I Environmental Site Assessment (ESA) in January 2012, and a Site Inspection and Regulatory Database Review in July 2013. The Indoor Air Quality Survey indicated that no volatile organic compounds (VOCs) were detected at concentrations above the range of anticipated background indoor air levels or comparison criteria. On-Site Recognized Environmental Conditions (RECs)/Vapor Encroachment Conditions (VECs) identified by the Phase I ESA included: historical site use as a sign manufacturer and potential buried structures from historical on-Site buildings that may contain underground storage tanks and/or historic fill of unknown origin. Off-Site RECs identified included: closed spills and a Petroleum Bulk Storage (PBS) listing at P.S. 33X north-northeast of the Site; a filling station with Resource Conservation and Recovery Act (RCRA), PBS and active spills listings; current and historical automotive-related facilities (auto repair shops, a car wash, and a filling station) with closed spills, PBS and/or RCRA listings; and sites with historical uses including an exterminator, known and suspected dry cleaners, paint and sign shops, printers, possible electric companies, and various manufacturers. The Site Inspection and Regulatory Agency Database Review did not identify any new RECs that were not present at the time of the January 2012 Phase I ESA.

The purpose of the Phase II ESI was to determine whether the RECs/VECs identified in the Phase I ESA Report have affected the suitability of the Site for acquisition and potential redevelopment by the NYCSCA. Initial Phase II ESI field activities were performed on June 17 and 21, 2014 and consisted of a geophysical survey and the completion of five soil borings, two temporary monitoring wells, and four sub-slab vapor sampling points. A total of five soil samples, two groundwater samples, and four sub-slab vapor samples were collected for laboratory analysis. Supplemental Phase II ESI activities were conducted on July 31, 2014, and consisted of a Vapor Intrusion (VI) Assessment, including a building inspection and a chemical inventory, and the collection and laboratory analysis of five (5) sub-slab vapor samples and five co-located indoor air samples from the annex building and one (1) ambient air sample from the adjacent play yard.

Based on the results of the Phase II ESI, AKRF concludes the following:

- Fill material, consisting of sand with silt, gravel, concrete, and asphalt, was observed to depths of approximately 3 to 5 feet below ground surface (bgs) in three of the soil borings. Apparent native material, consisting sand, silt, and gravel, was observed below the fill. Weathered bedrock was encountered between 1.5 and 15 feet below grade.
- Volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) were detected in select soil samples at concentrations below New York State Department of Environmental Conservation (NYSDEC) Soil Cleanup Objectives (SCOs) for Unrestricted Use and CP-51 Supplemental SCOs. No detectable concentrations of polychlorinated biphenyls (PCBs) or gasoline-range total petroleum hydrocarbons (GRO-TPH) were present in the soil samples. Diesel range (DRO) TPH was present in each of the soil samples; however, there are no SCOs for TPH and the concentrations are not anticipated to impact potential soil disposal options.
- Pesticides (4,4-DDT and 4,4-DDE) and metals (chromium, lead, and zinc) were detected in select soil samples at concentrations exceeding the NYSDEC Unrestricted Use SCOs. The detections were not indicative of an on-Site release but are attributable to historic fill material.

- Tetrachloroethene (PCE), trichloroethene (TCE), and petroleum-related compounds were detected in sub-slab vapor samples at concentrations above the New York State Department of Health (NYSDOH) Air Guideline Values (AGVs) and/or the range of anticipated background concentrations during initial sampling on June 21, 2014. Results from subsequent Vapor Intrusion Assessment on July 31, 2014 indicated that PCE and TCE were detected at concentrations below the AGVs, and petroleum-related compounds were detected at concentrations slightly above the anticipated range of background concentrations in sub-slab vapor. All the VOC concentrations in both sub-slab vapor and indoor air were below the AGVs and below levels that would warrant further monitoring or mitigation.

Based on these results, AKRF concludes that the Site is suitable for continued use as a public school facility in its current condition. If the on-Site building is substantially modified or demolished and replaced with a new building, AKRF recommends the following measures to make the Site suitable for use as a public school facility:

- If the on-Site building is replaced, consistent with NYCSCA standard practice, a soil vapor barrier should be incorporated into the new building design as a safeguard to prevent potential VOCs in soil vapor from entering the new school building. If substantial modifications are made to the existing building slab, consideration should be given to installing a sub-slab sheet membrane vapor barrier or a topically-applied vapor barrier (e.g., Aquafin).
- Water infiltration noted in the building basement during the July 2013 Site Inspection and Regulatory Agency Database Review should be properly addressed to prevent potential mold growth.
- All material excavated during construction activities should be properly characterized prior to transportation to an off-Site disposal facility. Results from the limited waste characterization sampling conducted during this investigation should not be used in lieu of data from a full Site characterization. Based on the results of the Phase II ESI, it is anticipated that material excavated from the Site would require handling as non-hazardous excavated material.
- Fill material should be evaluated for the presence of asbestos-containing materials (ACM). In addition, any suspect ACM, lead based paint (LBP) and polychlorinated biphenyl (PCB)-containing materials affected by the proposed demolition or construction work should be identified prior to and properly managed during construction activities.
- Any dewatering required during construction should be minimized to mitigate influx of potentially contaminated water from off-Site sources toward the Site. Treatment to remove sediment and other potential contaminants from dewatering effluent may be required prior to discharge to the municipal sewer. The contract specifications should include requirements that the Contractor procure all appropriate permits and conduct any pre-treatment required to meet applicable sewer effluent limitations for discharge of the dewatering fluids.
- If exposed soil (landscaped areas) is incorporated into redevelopment plans for the Site, a minimum of two feet of environmentally clean fill should be placed over existing soil in these areas.

At the time of issuing this report no hazardous material remediation is expected to be needed.

A soil vapor barrier and sub-slab depressurization system will be integrated into the new building design as per drawings H201-H208 dated 9July2018. The project team has incorporated the specification Sections 02200, Earthwork, 02220 Gas Vapor Barrier (Fluid Applied), 02221 Sub-slab Depressurization System, and 15880 Sub-slab Depressurization System Accessories into the construction documents dated 9July2018.

S1.7 Brownfield Redevelopment

Credit is not feasible.

See S1.6P above for the contamination status narrative and executive summary of the Phase I Environmental Site Assessment Report.

The site has not been defined as a Brownfield by a New York City, New York State, or federal government agency. The Phase I Environmental Site Assessment Report indicated that the databases and/or documentation of the following were evaluated:

- United States Environmental Protection Agency (USEPA)
- New York State Department of Environmental Conservation (NYSDEC)
- National Priorities Listing (NPL)
- Delisted NPL Site List
- Superfund Enterprise Management System (SEMS)
- Resource Conservation and Recovery Information System - Treatment, Storage, or Disposal Facilities (RCRIS- TSD)/RCRIS Corrective Action Activity (CORRACTS)
- Federal Institutional Control/ Engineering Control Registries
- Emergency Response Notification System (ERNS)
- Toxic Release Inventory System (TRIS)
- New York State Inactive Hazardous Waste Disposal Sites (SHWS)
- Hazardous Substance Waste Disposal Site Inventory (HSWDS)
- Solid Waste Management Facilities (SWMF)
- Vapor Reopened
- New York State Spills Information Database (NY Spills)/Leaking Underground Storage Tanks (LTANKs)
- Petroleum Bulk Storage Tanks (USTs/ASTs)
- Chemical Bulk Storage Tanks (USTs/ASTs)
- New York State Voluntary and Brownfields Cleanup Program Sites
- Registered Dry Cleaners
- Manufactured Gas Plant Sites (Coal Gas)
- New York City E-Designation Site Listing
- EDR Historic Auto Station
- New York City Fire Department (FDNY)
- New York City Department of Buildings (NYCDOB)

In addition, TRC requested hazardous materials information from the following agencies:

- New York State Department of Health (NYSDOH)
- New York City Department of Health and Mental Hygiene (NYCDHMH)
- New York City Department of Environmental Protection (NYCDEP)

See S1.6P above for the executive summary of the Phase II Environmental Site Assessment Report. The Phase II Environmental Site Investigation performed by AKRF Engineering, PC from June 17, 2014 to June 21, 2014 would seem to indicate that the site does not contain hazardous materials in quantities that would deem the site as contaminated. Thus, this credit would appear not to be feasible unless additional hazardous materials are found during excavation and construction.

A soil vapor barrier and sub-slab depressurization system will be integrated into the new building design as per drawings H201-H208 dated 9July2018. The project team has incorporated the specification Sections 02200, Earthwork, 02220 Gas Vapor Barrier (Fluid Applied), 02221 Sub-slab Depressurization System, and 15880 Sub-slab Depressurization System Accessories into the construction documents dated 9July2018.

Transportation

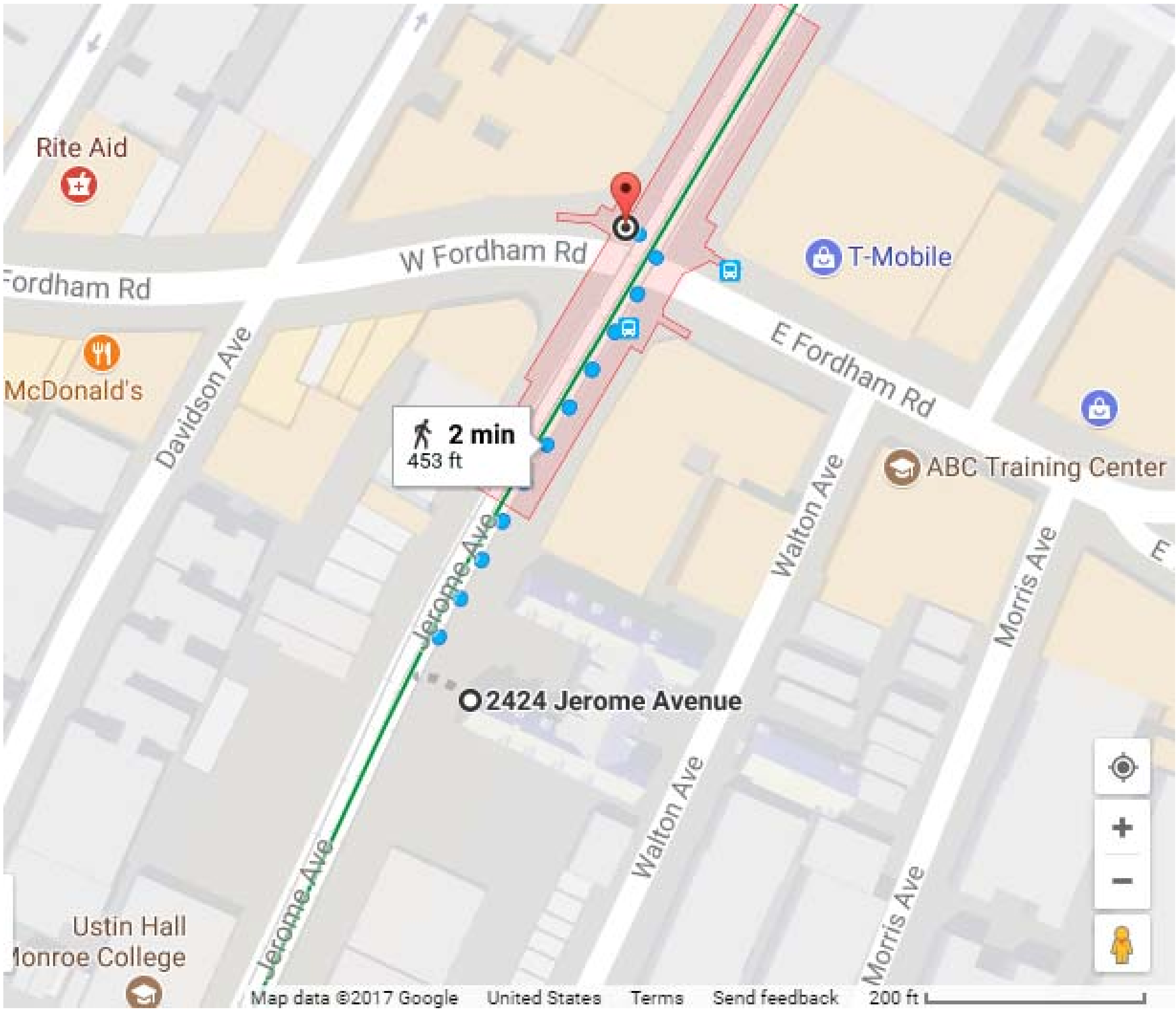
S2.1 Alternative Transportation, Public Transportation Access NARRATIVE AT SCHEMATIC SUBM.

Credit anticipated.

The project complies with Option 1, 1/2 mile to subway station; the following Google Map image indicates that the Fordham Road station for the 4 Subway line is within 1/2 mile of main building entrance; in addition, there are public buses and school buses that are in compliance with Option 2.

Option 1 walking distances are as follows:

- 0.2 miles to Fordham Road station for the 4 Subway line.



S2.2 Alternative Transportation, Bicycle Storage & Changing Rooms

Credit anticipated.

The project design incorporates secure bicycle storage and changing rooms. The bicycle storage will be provided outside and within the building and on the site and will accommodate at least 5% of all building staff and students above third grade. The shower and changing facilities in the building will accommodate 0.5% of Full-time equivalent (FTE) staff.

The interior bike storage will be provided on the 1st floor, in the entrance vestibule of the West entrance. SCA's DR1.3.1. requires 1 bicycle/10,000sf resulting in a minimum of 5 bicycle spots at 15sf/bicycle. The 19Feb2018 plan indicates storage for 5 interior bicycles.

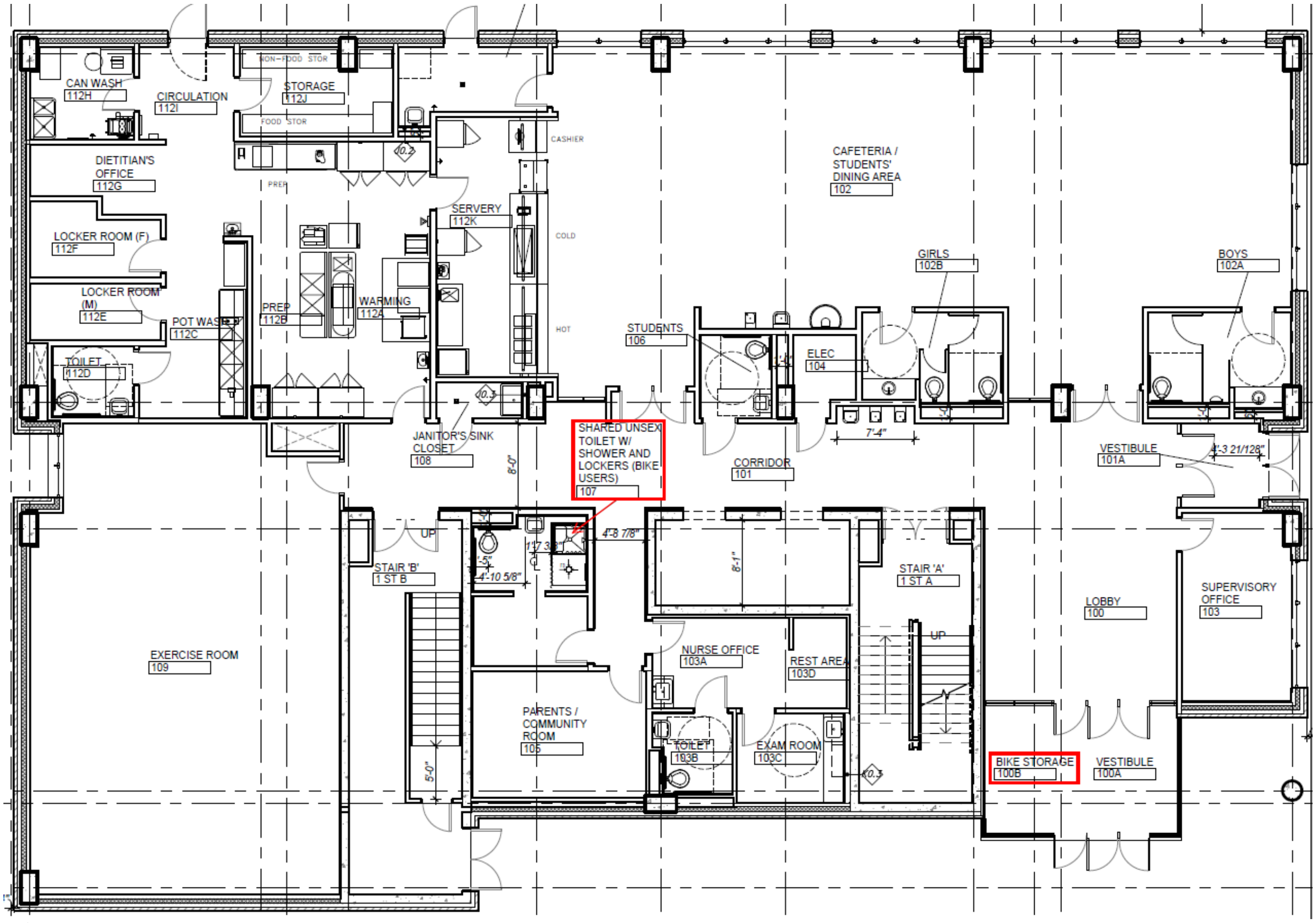
Full Time employees will be provided with a single unisex showers/changing room to the North of the bicycle storage on the 1st floor adjacent to the elevators and North stair.

Applicable SCA design requirements that will be complied with include DR 1.3.1.12 Bicycle Storage and DR 2.3.3 Bicycle Racks.

From 19Feb2018 Plans		
Building Area	0	From 11Dec2017 SD Report
Total Students in Building	1,080	From 11Dec2017 SD Report, 19Feb2018 Plans, and DR 2.3.3
Number of students above 3rd grade	0	From 11Dec2017 SD Report, 19Feb2018 Plans, and DR 2.3.3
Number of FTE	63	From 11Dec2017 SD Report, 19Feb2018 Plans, DR 2.3.3, and 2Oct2017 Pre-schematic POR
Total students above 3rd grade & FTE	63	
Required Bicycle Spots for students above 3rd grade & FTE	4	5% but no less than 1. 5 required per DR 1.3.1.12 and zoning.
Required Shower & Changing Facilites for FTE	1	0.5% but no less than 1.
Provided Interior Bicycle Spots	5	From 19Feb2018 Final Plans, 5 required per DR 1.3.1.12 and zoning.
Provided Exterior Bicycle Spots	0	The 5 interior comply with the required 5 total spaces.
Provided Shower & Changing Facilites for FTE	1	From 19Feb2018 Final Plans

	1st	2nd	3rd	4th	5th	Building Total
Pre-K	0	3919	0	0	0	3,919
Kindergarten		1,936	4,865			6,801
Grade 1				5,626		5,626
Grade 2					3,164	3,164
Grade 3						0
Grade 4						0
Grade 5						0
CSD Spec Ed					676	676
Reading/Speech/Res		530				530
Art						0
Music						0
Computer						0
Project Rm			891			891
Total SF all Grades						**21,607**
Total all Grade Students						1,080
Total SF Above 3rd Grade						
Total Above 3rd Grade Students						0

DR 2.3.3 Student Calculations



1st Fl Plan dated 19Feb2018

Applicable SCA design requirements that will be complied with include DR 1.3.1.12 Bicycle Storage and specification 05700 Ornamental Metals have been incorporated into construction documents dated 9July2018.

S2.3R Alternative Transportation, Fuel-Efficient Vehicles/Parking

Credit anticipated.

Option 1, no new parking, will be pursued.
The project is an annex next to an existing building with the majority of the non-building site dedicated to the undersized play areas; no new parking is planned to be provided within the building or on the site.

A site plan is not applicable due to no new parking provided.

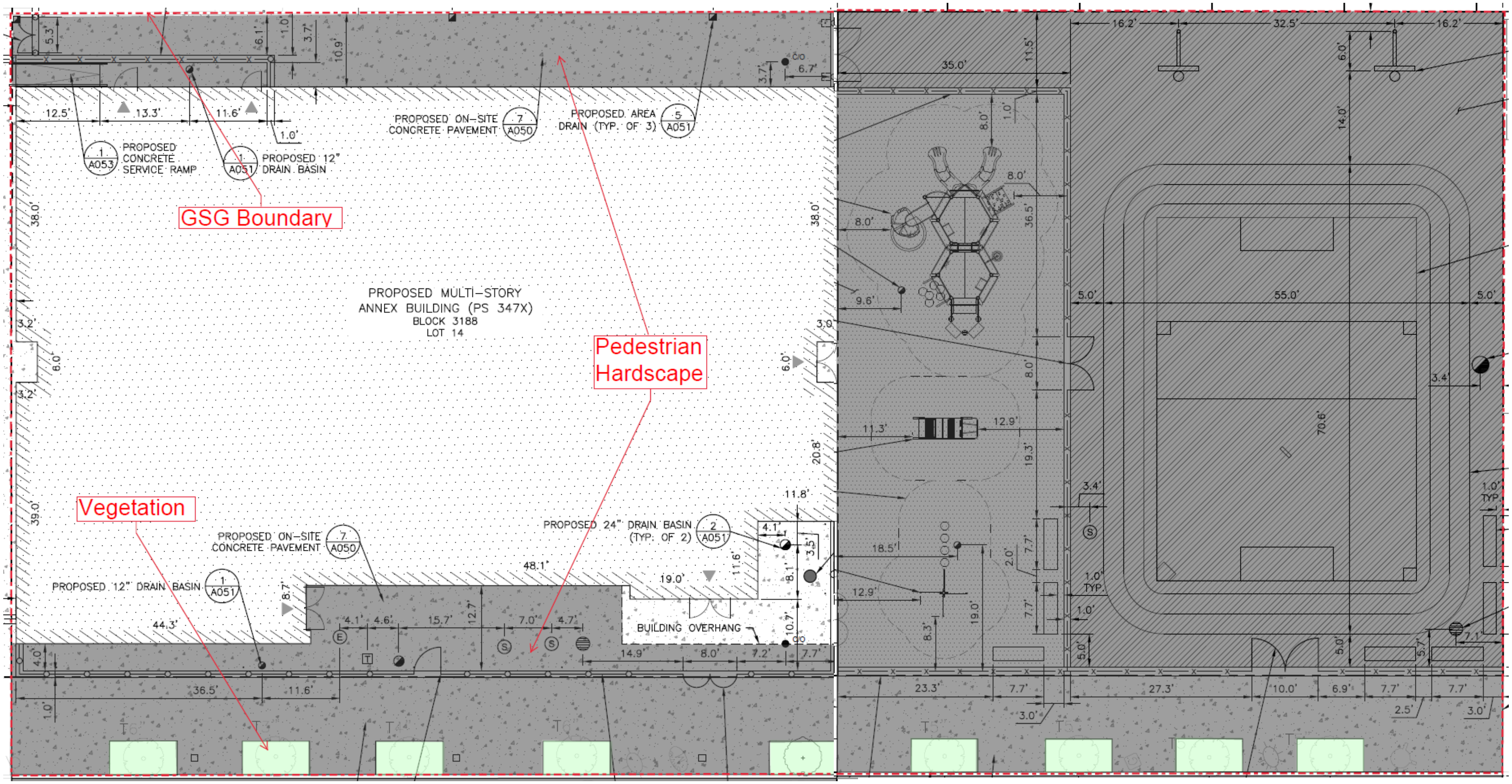
Minimize Impact on Site

S3.1 Site Development, Protect or Restore Habitat

Credit is not feasible

As currently designed, the project will be unable to comply with the requirements of this credit; the project site is currently a school playground (Lot 14); the new building is going to be built almost to the full extent of the site and will have no open spaces other than a circulation path at the back; SCA will demolish the existing one-story building (Lot 8) south of the new school and make it the future playground which will be maximized for play area with little vegetation. The credit guidelines would require the project to include a minimum of **7,501** sf of native or adapted vegetation which is not possible based on the site program. Currently, the site design contains approximately **369** sf of planted area and does not have a vegetated roof.

From 100% CDs		
Total Site Area (including sidewalk) for Lot 14 & 8	24,600	From Site Survey dated 25Oct2017
Building Footprint Proposed	9,598	From Z002 dated 9July2018
Site Area Minus Building Footprint	15,002	
50% of Site Area (excl. building footprint)	7,501	Required to use larger
20% of Total Site Area (incl. building footprint)	4,920	
Green Roof Space	0	
Vegetated Area (Existing Street Trees)	369	Scaled from Site Plans dated 9July2018, assume 100% of street trees are native/adaptive; includes existing sidewalk.



Site Plan Based on **100% CDs dated 9July2018**

S3.2 Site Development, Maximize Open Space NARRATIVE AT SCHEMATIC SUBM.

Credit is not feasible

In order to comply with this credit, the project must provide vegetated open space equal to at least 20% of the project's site area, excluding the building footprint. Since this project is located in an urban area and will be achieving S1.4, pedestrian-oriented hardscape can contribute to this credit if a minimum of 25% of the open space is vegetated.

As can be seen below, there is not enough vegetation for this credit to be earned; the project site is currently a school playground (Lot 14); the new building is going to be built almost to the full extent of the site and will have no open spaces other than a circulation path at the back; SCA will demolish the existing one-story building (Lot 8) south of the new school and make it the future playground which will be maximized for play area with little vegetation.

From 100% CDs		
Total Site Area (including sidewalk) for Lot 14 & 8	24,600	From Site Survey dated 25Oct2017
Building Footprint Proposed	9,598	From Z002 dated 9July2018
Site Area Minus Building Footprint	15,002	
20% of Site Area (excl. building footprint)	3,000	
25% of 20% Site Area Requiring Vegetation	750	
Open Space (Pedestrian & Vegetated)	16,096	Scaled from Site Plans dated 9July2018, assume 100% of street trees are native/adaptive; includes existing sidewalk.
Green Roof Space	0	
Vegetated Area (Existing Street Trees)	369	Scaled from Site Plans dated 9July2018, assume 100% of street trees are native/adaptive; includes existing sidewalk.

Applicable SCA design requirements that will be complied with include DR1.3.1.1 Building Layout and Orientation, and 1.3.1.2 Planning Guidelines for New Schools and Additions.

Stormwater Design

S4.1 Stormwater Design, Quality Control

Credit is not feasible.

Due to the fact that the site area of disturbance that is contributory to a combined sewer system and is 21,260 sf which is less than one acre, a New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) and preparation of a Stormwater Pollution Prevention Plan (SWPPP) is not anticipated to be required.

Lot 14 (the site of the proposed annex building), will have a restricted flow to the combined sewer in Jerome Avenue of 0.25 cubic feet per second (cfs). Stormwater will be detained as a combination of permanent roof detention and site detention. The future play yard project at Lot 8 will have its own separate site detention system. The proposed systems are not designed treat 90% of average annual rainfall and remove 80% of TSS, thus this credit is not earned; AKRF's 31July2018 e-mail verified the stormwater systems will not comply with this credit.

Applicable SCA Design Requirements include:

6.1.11 Stormwater Management

Applicable SCA Standard Specifications Include:
02723 Stormwater Drainage Systems.

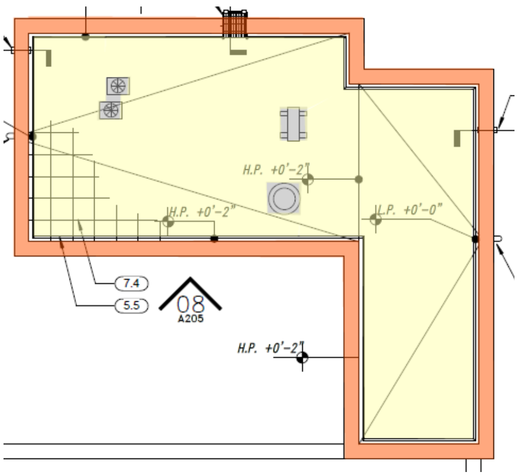
Heat Island Effect
S5.1R Heat Island Effect, Roof NARRATIVE AT DD SUBMISSION
Credit anticipated.

The top roof layer of roof paver ballast shall comply with SCA standard specification section 07560, Fluid applied Protected Membrane Roofing and have a SRI value of 78 for a minimum of 75% of the roof surface thus assuring compliance with this credit.

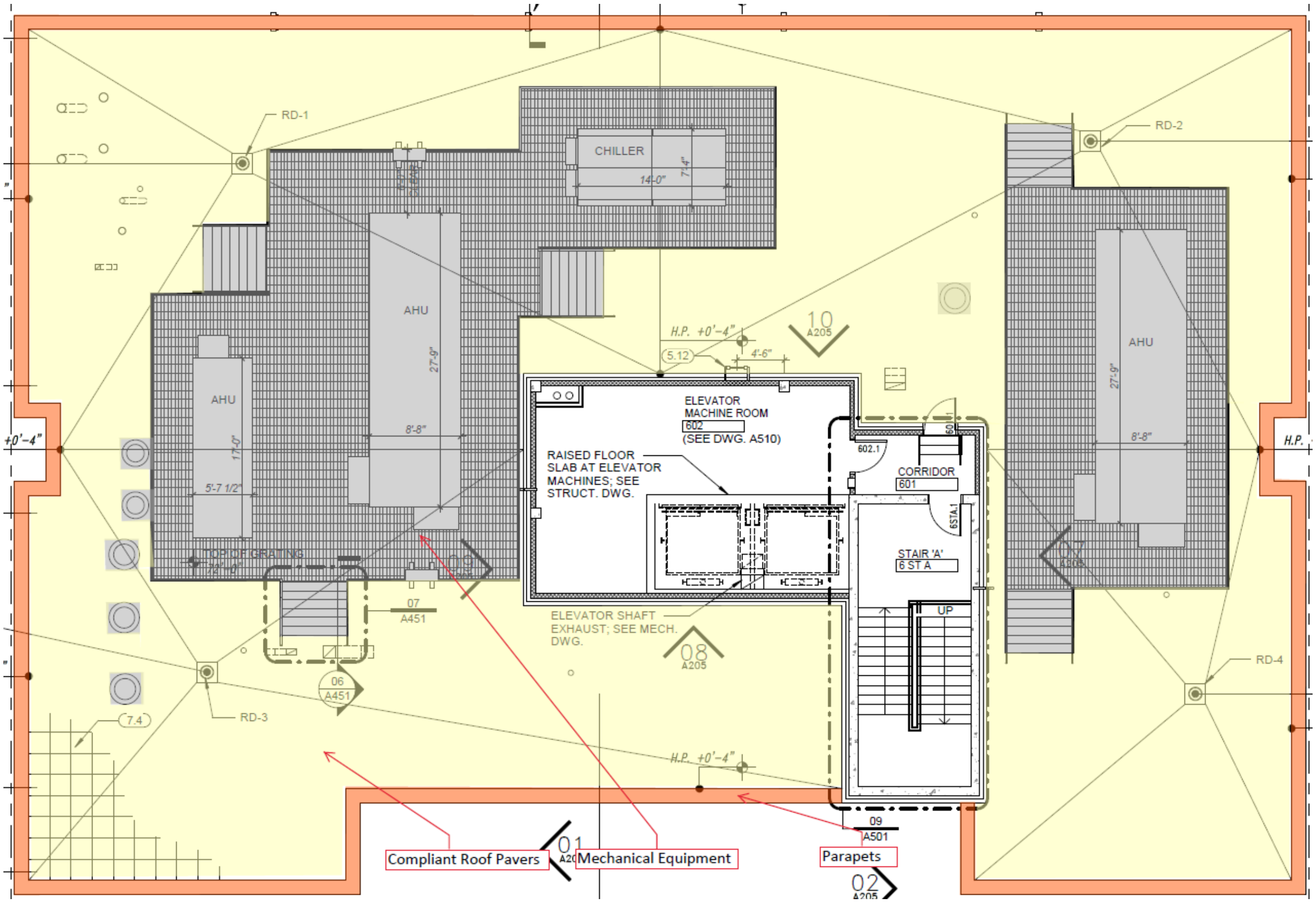
Applicable SCA Design Requirements include:
6.1.11 Stormwater Management

Applicable SCA Standard Specifications Include:
07560 Fluid Applied Protected Membrane Roofing.

Gross Roof Area	**9,598**	**Sq Ft**	**From Z002 dated 9July2018**
Parapets	**770**	**Sq Ft**	**Scaled from Plans dated 9July2018**
Mechanical Equipment & Penthouses	**2,698**	**Sq Ft**	**Scaled from Plans dated 9July2018**
Net Roof Area Not Including Mechanical Equipment, & Parapets	**6,130**	**Sq Ft**	
Roof Area Covered by Compliant Roof Pavers	**5,867**	**Sq Ft**	**Scaled from Plans dated 9July2018**
% of Roof Covered by Compliant Roof Pavers	**95.71%**		



Bulkhead Roof dated 9July2018



Roof Plan Dated 9July2018

Outdoor Lighting

S6.1 Light Pollution Reduction

Credit is not feasible.

In the past SCA has directed that similar sites meet GSG's definition of "areas predominantly consisting of Residential zoning, Neighborhood business districts, Light industrial with limited nighttime use, and Residential mixed-use areas" Zone LZ2 requirements as directed by RCNY5000-01 of the New York City Energy Code for projects in R-districts and R-districts with C overlays and MX districts. It has been verified that the project is in an R7-1 Residential District with C2-4 Commercial Overlay District. LZ2 limits initial illuminance to 0.10 horizontal and vertical footcandles at the site boundary and 0.01 horizontal footcandles 10 feet beyond the site boundary.

Light pollution reduction design approach toward meeting this credit include:

- Luminaires will be high efficiency LED.
- All interior lighting shall automatically be controlled by a programmable Lighting Control Panel with integral clock except for the emergency lighting. The Lighting Control Panel shall be provided at the Electric Closet and to control all spaces that do not have automatic shutoff and/or Occupant sensors. This will meet this credit's requirement for control of interior lighting with direct line of site to the exterior.

- Instructional space: For spaces 2,000 SF or less in area, lighting shall be controlled by one ceiling mounted vacancy sensor/daylight sensor which will meet this credit's requirement for control of interior lighting with direct line of site to the exterior.
- Exterior/site/security lighting will be provided around the perimeter of the school for safe passage of students and staff and to deter theft and vandalism.
- Main Entrances and Walkways: 1.0 foot-candle minimum as per DR7.2.5 revised 29Sept2017. This, many times, is at odds with the credit requirements for maximum lighting at site boundary, but student safety and security will take precedence although every effort will be made to still earn this credit.
- Building Perimeter: 1.0 foot-candle (average) to a 20-foot depth. This, many times, is at odds with the credit requirements for maximum lighting at site boundary, but student safety and security will take precedence although every effort will be made to still earn this credit.
- Exterior Lighting levels will be achieved utilizing high efficiency LEDs which will be full cut-off Dark Sky compliant and shall have optional visors and shields to prevent light trespass.
- All fixtures will be suitable for exterior use with a hinged and gasketed diffuser/door.
- Diffusers will be mechanically affixed to the doorframe.
- Lighting Control: All site security lighting will be master controlled by the programmable lighting controller.

Applicable SCA Design Requirements include:
7.2.1 Interior Lighting
7.2.3 Emergency Lighting
7.2.5 Exterior / Site / Security Lighting

Applicable SCA Standard Specifications Include
16145 Lighting Control Devices
16502 LED Interior Building Lighting
16520 Illuminated Exit Sign and Emergency Lighting Fixtures
16530 LED Site/Security Lighting

Light Pollution Reduction - Form A
Exterior Light Tresspass - Site Lumen Calculation
Credit S6.1

SCA School Construction Authority
NYC Green Schools Rating System - 2016

Project: P.S. 347X Bronx Annex at PS33X
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW: 107340
Date: 6/25/2018

Architect: Mitchell Giurgola Architects, LLP
Preparer: EME Group
Telephone: 212-529-5969

Site Lumen Calculation

Fixture Type		**Quantity of Installed Luminaries**	**Initial Lamp Lumens per Luminaire**	**Total Lamp Lumens**	**Initial Lamp Lumens Above 90 degrees from Nadir**	**Total Lamp Lumens Above 90 degrees**
Z1	Site	14	2,818	39,452	0	0
Z2	Roof	5	3,698	18,490	0	0
H3	Overhang	4	1,500	6,000	0	0
				0		0
[insert rows as necessary]						
			Total Lamp Lumens	**63,942**		
				Total Lamp Lumens above 90 degrees		**0**

Percentage of Site Lamp Lumens above 90 degrees 0%

If Percentage of Site Lamp Lumens above 90 degrees is less than or equal to the value referenced for the select site LZ then site complies. Yes

LZ1: 0%, LZ2: 2%, LZ3:5%, LZ4: 10%

Light Pollution Reduction - Form B

Light Power Density Calculations - Exterior Lighting Only

Credit S6.1 *Applicable for ASHRAE 90.1-2010*

SCA School Construction Authority

NYC Green Schools Rating System - 2016

Project: P.S. 347X Bronx Annex at PS33X
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW: 107340
Date: June 25, 2018

Consulting Firm: DVL Consulting Engineers, Inc
Preparer: EME Group
Telephone: 212-529-5969

1. Exterior Building Lighting Power Allowance (Tradable Lighting Applications) - BASELINE BUDGET

Designer Note: Building Entrance, Canopy & Overhang and Other Exterior Lighting ONLY (No Façade Lighting to be included)

Use this table to calculate the lighting power allowance for exterior lighting in tradable applications. Identify each of the tradable lighting applications listed in Table 9.4.5 that occur in the project, select the application type using the drop down menu (e.g. building entrance with canopy), the allowance is entered automatically, enter the linear feet **or** square feet as appropriate, the allowance times the area or length is automatically calculated, and entered in the Tradable Power Allowance column and summed in the cell shaded blue.

Exterior Lighting Applications (Identify each project-specific location)	**Table 9.4.5 - Select Your Application** (Apply 90.1-2010 Standard Description)	**Allowance (W/ft or W/sf)**	**Area or Length (ft or sf)**	**Tradable Power (Watts)**
Main school entrance	Bldg Entrances: Main entrances (W/ft of door width)	30.00	6	180
East Entrance	Bldg Entrances: Other doors (W/ft of door width)	20.00	6	120
Stair B Door	Bldg Entrances: Other doors (W/ft of door width)	20.00	6	120
Entrance Canopy	Canopies (free-standing & overhangs W/sf))	1.25	306	382.5
Refuse Door	Bldg Entrances: Other doors (W/ft of door width)	20.00	3	60
Receiving Doors	Bldg Entrances: Other doors (W/ft of door width)	20.00	3.5	70
Doors on Roof	Bldg Entrances: Other doors (W/ft of door width)	20.00	6	120
North Walkway	Bldg Grounds: Walkways < than 10 feet wide (W/lin-ft)	1.00	131	131
	Tradable BASELINE Allowance =			1183.5
	Tradable BASELINE Allowance (less 20% per SCA req'ts) =			**946.8**

2. Exterior Building Lighting Power Allowance (NON-Tradable Lighting Applications) - BASELINE BUDGET

Designer Note: Other Exterior Lighting ONLY (e.g. Façade Lighting to be included)

This table is identical to the previous table except that the non-tradable lighting applications, as listed in Table 9.4.5, are to be entered here.

Fixture ID	**Applied Area Desc.**	**Table 9.4.5 - Select Your Application** (Apply 90.1-2010 Standard Description)	**Allowance (W/ft or W/sf)**	**Area or Length (ft or sf)**	**Non-Tradable Power (Watts)**
		<blank - unused>	0.15		
		<blank - unused>			
		<blank - unused>			
		<blank - unused>			
		<blank - unused>			
		NON-Tradable BASELINE Allowance =			
		NON-Tradable BASELINE Allowance (less 20% per SCA req'ts) =			

Exterior Lighting Applications

(Identify each project-specific location)

3. Additional Unrestricted Exterior Lighting Power Allowance

Designer Note: This automatically adds 5% to the BASELINE

The total power allowances from the preceding two tables are automatically manipulated to calculate the additional unrestricted exterior lighting power allowance. This value may be applied in the Exterior Lighting Compliance Test below.

[Tradable BASELINE Budget] (Watts)	**+**	**[Non-Tradable BASELINE Budget] (Watts)**	**x**	**0.05**	**Additional Unrestricted Power**
946.8	+		x	0.05	**47.34**

Light Power Density Calculations - Exterior Lighting Only

Project:	**P.S. 347X Bronx Annex at PS33X**
LLW:	**107340**

4. Exterior Building Lighting Power (Tradable Lighting Applications) - DESIGN CASE

Designer Note: Building Entrance, Canopy & Overhang and Other Exterior Lighting ONLY (No Façade Lighting to be included)
Use this table to list the lighting equipment used for exterior lighting used for tradable applications as identified in Table 9.4.5.

Fixture ID	Luminaire Description (including number of lamp/fixture, Watt/lamp, type of ballast, type of fixture.	# of Luminaire	W/Luminaire	Total Watts
Z1	LED Wall Mounted Full Cut 0ff	14	18.4	257.6
Z2	LED Wall Mounted Full Cut 0ff (Roof)	5	38	190
H3	LED Canopy Mounted Full Cut Off	4	15.3	61.2
	Tradable DESIGN CASE =			**508.8**

5. Exterior Building Lighting Power (NON-Tradable Lighting Applications) - DESIGN CASE

Designer Note: Other Exterior Lighting ONLY (e.g. Façade Lighting to be included)
This table is similar to the preceding table except that the lighting application needs to be identified along with its corresponding luminaires because each of the non-tradable applications must comply individually.

Fixture ID	Luminaire Description (including number of lamp/fixture, Watt/lamp, type of ballast, type of fixture.	# of Luminaire	W/Luminaire	Total Watts
	NON-Tradable DESIGN CASE =			

6. Exterior Lighting Compliance Test

Designer Note: The compliance form is filled in automatically based on your inputs above. If any portion of this compliance test fails you must adjust the design accordingly to pass this test.

1) Each of the conditions in this table must be met for exterior lighting systems to comply. The tradable exterior lighting applications comply if the connected lighting power is no greater than the total allowance. All or a portion (or none) of the five percent additional allowance can be used to achieve compliance.

2) Connected lighting power for each of the non-tradable applications must be no greater than their corresponding allowances. Here additional allowance from the five percent pool can be applied to achieve compliance. The total of additional allowances used for both the tradable and non-tradable applications must be no greater than the total Additional Unrestricted Exterior Lighting Power Allowance.

Compliance test 1

Tradable Power Allowance (Watts) +	Additional Unrestricted Lighting Power (Watts)	**Must be ≥ than**	Tradable Connected Lighting Power (Watts)
946.8	**47.34**	Pass	**509**

Compliance test 2

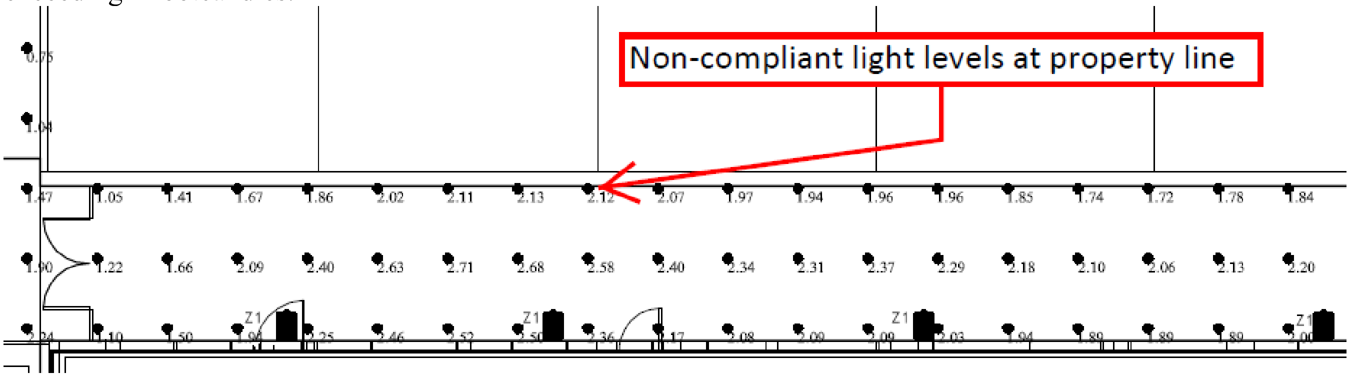
NON-tradable Application Fixture ID	NON-Tradable Power Allowance (Watts) +	Additional Unrestricted Lighting Power (Watts)	**Must be ≥ than**	NON-Tradable Connected Lighting Power (Watts)
			Pass	
			Pass	
			Pass	
			Pass	
			Pass	

Compliance test 3

Total Additional Allowance Applied (Sum) (Watts)	**Must be ≤ than**	Additional Unrestricted Lighting Power Allowance (Watts)
	Pass	***47.34***

There are no interior non-emergency luminaries with direct line of site to any exterior openings without automatic shut-off, thus a typical classroom plan indicating the angle of maximum candela is not needed. Occupancy and vacancy sensor details, and lighting control panel details are provided on drawing E703.00 dated 19Feb2018.

GSG requires that the exterior building mounted lighting fixtures produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical foot-candles (fc) at the curb line & site boundary and 0.01 horizontal foot-candles at 10 feet beyond the curb & site boundary for Zone LZ2, but the lighting boundary can be the centerline of street when bordering a street. From the photometrics plans received 25Apr2018 and 25Jun2018, the exterior lighting is not in compliance with this requirement. The East property line has lighting levels exceeding 2 footcandles.



No additional lighting is being provided for lot 8 playground.

See Appendix A for full photometric site plan.

Water Credits

Outdoor Systems

W1.1 Water Efficient Landscaping, Reduce by 50%

Credit is not feasible.

Consideration is being given to providing trees, shrubs, and plants that are low maintenance, low water, and drought resistant. Plantings that eliminate the need for permanent irrigation will be selected.

Temporary irrigation, if necessary, will be limited to up to one year after installation.

Any new street tree(s) shall comply with NYCDPR, NYCSCA, and NYCDOT standards and clearance requirements. Sorbus, Populus, Ailantus and Selix will be avoided. Trees that flower, require yearly spraying or that grow too wide for their location will be avoided.

Flowering shrubs will be avoided.

English Ivy (Hedera helix) is the preferred type cover (from DR2.5.1), especially in areas with leaves. Allegheny Pachysandra (Pachysandra procumbens) and Vinca minor which are also good ground cover and are native species that don't climb will also be considered. Ground cover in large areas will be avoided. Japanese Honeysuckle and Boston Ivy (Partenocissus tricuspidata) will be avoided.

369 sf proposed vegetated area (currently only at street trees) divided by the total project site area **(including Lot 8)** of **24,600** sf, including the West sidewalk at Jerome Avenue, results in vegetation making up **1.5**% of the total site area. Credit is assumed to be not feasible as the vegetated area is less than 5% of the site area.

Applicable SCA Design Requirements include:
2.5.1 Trees, Shrubs, Ground Cover and Lawns
6.1.7 Wall Hydrant Requirements for Window Washing and General Maintenance

Applicable SCA Standard Specifications Include:
02900 Landscaping

Because the credit is not feasible due to the vegetated area being less than 5% of the site area, no water use calculations are required.

Site plans on A035 and **A045 dated 9July2018** indicate only street trees being provided within the current GSG project boundary. Tree pit detail is provided on drawing A050. The street trees specified will be considered native and/or adaptive due to them being chosen from NYC Parks Department right-of-way trees list which are based on other trees in the area/what will work best at the specific site.

Permanent irrigation is not indicated in the current drawings and specifications.

W1.2 Water Efficient Landscaping, Reduce by 100%

Credit is not feasible.

Consideration is being given to providing trees, shrubs, and plants that are low maintenance, low water, and drought resistant. Plantings that eliminate the need for permanent irrigation will be selected.

Temporary irrigation, if necessary, will be limited to up to one year after installation.

Any new street tree(s) shall comply with NYCDPR, NYCSCA, and NYCDOT standards and clearance requirements. Sorbus, Populus, Ailantus and Selix will be avoided. Trees that flower, require yearly spraying or that grow too wide for their location will be avoided.

Flowering shrubs will be avoided.

English Ivy (Hedera helix) is the preferred type cover (from DR2.5.1), especially in areas with leaves. Allegheny Pachysandra (Pachysandra procumbens) and Vinca minor which are also good ground cover and are native species that don’t climb will also be considered. Ground cover in large areas will be avoided. Japanese Honeysuckle and Boston Ivy (Partenocissus tricuspidata) will be avoided.

369 sf proposed vegetated area (currently only at street trees) divided by the total project site **area (including Lot 8)** of **24,600** sf, including the West sidewalk at Jerome Avenue, results in vegetation making up **1.5**% of the total site area. Credit is assumed to be not feasible as the vegetated area is less than 5% of the site area.

Applicable SCA Design Requirements include:
2.5.1 Trees, Shrubs, Ground Cover and Lawns
6.1.7 Wall Hydrant Requirements for Window Washing and General Maintenance

Applicable SCA Standard Specifications Include:
02900 Landscaping

Because the credit is not feasible due to the vegetated area being less than 5% of the site area, no water use calculations are required.

Site plan A035 **and A045 dated 9July2018** indicate only street trees being provided within the current GSG project boundary. Tree pit detail is provided on drawing A050. The street trees specified will be considered native and/or adaptive due to them being chosen from NYC Parks Department right-of-way trees list which are based on other trees in the area/what will work best at the specific site.

Permanent irrigation is not indicated in the current drawings and specifications.

Indoor Systems

W2.1P Water Use Reduction

Credit anticipated.

As per SCA standard specification section 15440, the intended plumbing fixture flow rates are as follows:

Water closet flush valve: 1.28 gpf
Urinal flush valve: 0.125 gpf
Lavatory faucet: sensor-operated 0.125 gpc
Kitchen lavatory faucet: sensor-operated 0.125 gpc
Classroom sinks: 0.5 gpm.
Art Room sink: 0.5 gpm.
Science Lab sink: 0.5 gpm.
Shower: 1.8 gpm.

Applicable SCA Design Requirements include:
6.1.16 Compliance with LL86/05

Applicable SCA Standard Specifications Include:
11400 Food Service Equipment
15440 Plumbing Fixtures

WATER USE REDUCTION FORM
Credits W 2.1R, W 2.2R, W2.3 & W2.4

SCA School Construction Authority
NYC Green Schools Rating System

Page 1 of 2

Project: P.S. 347X Bronx Annex at PS33X
Address: 2424 Jerome Ave, Bronx, NY
Zip Code: 10468
LLW: 107340
Date: 4/18/18
Engineer: DVL Consulting Engineers, Inc
Preparer: EME Group
Telephone: 212-529-5969

School in Full Operation

BASE CASE

Base Case <u>Flush</u> Fixture Type		**% of Student Population by Grade**	**Daily Uses**	**Flow Rate [gpf]**	**Duration [Flush]**	**Fill In Only the three Un-Shaded Boxes** **Student Population**	**Occupant Users**	**Fill In Only the one Un-Shaded Box** **Sewage Generated [Gal]**
Conventional Water Closet	male 3-12	55%	1.00	1.6	1	N/A	130	207.7
Conventional Urinal	male 3-12	55%	2.00	1.0	1	N/A	130	259.6
Conventional Water Closet	female 3-12	55%	3	1.6	1	N/A	130	623.0
Conventional Water Closet	male PK-2	45%	3.00	1.6	1	N/A	106	509.8
Conventional Water Closet	female PK-2	45%	3.00	1.6	1	N/A	106	509.8
Conventional Water Closet	Adult	N/A	3.00	1.6	1	N/A	63	302.4

Base Case <u>Flow</u> Fixture Type		**Daily Uses**	**Flow Rate**	**Duration**	**Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
Conventional Lavatory (Student)		3	0.25 g/cycle	1 cycle	N/A	472	354.0
Conventional Lavatory (Adult)		3	0.25 g/cycle	1 cycle	N/A	63	47.3
Shower		0.1	2.5 gpm	300 sec	N/A	63	78.8
Food Service Hand Sink		4	0.25 g/cycle	1 cycle	472	5	4.7

<u>Base Case</u> "School In Full Operation" Daily Volume [Gal]	2897.0
Annual Days School In Full Operation	**180**
<u>Base Case</u> Annual "School in Full Operation" Total Volume [Gal]	***521,453***

DESIGN CASE

Design Case <u>Flush</u> Fixture Type		**% of Student Population by Grade**	**Daily Uses**	**Flow Rate [gpf]**	**Duration [Flush]**	**POR Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
High Efficiency Water Closet	male 3-12	55%	1.00	1.28	1	N/A	130	166.1
High Efficiency Urinal	male 3-12	55%	2.00	0.125	1	N/A	130	32.5
High Efficiency Water Closet	female 3-12	55%	3	1.28	1	N/A	130	498.4
High Efficiency Water Closet	male PK-2	45%	3.00	1.28	1	N/A	106	407.8
High Efficiency Water Closet	female PK-2	45%	3.00	1.28	1	N/A	106	407.8
High Efficiency Water Closet	Adult	N/A	3.00	1.28	1	N/A	63	241.9

Design Case <u>Flow</u> Fixture Type		**Daily Uses**	**Flow Rate**	**Duration**	**Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
Aerated Lavatory with metering device (Student)		3	0.125 g/cycle	1 cycle	N/A	472	177.0
Aerated Lavatory with metering device (Adult)		3	0.125 g/cycle	1 cycle	N/A	63	23.6
Low Flow Shower		0.1	1.8 gpm	300 sec	N/A	63	56.7
Food Service Hand Sink		4	0.125 g/cycle	1 cycle	472	5	2.4

Design <u>Case</u> "School In Full Operation" Daily Volume [Gal]	2,014.2
Annual Days School In Full Operation	**180**
<u>Design Case</u> "School in Full Operation" Total Volume [Gal]	***362,564.5***
Sub-Total: Water Use Reduction for "School in Full Operation"	***30%***

WATER USE REDUCTION FORM
Credits W 2.1R, W 2.2, W2.3 & W2.4

School Construction Authority
NYC Green Schools Rating System

Page 2 of 2

Project: P.S. 347X Bronx Annex at PS33X
Address: 2424 Jerome Ave, Bronx, NY
Zip Code: 10468
LLW: 107340
Date: 4/18/2018
Engineer: DVL Consulting Engineers, Inc
Preparer: EME Group
Telephone: 212-529-5969

Summer Operation

BASE CASE

Fill In Only the three Un-Shaded Boxes | Fill In Only the one Un-Shaded Box

Base Case Flush Fixture Type		**% of Student Population by Grade**	**Daily Uses**	**Flow Rate [gpf]**	**Duration [Flush]**	**POR Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
Conventional Water Closet	male 3-12	55%	1.00	1.6	1	N/A	39	62.3
Conventional Urinal	male 3-12	55%	2.00	1.0	1	N/A	39	77.9
Conventional Water Closet	female 3-12	55%	3	1.6	1	N/A	39	186.9
Conventional Water Closet	male PK-2	45%	3.00	1.6	1	N/A	32	152.9
Conventional Water Closet	female PK-2	45%	3.00	1.6	1	N/A	32	152.9
Conventional Water Closet	Adult	N/A	3.00	1.6	1	N/A	19	90.7

Base Case Flow Fixture Type		**Daily Uses**	**Flow Rate**	**Duration**	**POR Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
Conventional Lavatory (Student)		3	0.25 g/cycle	1 cycle	N/A	142	106.2
Conventional Lavatory (Adult)		3	0.25 g/cycle	1 cycle	N/A	19	14.2
Shower		0.1	2.5/gpm	300 sec	N/A	19	23.6
Food Service Hand Sink		4	0.25 g/cycle	1 cycle	142	2	2.0

Base Case "Summer Operation" Daily Volume [Gal]	458.9
Annual Days Summer Operation	**30**
Base Case Annual "Summer Operation" Total Volume [Gal]	***13,768***

DESIGN CASE

Design Case Flush Fixture Type		**% of Student Population by Grade**	**Daily Uses**	**Flow Rate [gpf]**	**Duration [Flush]**	**POR Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
High Efficiency Water Closet	male 3-12	55%	1.00	1.28	1	N/A	39	49.8
High Efficiency Urinal	male 3-12	55%	2.00	0.125	1	N/A	39	9.7
High Efficiency Water Closet	female 3-12	55%	3	1.28	1	N/A	39	149.5
High Efficiency Water Closet	male PK-2	45%	3.00	1.28	1	N/A	32	122.3
High Efficiency Water Closet	female PK-2	45%	3.00	1.28	1	N/A	32	122.3
High Efficiency Water Closet	Adult	N/A	3.00	1.28	1	N/A	19	72.6

Design Case Flow Fixture Type		**Daily Uses**	**Flow Rate**	**Duration**	**POR Student Population**	**Occupant Users**	**Sewage Generated [Gal]**
Aerated Lavatory with metering device (Student)		3	0.125 g/cycle	1 cycle	N/A	142	53.1
Aerated Lavatory with metering device (Adult)		3	0.125 g/cycle	1 cycle	N/A	19	7.1
Low Flow Shower		0.1	1.8 gpm	300 sec	N/A	19	17.0
Food Service Hand Sink		4	0.125 g/cycle	1 cycle	142	2	1.0

Design Case "Summer Operation" Daily Volume [Gal]	280.2
Annual Days Summer Operation	**30**
Design Case "Summer Operation" Total Volume [Gal]	***8,406.5***
Sub-Total: Water Use Reduction for "Summer Operation"	***39%***
Total Base Case "School In Full Operation & Summer Operation" [Gal]	***535,220.4***
Total Design Case "School In Full Operation & Summer Operation" [Gal]	***370,971.0***
Total Water Use Reduction	***30%***

Notes:

1. Figures in shaded boxes are based on EPA 1992 as amended in 2005 with revisions as per LEED 2009 (base case), SCA standards (design case) or are calculated by this spreadsheet. No design team revision required.

2. Spreadsheet will calculate occupant users for water closets and urinals for design and base cases based on figures entered by Design Team for "Occupant Users" for "Conventional Lavaratory" for students and adults, along with "% of Student Population by Grade". Distribution of male and female "Occupant USers" are based on assumption of 50-50 ratio of male and female.

3. Methodology to determine student population: Use unadjusted capacity from POR
Methodology to determine adult population: Follow DR 2.3.3.-Bicycle Racks

4. Figure entered by Design Team for occupant users for showers should include all physical education staff, potential adult bike users (GSG credit S 2.2) and for high schools with showers in the student locker rooms, all students.

5. Figure entered by Design Team to determine occupant users for "Food Service Hand Sinks" is based on 1 FTE for each 100 students. Student poplulation based on unadjusted capacity from POR is to be entered. (Minimum of 2 kitchen staff is required).

6. For "Summer Operation", occupant users is anticipated to be 30% of "Full Operation Population". If program is known to be different, actual summer population should be entered.

7. For "Annual Days of Summer Operation", revise anticipated number of days for regular summer operation, excluding weekends and days when school is closed, if program is known to be different than the default value of 30.

8. Modernization projects should include the actual fixture flow rate of fixtures to remain in the design case calculations and indicate assumptions about percentage of occupant users who will use those existing fixtures to remain.

9.Percentage of Student Population by Grade should be based on number of students in classrooms with toilets located within the classrooms. Dedicated classroom toilets would be applicable to PK and K and to first and second grade classrooms as indicated in the POR. Single user toilets are typically provided for staff use. If first and second grade don't have toilets, include poplulation in 3-12

10. For typical IS and HS, percentage of occupant users in the PK-2 row should be equal to zero.

11. For typical PS and PS/IS, percentage of occupant users in the PK-2 row should be based on occupants users in PK-2 grade classrooms that have dedicated toilets.

The above calculations indicate a 30% savings with pre-kindergarten and kindergarten classrooms only having toilets, thus earning this credit.

W2.2R Water Use Reduction, 30% Reduction

Credit anticipated.

See narrative in W2.1P above.

The above calculations indicate a 30% savings with pre-kindergarten and kindergarten classrooms only having toilets, thus earning this credit.

W2.3 Water Use Reduction, 35% Reduction

Credit is not feasible.

See narrative in W2.1P above.

The above calculations indicate a 30% savings with pre-kindergarten and kindergarten classrooms only having toilets, thus not earning this credit.

W2.4 Water Use Reduction, 40% Reduction

Credit is not feasible in the **22**June2018 meeting minutes.

The fixtures indicated narrative in W2.1P above typically do not result in a 40% savings thus this credit is not feasible.

The above calculations indicate a 30% savings with pre-kindergarten and kindergarten classrooms only having toilets, thus not earning this credit.

Energy

Commissioning

E1.1P Fundamental Commissioning

Credit anticipated. Setty & Asssociates is CxA.

The Specification Table of Contents may require further revision when project materials and systems are further defined.

Applicable SCA Standard Specifications include:
- S01352 Sustainability
- S01650 Facility Start-up, Demonstration, and Training
- S01660 Supplemental Commissioning Requirements

SCA CxA, Setty & Associates, to review the Project Specifications Table of Contents, OPR (Owner's Project Requirements contained in the Program of Requirements and SCA's Design Requirements), and BOD (Basis of Design contained in the Schematic Design Report).

See Appendix A for Project Specifications Table of Contents.

Refrigerant Management

E2.1P Fundamental Refrigerant Management

Credit is being pursued.

The air-cooled chiller servicing the new building will utilize R-410A refrigerant; split heat pumps servicing MDF, IDF, and the elevator machine rooms will have R-410A refrigerant. No CFC-based refrigerants will be used on the project.

The one existing 1-story PS347X Annex on lot 8 is to be removed; all existing equipment in building being removed will not be re-used in the new addition.

A summary of the scope of work for removal of removed building's air conditioning systems is as follows:

- **DX cooling air conditioning rooftop unit and refrigerant piping with R-12 (CFC) or R-22 (HCFC) refrigerant.**

All refrigerant from existing equipment will be recovered and recycled as required by city, state, and federal laws.

Applicable SCA Standard Specifications:
- 11400 Food Service Equipment
- 11450 Domestic Type Equipment
- 11452 Culinary Arts Lab Equipment
- 15660 Packaged Modular Outdoor Chillers
- 15783 Split Heat Pump System

E2.2 Enhanced Refrigerant Management

Credit is not feasible.

The air-cooled chiller servicing the new building will utilize R-410A refrigerant; split heat pumps servicing MDF, IDF, and the elevator machine rooms will have R-410A refrigerant. No CFC-based refrigerants will be used on the project. Architect's 25Apr2018 e-mail indicated there are no walk-in refrigerator or freezer in project.

The one existing 1-story PS347X Annex on lot 8 is to be removed; all existing equipment in building being removed will not be re-used in the new addition.

A summary of the scope of work for removal of removed building's air conditioning systems is as follows:

- **DX cooling air conditioning rooftop unit and refrigerant piping with R-12 (CFC) or R-22 (HCFC) refrigerant.**

All refrigerant from existing equipment will be recovered and recycled as required by city, state, and federal laws.

Applicable SCA Standard Specifications:

11400 Food Service Equipment
11450 Domestic Type Equipment
11452 Culinary Arts Lab Equipment
15660 Packaged Modular Outdoor Chillers
15783 Split Heat Pump System

The following Refrigerant Impact Form indicates a Weighted Average Atmospheric Impact of 123 which is more than the maximum of 100 thus showing credit non-compliance.

REFRIGERANT IMPACT FORM

Credit E2.2

SCA School Construction Authority

NYC Green Schools Rating System

Project:	**P.S. 347X Bronx Annex at PS33X**	Engineering Firm:	**DVL Consulting Engineers, Inc.**
Address:	**2424 Jerome Ave, Bronx, NY, 10468**	Preparer:	**EME Group**
LLW #:	**107340** Design #:	Telephone:	**212-529-5969**
Date:	**4/25/2018**		

The matrix below is to assist in calculating the refrigerant impact using the following calculation: **LCGWP + LCODP x 100,000 is less than or equal to 100**

Weighted average for multiple pieces of **[Σ (LCGWP + LCODP x 100,000) x Qunit] / Qtotal is less than or equal to 100**

Inputs - **Enter project specific project information in below**										Calculations - shaded cells will calculate automatically					
Description HVAC&R equipment	**N** No. of Units	**Q unit** (Tons)	**Refrig-erant**	**GWPr**	**ODPr**	**Rc** (lb/ton)	**Life** (yrs)	**Lr** (%)	**Mr** (%)	**Q total Tons**	**Tr** (Lr x Life +Mr)	**LCGWP** (GWPr x Tr x Rc/Life)	**LCODP x 10000**	**RAI =** LCGWP+ LCODPx 100000	**(LCGWP + LCODP x 100000) x Qtotal**
CH-1	**1**	**133.9**	**R410a**	**1,890**	**0**	**2.6139**	**20**	**2.0%**	**10%**	**134**	**50%**	**123.5**	**0**	**123.5**	**16538**
ACCU-1	**1**	**2**	**R410a**	**1,890**	**0**	**3**	**15**	**2.0%**	**10%**	**2**	**40%**	**151.2**	**0**	**151.2**	**302**
ACCU-2&3	**2**	**2.85**	**R410a**	**1,890**	**0**	**2.1053**	**15**	**2.0%**	**10%**	**6**	**40%**	**106.1**	**0**	**106.1**	**605**
				1,780	**0.04**	**7.54**	**10**	**2.0%**	**10%**	**0**	**30%**	**402.6**	**90.48**	**493.1**	**0**
										142				**Subtotal =**	**17445**
			Weighted Average Atmospheric Impact [Σ (LCGWP + LCODP x 100,000) x Qunit] / Qtotal =												**123.2**

Definitions:

LCGWP: Lifecycle Direct Global Warming Potential (lbCFC11.Ton-Year) = [GWPr x (Lr x life + Mr) x Rc]/life
LCODP: Lifecycle Ozone Depletion Potential (lbCFC11.Ton-Year) = [ODPr x (Lr x life + Mr) x Rc]/life
GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lbCO2/lbr). See on following page.
ODPr: Ozone Depletion Potential of Refrigerant (0 to .2lbCFC11/lbr). See on following page.
Q unit: Cooling capacity of an individual HVAC or refrigeration unit in tons.
Rc: ACTUAL Refrigerant Charge (0.5 to 5.0 lbs of refrigerant per ton of mechanical-cooling capacity)
Life: Equipment Life (based on equipment type, 15 years unless otherwise demonstrated)
Lr: Refrigerant Leakage Rate (0.5% to 2%; default of 2% unless otherwise demonstrated)
Mr: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)
Q total: Total mechanical-cooling capacity for a given type of HVAC or refrigeration unit on the project.
RAI: Refrigerant Atmosheric Impact

Ozone-depletion and global-warming potentials of refrigerants (100-yr values)

Refrigerant		**ODP**	**GWP**	**Common Building Application**
Chlorofluorocarbons	CFC-11	1.0	4,680	Centrifugal chillers
	CFC-12	1.0	10,720	Refrigerators, chillers
	CFC-114	0.94	9,800	Centrifugal chillers
	CFC-500	0.605	7,900	Centrifugal chillers, humidifiers
	CFC-502	0.221	4,600	Low-temperature refrigeration
Hydrochloroflurocarbons	HCFC-22	0.04	1,780	Air conditioning, chillers,
	HCFC-123	0.02	76	CFC-11 replacement
Hydrofluorocarbons	HFC-23	~0	12,240	Ultra-low-temperature refrigeration
	HFC-134a	~0	1,320	CFC-12 or HCFC-22 replacement
	HFC-245fa	~0	1,020	Insulation agent, centrifugal chillers
	HFC-404A	~0	3,900	Low-temperature refirifugal chillers
	HFC-407C	~0	1,700	Low-temperature refrigeration
	HFC-410A	~0	1,890	HCFC-22 replacement
	HFC-507A	~0	3,900	Air conditioning
Natural Refrigerants	Carbon Dioxide (CO2)	0	1.0	
	Ammonia (NH3)	0	0	
	Propane	0	3	

Default Maximum Allowable Equipment Refrigerant Charge (lb/ton)

Refrigerant	**10 Year Life**	**15 Year Life**	**20 Year Life**	**23 Year Life**
	(Room or window AC & heat pumps)	(Unitary, split and packaged AC and heat pumps)	(Reciprocating compressors & chillers)	(Centrifugal, Screw & Absorption Chillers)
R-22	0.57	0.64	0.69	0.71
R-123	1.60	1.80	1.92	1.97
R-134a	2.52	2.80	3.03	3.10
R-245fa	3.26	3.60	3.92	4.02
R-407c	1.95	2.20	2.35	2.41
R-410a	1.76	1.98	2.11	2.17

Verification

E3.1R Measurement & Verification

Credit anticipated.

The control system will be a Direct Digital Control (DDC) system integrated into a Building Management System (BMS). Sub-meters will be installed to meter gas, electricity, domestic hot water and building hot water.

The school will be provided with a low pressure gas service with the gas meter rig located outside the building in the alleyway between the existing PS-33X school and new PS-347X schools. ConEdison will only be required to provide one gas meter since the service is a low gas pressure service Two (2) gas submeters (boilers and domestic water heater) will be required since the school will be provided with a low pressure gas service by ConEdison. NYC SCA Plumbing Design Guidelines only require for schools with low pressure gas service one (1) utility gas meter and two (2) gas sub-meters (for boilers and for domestic water heater). All gas submeters, as well as the main utility gas meters, will be pulse type meters connected to the BMS LonWorks network. Warming Kitchen gas usage can be calculated by subtracting the two sub-meters from the utility meter.

Lighting loads: as per SCA Standard Detail 1598515a, energy use will be measured by a watt meter.

Receptacle loads: as per SCA Standard Detail 1598515a, energy use will be measured by a watt meter.

Chiller: as per SCA Standard Detail 1598510a, energy use will be measured by a watt meter and chilled water by flow meter.

Rooftop AHU units: as per SCA Standard Details 1598508b&g energy use will be measured by watt meters.

Miscellaneous electrical loads: as per SCA Standard Detail 1598515b, energy use will be measured by watt meters.

Applicable SCA Design Requirements include:

6.2.20 Building Management Control System/Direct Digital Control BMS/DDC

Applicable SCA Standard Specifications include:

15416 Gas Piping System
15970 Temperature Control System (LonWorks BMS/DDC With School Operating Console)
15973 Facility Management Systems Integration
15985 Sequence of Operations
16420 Service Entrance Equipment

Applicable SCA Standard Details include:

15985 HVAC Standard Detail Series

The project team has incorporated applicable SCA Standard Specifications, including 15416, 15970, 15973, 15985, and 16420 into the construction documents dated 9July2018.

BMS control diagrams have also been incorporated into the construction documents on drawings M404 through M412.

E3.2R Energy Management System Controls, HVAC and Hot Water

Credit is anticipated.

The control system will be a Direct Digital Control (DDC) system integrated into a Building Management System (BMS). The protocol to be employed between the sensors and actuators will be the LONTALK Network System (LNS). All controllers that drive the valves, dampers, etc. will be LONMARK certified. LONMARK certified controllers will be interchangeable.

Applicable SCA Design Requirements include:
 6.2.20 Building Management Control System / Direct Digital Control BMS/DDC

Applicable SCA Standard Specifications include:
 15970 Temperature Control System (LonWorks BMS/DDC With School Operating Console)
 15973 Facility Management Systems Integration
 15985 Sequence of Operations

Applicable SCA Standard Details include:
 15985 HVAC Standard Detail Series

Control system will utilize night setback settings. Winter temperature setpoints will be reset to 55°F from the 72°F day setting.

The School Construction Authority will use the services of a Facility Management Systems Integrator (FMSI) whose responsibilities will be to:

- Evaluate the control submissions made by the HVAC contractor's proposed Temperature Controls subcontractor. Systems Integrator will prepare a report if the proposed Temperature Controls Contractor is rejected by the Systems Integrator.
- Supervise the installation of the field level controls by the controls subcontractor.
- Commission the field level controls as installed by the controls subcontractor.
- Provide the LNS/WEB Server and UPS
- Provide the Cisco 3560 Switch
- Provide the School's Operator Console (SOC)
- Review of shop drawings for BMS/ATC system and all HVAC equipment that connects to the BMS LonWorks network.
- Provide the Graphic User Interface (GUI) front-end software and provide Pre-Schematic control graphics according to SCA Standard Details.
- Turn over all software routines, operation manuals and access codes.
- Provide 40 hours of training for the custodial staff in the operation of the control system.
- Connect the project school to the Department of Education Centralized Host Work Station located at the Department of Education Bureau of Supplies Building.

The project team has incorporated applicable SCA Standard Specifications, including 15970, 15973, and 15985, into the construction documents dated 9July2018.

BMS control diagrams have also been incorporated into the construction documents on drawings M404 through M412.

All FMSI 60% design comments have been addressed as noted in DVL's 6Jun2018 e-mail.

Energy Efficiency

E4.1P Minimum Energy Performance

Credit is being pursued.

The Project's goal is complete compliance with NYC Green Schools Guide (GSG) 2016 which will show compliance with NYC Local Law 86/05 amended by LL32/16. SCA has indicated that a project specific energy model will be completed to demonstrate compliance.

The building will be heated by two gas fired condensing boilers with an approximate heating output capacity of **1,584** MBH (each as per M002 dated **9July2018**); hot water to be used for perimeter heating (finned tube radiation, convectors, etc.) and hot water coils at Variable Air Volume AHU Units and Single Zone Variable Air Volume (SZVAV) AHU Units.

The primary 160°F maximum, resettable, nominal hot water loop serving the air handlings units shall utilize 30% propylene glycol. The secondary 140°F maximum resettable, nominal hot water loop serving the perimeter fin tube radiation units shall be non-glycol water. All hot water return water to the boilers shall be at nominally 120°F. The nominal 160°F maximum hot water supply temperature to the air handling units is to be provided on a design day. The primary loop and secondary loop hot water supply temperature shall be reset based on outside air temperature.

An Air cooled modular chiller will be provided for the new building; chilled water to be used for chilled water coils of VAV and SZVAV AHU units. The anticipated size of the chiller is **103.3** tons (as per M002 dated **9July2018**).

The chilled water cooling system will have one hydronic loop with 30% polypropylene glycol to service coils of VAV and SZVAV AHU units. The chiller plant shall provide 45°F chilled water to the central VAV air handling unit cooling coil to provide a 55°F discharge air temperature off of the cooling coil, thus providing indirect dehumidification.

Classrooms, Offices, other Non-Assembly areas and Corridor VAV boxes shall be provided with supply air from (VAV) central recirculating air handling units with energy recover wheels. The VAV air handling units' role is to temper the heating season ventilation air and provide all of the space cooling capacity. The fin tube radiation units located in each Classroom, Office and other Non-Assembly area shall provide the balance of the space heating capacity.

The VAV system will be designed with a Demand Control Ventilation (DCV) control sequence. The design documents will indicate occupied minimum, vacant standby minimum, and maximum air flows for each VAV box.

The cafeteria (public assembly space) and kitchen shall be served by Single Zone Variable Air Volume (SZVAV) air handling unit (AHU) without energy recovery wheel (as per M002 dated 30Apr2018). The SZVAV system shall have a decoupled heating system where the SZVAV units provide nominally 65°F ventilation air during the heating mode and the PA space will be equipped with terminal heating capability (recessed convectors and/or fin tube radiation). Kitchen terminal heating shall be accomplished by a reheat hot water coil located in the duct that serves the Kitchen. Units shall be coupled in cooling with a mixed variable air volume system (SZVAV). DCV is to be employed, so carbon dioxide sensors shall be located in each PA space to reduce the outside air intake when the spaces are not occupied. The Cafeteria and Kitchen minimum outside air intake ventilation rate that the carbon dioxide sensors can throttle the outside air intake rate down to in the non-cooking mode is the Cafeteria specific cfm per square foot requirements as defined in MC Table 403.3 of the 2014 NYC Mechanical Code times the Cafeteria square footage plus the cumulative Kitchen General

Exhaust, Can Wash Room and Staff Toilet exhaust make up requirements considering that ample make up air must always be provided for the Kitchen General Exhaust, Can Wash Room, and Staff Toilet.

Telecom rooms, food storage rooms, and elevator machine room will be provided with ductless spilt-type heat pump systems that will maintain the space temperatures 24 hours a day, seven days a week.

Wall recessed cabinet unit heaters and/or convectors will be used in stairways. Ceiling hung cabinet heaters may be used in lieu of wall recessed convectors in stairways if space is limited.

Toilets will be provided with ceiling mounted cabinet heaters for all toilets that are located on the perimeter of the building or any toilet room (interior or perimeter located) that is located on the top floor or on a slab on grade.

Entrance vestibules will be provided with hot water air curtains; hot water from the primary hot water heating loop (30% glycol) will be used to service the heating coil of the air curtains.

Hot water unit heaters will also be provided in equipment rooms, custodial storage rooms and other storage rooms.

Non-glycol hot water for perimeter building heating is to be provided by a plate to plate heat exchanger that is supplied by glycol hot water generated by high efficiency gas fired hot water condensing boilers located in a mechanical room on the roof.

The boiler room, all domestic water service rooms and the sprinkler booster pump room will be provided, in addition to the hot water unit heaters, with electric unit heaters that will prevent freeze ups of the room in case there is a failure of the hot water heating system.

The building will be provided with lighting fixtures that are in compliance with the NYC SCA's latest Electrical Design Requirements 7.2.1 for Interior Lighting, 7.2.3 for Emergency Lighting, 7.2.4 for Exit Signs, and 7.2.5 for Exterior/Site/Security Lighting. Daylight sensors will be provided for all spaces with windows.

Applicable SCA Design Requirements include:

- 4.2.1 Exterior Masonry Wall
- 6.2.0 General Overview of HVAC
- 6.2.3 Non-Assembly Spaces
- 6.2.4 Public Assembly Spaces
- 6.2.9 Convectors and Enclosures
- 6.2.20 BMS/DDC Controls
- 7.2.1 Interior Lighting
- 7.2.5 Exterior/Site/Security Lighting

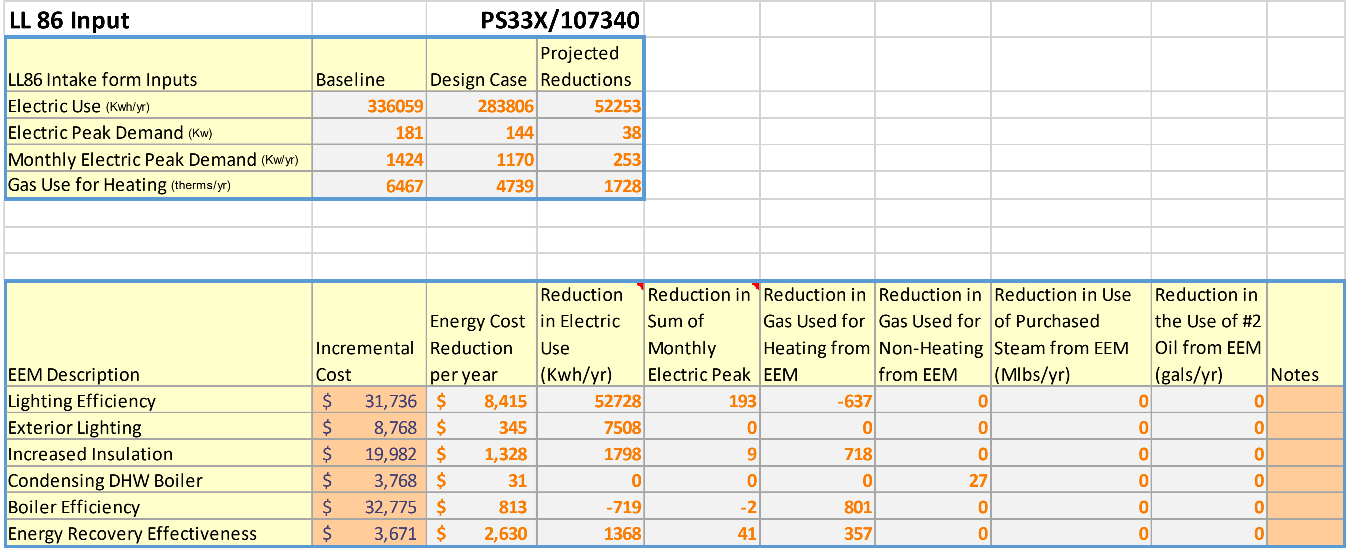
Applicable SCA Standard Specifications include:

- 08413 Aluminum-Framed Entrance and Storefronts
- 08524 Aluminum Projected Windows
- 15540 HVAC Pumps
- 15565 Hot Water Condensing Boilers
- 15783 Split Heat Pump System
- 15853 Custom Packaged Rooftop Heating and Cooling Units (Variable Air Volume System)
- 15930 Variable Air Terminals
- 15935 Single Zone Variable Air Volume (SZVAV) Air Handling Units for Public Assembly Spaces
- 15970 Temperature Control System (LONWORKS BMS/DDC with School Operating Console)

15973 Facility Management Systems Integration
15985 Sequence of Operations
16145 Lighting Control Devices
16502 LED Interior Building Lighting
16530 Site/Security Lighting

Applicable SCA Standard Details include:
04200 Unit Masonry
15970 BMS Control Diagrams

The revised project specific **100**% energy model, located in Appendix A indicates there is a **20.7%** savings relative to GSG baseline (ASHRAE 90.1-10) and **22.4%** savings for LL86/05 as compared to ASHRAE 90.1-13; the minimum energy requirements have been met for the GSG and LL86/05.



LL 86 Input **PS33X/107340**

LL86 Intake form Inputs	Baseline	Design Case	Projected Reductions
Electric Use (Kwh/yr)	336059	283806	52253
Electric Peak Demand (Kw)	181	144	38
Monthly Electric Peak Demand (Kw/yr)	1424	1170	253
Gas Use for Heating (therms/yr)	6467	4739	1728

EEM Description	Incremental Cost	Energy Cost Reduction per year	Reduction in Electric Use (Kwh/yr)	Reduction in Sum of Monthly Electric Peak	Reduction in Gas Used for Heating from EEM	Reduction in Gas Used for Non-Heating from EEM	Reduction in Use of Purchased Steam from EEM (Mlbs/yr)	Reduction in the Use of #2 Oil from EEM (gals/yr)	Notes
Lighting Efficiency	$ 31,736	$ 8,415	52728	193	-637	0	0	0	
Exterior Lighting	$ 8,768	$ 345	7508	0	0	0	0	0	
Increased Insulation	$ 19,982	$ 1,328	1798	9	718	0	0	0	
Condensing DHW Boiler	$ 3,768	$ 31	0	0	0	27	0	0	
Boiler Efficiency	$ 32,775	$ 813	-719	-2	801	0	0	0	
Energy Recovery Effectiveness	$ 3,671	$ 2,630	1368	41	357	0	0	0	

EPA Target Finder Statement of Energy Design Intent (SEDI) signed and certified by the engineer is as follows:

ENERGY STAR® Statement of Energy Design Intent (SEDI)[1]

P.S. 347X Bronx Annex at PS33X

LEARN MORE AT energystar.gov

93

ENERGY STAR®
Design Score[2]

Primary Property Type: K-12 School
Gross Floor Area (ft²): 49,128
Estimated Date of Certification of Occupancy: __________

Date Generated: August 21, 2018

1. This form is required when applying for Designed to Earn the ENERGY STAR recognition. It was generated from ENERGY STAR Portfolio Manager.
2. The ENERGY STAR 1 – 100 Score is based on total annual Source Energy. To be eligible for Designed to Earn the ENERGY STAR recognition you must score at least 75.

Property & Contact Information for Design Project

Property Address	**Project Architect**	**Owner Contact**
P.S. 347X Bronx Annex at PS33X 2424 Jerome Ave Bronx, New York 10468	John Doherty 630 Ninth Avenue Suite 711 New York, NY 10036 2126634000 Doherty@mitchellgiurgola.com	Jeremy R. M. Shannon 30-30 Thomson Avenue Long Island City, NY 11101 7184728765 jshannon@nycsca.org
Property ID: 6323921	**Architect Of Record** Mitchell Giurgola Architects 630 Ninth Avenue Suite 711 New York, NY 10036 (____)____-______	**Property Owner** NYC School Construction Authority 30-30 Thomson Avenue Long Island City, NY 11101 7184728561

Estimated Design Energy

Fuel Type	**Usage**	**Energy Rate ($/Unit)**
Electric - Grid	283,806 kWh (thousand Watt-hours)	$ 0.21/kWh (thousand Watt-hours)
Natural Gas	6,547 therms	$ 1.16/therms

Estimated Design Use Details

★ This Use Detail is used to calculate the 1-100 ENERGY STAR Score.

K-12 School	
Number of Workers on Main Shift	37.83 ← default value
★ Percent That Can Be Cooled	90
★ Number of Computers	85.97 ← default value
Gymnasium Floor Area	1,284 Sq. Ft.
★ Number of Walk-in Refrigeration/Freezer Units	0
★ Cooking Facilities	Yes
School District	
Student Seating Capacity	491.28 ← default value
★ Weekend Operation	No ← default value
★ High School	No
★ Percent That Can Be Heated	90
★ Gross Floor Area	49,128 Sq. Ft.

Months in Use	12

Design Energy and Emission Results

Metric	Design Project	Median Property	Estimated Savings
ENERGY STAR Score (1-100)	**93**	50	N/A
Energy Reduction (from Median)(%)	**-43.2**	0	N/A
Source Energy Use Intensity (kBtu/ft²/yr)	**75**	133	58
Site Energy Use Intensity (kBtu/ft²/yr)	**33**	58	25
Source Energy Use (kBtu/yr)	**3,728,041**	6,567,443	2,839,402
Site Energy Use (kBtu/yr)	**1,623,046**	2,859,212	1,236,166
Energy Costs ($)	**66,069**	116,390	50,321
Total GHG Emissions (Metric Tons CO2e)	**120**	212	92

Designed to Earn the ENERGY STAR: Application Checklist

This section is only required if you are using this document to apply for Designed to Earn the ENERGY STAR. All design projects that achieve an EPA energy performance score of 75 or higher are eligible for this certification.

1) Does your property type match the function or use of a property that's eligibility to receive an ENERGY STAR design score?	☒ **Yes**	☐ **No/Not Sure**

If you are not sure your project is eligible for an ENERGY STAR design score, please describe the property's major functions or use:

2) Is the design project at least 95% complete with construction documents?	☒ **Yes**	☐ **No**

If no, please explain:

3) Is the property currently unoccupied and not yet generating energy bills?	☒ **Yes**	☐ **No**
4) Do energy calculations account for the whole building intended operations and all energy sources?	☒ **Yes**	☐ **No**
5) Is the Architect of Record (AOR) applying for ENERGY STAR partnership?	☐ **Yes**	☒ **No**
6) Was the design record created in the owner's Portfolio Manager account?	☐ **Yes**	☒ **No**
7) Are you seeking other qualifications for this design project?	☒ **Yes**	☐ **No**

If so, please select all that apply:

- ☐ AIA 2030 Commitment
- ☐ Architecture 2030 Challenge
- ☐ Federal, State or Local Disclosure Ordinance
- ☐ Green Globes
- ☐ LEED
- ☐ Other, please indicate: NYC GSG

Professional Verification

I Michael McNamara verify that the above information is true and correct to the best of my knowledge.

Signature: Date: August 21, 2018

Verifying Professional

(212)529 - 5969
mmcnamara@emegroup.com

STATE OF NEW YORK
MICHAEL McNAMARA
62959
LICENSED PROFESSIONAL ENGINEER

Verifying Professional Stamp (if applicable)

Note: When applying for the ENERGY STAR Designed to Earn, the signature of the Verifying Professional must match the stamp.

I agree to adhere to the ENERGY STAR Identity Guidelines when using the Designed to Earn the ENERGY STAR recognition graphic in association with this project.

Architect of Record Acknowledgement

As the Architect of Record representative, I confirm that the information on this SEDI is true and accurate to the best of my knowledge. It is our best estimate for all energy use of specified systems and processes but does not guarantee the operational performance of this building. Instead, this project has been specified to achieve Designed to Earn the ENERGY STAR recognition in an effort to assist the Owner/Developer in meeting their operational performance goal for the building to earn ENERGY STAR certification.

Signature: ______________________

Date: _________________________

Building Owner/Developer Acknowledgement

As the Building Owner/Developer representative, I concur that this project be nominated for Designed to Earn the ENERGY STAR recognition. Our organization understands the importance of measuring actual energy use in Portfolio Manager after receiving the Certificate of Occupancy to verify that this property is performing as intended. We understand that once the building earns an ENERGY STAR score of 75 or higher, it may be eligible for ENERGY STAR certification.

Signature: ______________________

Date: _________________________

HVAC Optimization

E4.2R HVAC System Sizing, Avoid Oversizing

Credit anticipated.

The HVAC Systems for the building will be sized per SCA DR 6.2.13 Arrangement and Sizing of Equipment and 6.2.9 Heating and Cooling Design (Load Calculations) and not be oversized except when required to optimize energy efficiency operation of system. RTU's will be sized slightly above ventilation requirements to account for ductwork leakage.

Documentation demonstrating that cooling load calculations were performed for both the maximum dry-bulb and wet-bulb conditions will be submitted at 60%.

The project team has designed the HVAC system to not only efficiently handle peak and design load conditions, but to operate efficiently during a wide range of partial load conditions, which are the most common operating conditions.

The heating loads and cooling loads shall be calculated as per Design Requirements 6.2.9 and 6.2.13 as follows:

Heating and Cooling Systems shall be designed in accordance with Section MC 312 of the 2014 NYC Mechanical Code, Heating and Cooling Load Calculations, and shall be in accordance with 2005 ASHRAE Fundamentals Handbook, 2000 ASHRAE HVAC Systems and Equipment Handbook; and ANSI/ASHRAE/ACCA Standard 183 per Section C403.2.1 of the 2016 New York City Energy Conservation Code (NYCECC) and Section 6.4.2.1 of ASHRAE 90.1-2013. Per Section C403.2.1, heating and cooling loads shall be adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE Handbook - HVAC Systems and Equipment.

Heating Capacity:
All boilers (condensing) shall be provided with a reserve capacity equal to that as defined in the Engineering Criteria for Fuel Oil Burning Equipment of the NYC Department of Environmental Protection Bureau of Air Resources, July 1973 and SCA Standards. Reserve capacity shall be 25% to account for piping losses and pickup. Boiler capacity shall be based on total connected capacity.

Cooling Capacity:
The cooling capacity for roof top units shall be increased by 10% to account for duct losses (duct insulation losses, duct air leakage) and general building pull-down. The 10% term (i.e. 1.10 multiplier) shall be applied to all terms (transmission, infiltration, lighting loads, equipment loads, people loads, and solar loads). Cooling loads shall include the sensible loads and the latent dehumidification loads (as per Design Requirements 6.2.3 and 6.2.4).

Applicable SCA Design Requirements include:

6.2.9 Heating and Cooling Design Parameters (Load Calculations)
6.2.13 Arrangement and Sizing of Equipment
6.2.34 Verification of Air System Design

Applicable SCA Standard Specifications include:

15540 HVAC Pumps
15565 Hot Water Condensing Boilers
15660 Packaged Modular Outdoor Chillers
15783 Split Heat Pump System
15853 Custom Packaged Rooftop Heating and Cooling Units (Variable Air Volume System)

15935 Single Zone Variable Air Volume (SZVAV) Air Handling Units for Public Assembly Spaces

See Appendix A for cooling and heating load calculations.

Applicable design drawings can be found on M100 to M504 and the HVAC schedule can be found on M002 to M005 dated 9July2018.

Power

E5.1R Green Power

Credit pursued.

The project will provide at least 35% of its electricity from renewable sources by engaging in at least a two-year renewable energy contract. The amount of energy required will be established from the project specific energy model (Option 1) related to credit E4.1R.

As stated in GSG Construction Phase Architect/PO Toolkit, Page 6, "New York City has stated that they are providing the requisite green power to meet this credit for all city projects, and thus by such fiat the credit can be initialed by the AOR.

The latest results from the **100% CD** Energy Model Report dated **17August2018** indicates the Design Case with Unregulated Loads will have an annual electrical energy consumption of **283,806 kWh**. Based on this estimate, **99,332 kWh** of green power will need to be purchased for each of the first two years of building operation to satisfy the 35% requirement.

Materials Credits

Efficient Material Use

M1.1P Storage & Collection of Recyclables

Credit anticipated.

The project space will have a dedicated area for the storage and collection of recyclables located on the ground floor with close access to the warming kitchen. The recyclable materials will include, at a minimum, paper, corrugated cardboard, glass, plastic, and metal. In addition to the recycling area on the ground floor, there will be designated bins in the cafeteria. In the warming kitchen, there will be two types of bins; one, to accommodate glass/plastic/metal and the other to accommodate paper/cardboard. There will also be recycling bins in the classroom and office spaces. The current area of the refuse and recycling room is 123 sqft.

Applicable SCA Design Requirements include:

1.3.1.2 Building Organization – Space Relationships
1.3.1.8 Refuse and Recycling Storage
1.3.5.01 Cafeterias PK-8 and HS

Applicable SCA Standard Specifications include:

11172 Waste Handling Equipment

Room	Number of Rooms	Type of Recycling	Area of Recycling Type (sf)	Recycling Area Sub-total (sf)	
Refuse and Recycling Rm in New Building	1	Recycling Storage (1/2 of room)	61.5	61.5	
Warming Kitchen in New Building	1	Bin	1.6	1.6	
Cafeteria in New Building	1	Bin	2.3	2.3	
Classrooms in New Building *1	25	Bins	1.6	40.0	*1 bin in each classrm*
Offices in New Building *2	7	Bins	1.6	11.2	*1 bin in each office*
Total Recycling Area				**116.6**	
*Footnote *1*	*includes spec ed, reading/speach, and project room*				
*Footnote *2*	*includes supervisory1&3, parent community1, dietician's office1, nurse1, staff lunch4, and custodian5*				

Room recycling bin locations shown on drawings FF201-FF221 dated 9July2018.

M1.2 Building Reuse, Maintain 75% of Existing Walls, Floors & Roof

Credit is not feasible.

The focus of this GSG project is the new addition so this credit would not be applicable and thus not feasible.

M1.3 Building Reuse, Maintain 95% of Existing Walls, Floors & Roof

Credit is not feasible.

The focus of this GSG project is the new addition so this credit would not be applicable and thus not feasible.

M1.4 Building Reuse, Maintain 50% of Interior Non-Structural Elements

Credit is not feasible.

The focus of this GSG project is the new addition so this credit would not be applicable and thus not feasible.

M1.5R Construction Waste Management, Divert 50% from Disposal

Credit anticipated.

This credit is assumed to be feasible: the project will follow SCA specifications to achieve waste management requirements.

As this building new construction, it is assumed that no building structure or non-structural items can be re-used. **The materials from the demolished building on Lot 8 will be included in this credit's waste calculation.**

Applicable SCA Specification Sections include:

S01352 Sustainability Requirements

S01524 Construction Waste Management
02060 Building Demolition
02070-Selective Removals and Demolition

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M1.6R Construction Waste Management, Divert 75% from Disposal
Credit anticipated.

This credit is assumed to be feasible: the project will follow SCA specifications to achieve waste management requirements.

As this building new construction, it is assumed that no building structure or non-structural items can be re-used. **The materials from the demolished building on Lot 8 will be included in this credit's waste calculation.**

Applicable SCA Specification Sections include:
S01352 Sustainability Requirements
S01524 Construction Waste Management
02060 Building Demolition
02070-Selective Removals and Demolition

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M1.7 Construction Waste Management, Divert 95% from Disposal
Credit feasible.

This credit is assumed to be feasible although experience suggests unlikely: the project will follow SCA specifications to achieve waste management requirements.

As this building new construction, it is assumed that no building structure or non-structural items can be re-used. **The materials from the demolished building on Lot 8 will be included in this credit's waste calculation.**

Applicable SCA Specification Sections include:
S01352 Sustainability Requirements
S01524 Construction Waste Management
02060 Building Demolition
02070-Selective Removals and Demolition

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Sustainable Materials
M2.1R Recycled Content, 10% (post-consumer + ½ pre-consumer)
Credit anticipated.

When choosing materials, the project team will give preference to materials with a recycled content value in accordance with the SCA Standard Specifications.

This credit will be achieved by using materials with recycled content such that the sum of pos-consumer content plus on-half of pre-consumer recycling content constitutes at least 10% of the total value of the materials in the project. The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of the assembly to determine the recycled content value. Recycled contents shall be defined in accordance with the International Organization for Standardization document, ISO 14021 – Environmental Labels and Declaration – Self-Declared Environmental Claims (Type II environmental labeling). Per the methodology for this credit in the current version of LEED, the typical value of materials on the project will be assumed to be 45% of the cost of divisions 2-10.

Applicable SCA Standard Specifications include:

- S01352 Sustainability Requirements
- 02200 Earthwork
- 02513 Sidewalk and Street Paving
- 02521 Concrete Curbs and Pavements
- 03200 Concrete Reinforcement
- 03300 Cast-in-Place Concrete
- 04200 Unit Masonry
- 05120 Structural Steel
- 07211 Perimeter Foundation Insulation
- 07212 Miscellaneous Building Insulation
- 07560 Fluid-applied Protected Membrane Roofing
- 08110 Steel Doors and Frames
- 08330 Coiling Doors, Grilles and Shutters
- 08524 Aluminum Projected Windows
- 08921 Aluminum Storefront
- 09260 Gypsum Board Assemblies
- 09310 Ceramic Tile
- 09510 Acoustic Ceilings
- 09650 Resilient Flooring
- 10151 Toilet Compartments
- 10185 Plastic Shower and Dressing Compartments
- 10505 Metal Lockers

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M2.2 Recycled Content, 20% (post-consumer + ½ pre-consumer)

Credit pursued.

When choosing materials, the project team will give preference to materials with a recycled content value in accordance with the SCA Standard Specifications.

This credit can be achieved by using materials with recycled content such that the sum of pos-consumer content plus on-half of pre-consumer recycling content constitutes at least 20% of the total value of the materials in the project. The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of the assembly to determine the recycled content value. Recycled contents shall be defined in accordance with the International Organization for Standardization document, ISO 14021 – Environmental Labels and Declaration – Self-Declared Environmental Claims (Type II environmental labeling). Per the methodology for this credit in the current version of LEED, the typical value of materials on the project will be assumed to be 45% of the cost of divisions 2-10.

Applicable SCA Standard Specifications include:

S01352 Sustainability Requirements
02200 Earthwork
02513 Sidewalk and Street Paving
02521 Concrete Curbs and Pavements
03200 Concrete Reinforcement
03300 Cast-in-Place Concrete
04200 Unit Masonry
05120 Structural Steel
07211 Perimeter Foundation Insulation
07212 Miscellaneous Building Insulation
07560 Fluid-applied Protected Membrane Roofing
08110 Steel Doors and Frames
08330 Coiling Doors, Grilles and Shutters
08524 Aluminum Projected Windows
08921 Aluminum Storefront
09260 Gypsum Board Assemblies
09310 Ceramic Tile
09510 Acoustic Ceilings
09650 Resilient Flooring
10151 Toilet Compartments
10185 Plastic Shower and Dressing Compartments
10505 Metal Lockers

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M2.3 Regional Materials, 10% Extracted, Processed & Manufactured Regionally

Credit anticipated.

The credit requirements will be met by verifying if the materials or products used for this project have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% of the total material value. Per the methodology of this credit in LEEDv3, the typical value of materials on the project can be assumed to be 45% of the cost of divisions 2-10.

Applicable SCA Standard Specifications include:

S01352 Sustainability Requirements
02200 Earthwork
05211 Asphaltic Concrete Paving
02513 Sidewalk and Street Paving
02521 Concrete Curbs and Pavements
03200 Concrete Reinforcement
` 03300 Cast-in-Place Concrete
04200 Unit Masonry
04435 Cast Stone
05120 Structural Steel
07211 Perimeter Foundation Insulation
07212 Miscellaneous Building Insulation
08524 Aluminum Projected Windows (standard SCA spec does not request local information)
09260 Gypsum Board Assemblies
09310 Ceramic Tile

09510 Acoustical Ceilings (standard SCA spec does not request local information)

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M2.4 Regional Materials, 20% Extracted, Processed & Manufactured Regionally

Credit pursued.

The credit requirements can be met by verifying if the materials or products used for this project have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 20% of the total material value. Per the methodology of this credit in LEEDv3, the typical value of materials on the project can be assumed to be 45% of the cost of divisions 2-10.

Applicable SCA Standard Specifications include:

S01352 Sustainability Requirements
02200 Earthwork
05211 Asphaltic Concrete Paving
02513 Sidewalk and Street Paving
02521 Concrete Curbs and Pavements
03200 Concrete Reinforcement
03300 Cast-in-Place Concrete
04200 Unit Masonry
04435 Cast Stone
05120 Structural Steel
07211 Perimeter Foundation Insulation
07212 Miscellaneous Building Insulation
08524 Aluminum Projected Windows (standard SCA spec does not request local information)
09260 Gypsum Board Assemblies
09310 Ceramic Tile
09510 Acoustical Ceilings (standard SCA spec does not request local information)

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

M2.5R Wallboard & Roof Deck Products, Mold Resistance

Credit anticipated.

When choosing materials, the project team will select materials for the interior and exterior envelope that are resistant to mold in accordance with the SCA Standard Specifications.

Applicable SCA Standard Specifications include:

S01352 Sustainability Requirements
06100 Rough Carpentry
07212 Miscellaneous Building Insulation
09260 Gypsum Board Assemblies

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Indoor Environmental Quality Credits

IAQ Post-occupancy

Q1.1P Minimum IAQ Performance

Credit anticipated.

The project will be designed as to establish minimum indoor air quality (IAQ) performance in accordance with the minimum requirements outlined in Sections 4 through 7 of ASHRAE 62.1-2007 Ventilation for Acceptable Indoor Air Quality (with errata but without addenda). The new building does not contain auditorium or gymnasium spaces; they remain in the existing building.

The proposed configuration of the ventilation system for the project includes the following components:

- The HVAC system for the Classrooms, Offices, other Non-Assembly areas and Corridors shall utilize Variable Air Volume (VAV) boxes. The general requirements for the VAV system are as follows:
    - Outside air will be introduced to classrooms, offices, other non-assembly spaces, and corridors through VAV central recirculating air handling units. The VAV air handling units' role is to temper the heating season ventilation air and provide all of the space cooling capacity.
    - The VAV system will be designed with a Demand Control Ventilation (DCV) control sequence. Each classroom will be provided, in addition to space temperature sensor, with an occupancy sensor in order to reset the minimum required ventilation air rate at the outside air intake of the central VAV AHU unit. The design documents will indicate occupied minimum, vacant standby minimum and maximum air flows for each VAV box.
    - The maximum air flow shall be that required to satisfy the thermal loads during the occupied scheduled time periods at the adjustable space temperature setpoint. Demand Controlled Ventilation (DCV) for each space will be provided in addition to utilizing an energy recovery wheel (ERW) in the central air handling unit.
    - The following required DCV logic shall be utilized: When classroom is actually occupied during scheduled occupied hours as determined by an occupancy sensor, the minimum ventilation rate shall be the sum of the space ventilation rates (cfm/SF * SF) plus the occupant ventilation rate (cfm/p * population), and when vacant during scheduled occupied hours as determined by an occupancy sensor, the minimum ventilation rate shall be the space ventilation rates (cfm/SF * SF). The space ventilation rate (cfm/SF) and occupancy ventilation rate (cfm/p) will be determined from MC Table 403.3.
    - These spaces should be hard ducted, as ceilings will not be used as return plenums.

- The cafeteria and kitchen shall be served by a Single Zone Variable Air Volume (SZVAV) air handling unit (AHU) with the following requirements:
    - The SZVAV system shall have a decoupled heating system where the SZVAV units provide nominally 65°F ventilation air during the heating mode. Units shall be coupled in cooling with a mixed variable air volume system (SZVAV).
    - DCV is to be employed, so carbon dioxide sensors shall be located in each PA space to reduce the outside air intake when the spaces are not occupied. The control of the outside air intake for each public assembly space is as follows: For the Cafeteria and Kitchen the minimum outside air intake ventilation rate that the carbon dioxide sensors can throttle the outside air intake rate down to in the non-cooking mode is the Cafeteria specific cfm per square foot requirements as defined in MC Table 403.3 of the 2014 NYC Mechanical Code times the Cafeteria square footage plus the cumulative Kitchen General Exhaust, Can Wash Room and Staff Toilet exhaust make up requirements considering that ample make up air must always be provided for the Kitchen General Exhaust, Can Wash Room and Staff Toilet.

- All air intake units will have MERV 7 pre-filters and MERV 13 final-filters installed.

Applicable SCA Design Requirements include:

6.2.0 General Overview of Heating Ventilation and Air Conditioning Systems
6.2.1 HVAC Unit Centralization and Coordination
6.2.3 Non-Assembly Spaces (Classrooms, Offices, etc.)
6.2.4 Public Assembly Spaces
6.2.9 Heating and Cooling Design Parameters (Load Calculations)

Applicable SCA Standard Specifications include:

S01550 Indoor Air Quality Requirements
15853 Custom Packaged Rooftop Heating and Cooling Units (Variable Air Volume System)
15930 Variable Air Terminals
15935 Single Zone Variable Air Volume (SZVAV) Air Handling Units for Public Assembly Spaces
15985 Sequence of Operations
15992 Cleaning and Testing
15993 Balancing of Systems

See Appendix A for the IEH Outdoor Analysis Report (ASHRAE Outdoor Air Assessment) and the PS 347X – Outdoor Air Intake Quality for GSG Prerequisite Q1.1P and LEED v4 EQp1 DRAFT REPORT (CFD Modeling) from NYC SCA. The IEH Outdoor Analysis Report indicates moderate non-attainment for ozone. The Outdoor Air Intake Quality report indicates that no special filters are required to meet the outdoor air quality requirements of ASHRAE 62.1-2007 and the surrounding air meets the air quality requirements of Section 4 of ASHRAE 62.1-2007 and ASHRAE 62.1-2010, necessary for GSG and LEED compliance.

Please note that LEED does not specifically require special filtration for areas with moderate non-attainment for ozone.

Calculations to show compliance with this credit and ASHRAE 62.1-2007 as applicable are provided below; NYCMC 2014 references ASHRAE 62.1-2007.

VENTILATION INDEX

Zone Name and Number	Occupancy Category	Zone Floor Area Az (sq ft)	Are you using default value for zone population?	Zone Population Pz (people)	Zone Air Distribution Effectiveness Ez	Zone Outdoor Airflow Voz (cfm)	Zone Discharge Airflow Vdz (cfm)	Zone Primary Airflow Vpz (cfm)	Zone Secondary Recirculation Fraction Er	Zone Primary Air Fraction Ep
AHU–1										
100 LOBBY	Corridors	1,102	Yes	0	1.00	66	400	400	1.00	1.00
105 PARENT COMMUNITY	Office space	165	No	1	1.00	15	160	160	1.00	1.00
111A NURSE	Office space	159	No	1	1.00	15	50	50	1.00	1.00
111C EXAM ROOM	Office space	77	No	1	1.00	10	25	25	1.00	1.00
103 SUPEVISORY OFFICE	Office space	157	No	1	1.00	15	160	160	1.00	1.00
201 CORRIDOR	Corridors	997	Yes	0	1.00	60	250	250	1.00	1.00
203 KINDERGARTEN	Daycare (through age 4)	930	No	23	1.00	398	400	400	1.00	1.00
204 PRE–K	Daycare (through age 4)	954	No	24	1.00	411	420	420	1.00	1.00
206 PRE–K	Daycare (through age 4)	917	No	23	1.00	395	400	400	1.00	1.00
301 CORRIDOR	Corridors	997	Yes	0	1.00	60	250	250	1.00	1.00
303 PROJECT ROOM	Classrooms (ages 5–8)	930	No	23	1.00	342	400	400	1.00	1.00
304 KINDERGARTEN	Daycare (through age 4)	954	No	24	1.00	411	420	420	1.00	1.00
306 KINDERGARTEN	Daycare (through age 4)	917	No	23	1.00	395	400	400	1.00	1.00
403 GRADE 1	Classrooms (ages 5–8)	838	No	23	1.00	331	400	400	1.00	1.00
404 GRADE 1	Classrooms (ages 5–8)	804	No	21	1.00	307	420	420	1.00	1.00
406 GRADE 1	Classrooms (ages 5–8)	761	No	19	1.00	281	400	400	1.00	1.00
408 GRADE 1	Classrooms (ages 5–8)	792	No	23	1.00	325	400	400	1.00	1.00
503 LIBRARY	Classrooms (ages 5–8)	864	No	23	1.00	334	480	480	1.00	1.00
504 GRADE 2	Classrooms (ages 5–8)	804	No	21	1.00	307	420	420	1.00	1.00
506 GRADE 2	Classrooms (ages 5–8)	756	No	19	1.00	281	400	400	1.00	1.00
508 GRADE 2	Classrooms (ages 5–8)	773	No	20	1.00	293	400	400	1.00	1.00
AHU–2										
C01 CORRIDOR	Corridors	545	Yes	0	1.00	33	150	150	1.00	1.00
109 EXERCISE	Classrooms (ages 5–8)	1,258	No	31	1.00	460	460	460	1.00	1.00
205 RESOURCE ROOM	Daycare (through age 4)	540	No	14	1.00	183	400	400	1.00	1.00
207 KINDERGARTEN	Daycare (through age 4)	921	No	23	1.00	396	400	400	1.00	1.00
208 PRE–K	Daycare (through age 4)	936	No	23	1.00	398	400	400	1.00	1.00
210 PRE–K	Daycare (through age 4)	923	No	23	1.00	396	400	400	1.00	1.00
305 SUPERVISORY	Office space	180	No	1	1.00	16	160	160	1.00	1.00
307 KINDERGARTEN	Daycare (through age 4)	921	No	23	1.00	396	400	400	1.00	1.00
308 KINDERGARTEN	Daycare (through age 4)	917	No	23	1.00	396	400	400	1.00	1.00
310 KINDERGARTEN	Daycare (through age 4)	936	No	23	1.00	398	400	400	1.00	1.00
401 CORRIDOR	Corridors	997	Yes	0	1.00	60	250	250	1.00	1.00
405 STAFF LUNCH	Office space	588	No	3	1.00	50	400	400	1.00	1.00
407 GRADE 1	Classrooms (ages 5–8)	843	No	21	1.00	311	400	400	1.00	1.00
410 GRADE 1	Classrooms (ages 5–8)	788	No	20	1.00	295	400	400	1.00	1.00
412 GRADE 1	Classrooms (ages 5–8)	796	No	20	1.00	296	400	400	1.00	1.00
501 CORRIDOR	Corridors	997	Yes	0	1.00	60	250	250	1.00	1.00
505 SPECIAL EDUCATION	Classrooms (ages 5–8)	637	No	16	1.00	236	400	400	1.00	1.00
507 GRADE 2	Classrooms (ages 5–8)	843	No	21	1.00	311	400	400	1.00	1.00
514 CUSTODIAN'S	Office space	160	No	1	1.00	15	125	125	1.00	1.00
AHU–3										
102 CAFETERIA	Cafeteria	1,960	No	140	1.00	1403	1,785	1,785	1.00	1.00

SUMMARY

System Name and Number	System Type	All zones included in the VRP calculation?	Condition Analyzed	System Floor Area As (sq ft)	System Population Ps (people)	Outdoor Air Intake Flow (required by 6.2.1) Vot (cfm)	Outdoor Air Intake Flow Provided (design) Vot (cfm)	Outdoor air intake flow provided meets or exceeds Vot?
AHU–1	Multiple Zones	Yes	Heating	15648	313	5052	7455	Yes
AHU–2	Multiple Zones	Yes	Heating	14726	286	4706	6595	Yes
AHU–3	Multiple Zones	Yes	Heating	1960	140	1403	1785	Yes

Q1.2R Outdoor Air Delivery Monitoring
Credit anticipated.

The central ventilation system (rooftop HVAC units) for the addition will be provided with air flow measuring stations at the outside air intakes in order to measure/monitor the outside air supplied to the school. Data for outside air measurement will be available for verification at the school level through the BMS system schools operating console in the Custodian's Office or through the DOE centralized host control station for Automatic Temperature Control of Schools in NYC.

The VAV system will be designed with a Demand Control Ventilation (DCV) control sequence. Each classroom will be provided, in addition to space temperature sensor, with an occupancy sensor in order to reset the minimum required ventilation air rate at the outside air intake of the central VAV AHU unit.

Applicable SCA Design Requirements include:
- 6.2.0 General Overview of Heating Ventilation and Air Conditioning Systems
- 6.2.1 HVAC Unit Centralization and Coordination
- 6.2.3 Non-Assembly Spaces (Classrooms, Offices, etc.)
- 6.2.4 Public Assembly Spaces
- 6.2.9 Heating and Cooling Design Parameters (Load Calculations)

Applicable SCA Standard Specifications Include:
- 15970 Temperature Control System (LonWorks BMS/DDC with School Operating Console)
- 15985 Sequence of Operations

Applicable SCA Standard Details include:
- 15985 HVAC Standard Detail Series

The project team has incorporated the above SCA Design Requirements into the HVAC drawings, the SCA Standard Details into drawings M404, M405, M406, and M407 and the above SCA Standard Specifications into the project Specifications.

IAQ Pre-occupancy

Q2.1R Construction IAQ Management Plan, During Construction
credit anticipated.

The project specifications will require that the project contractor to develop an IAQ Construction Management Plan to be implemented during construction. The Plan will include requirements to meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3). All absorptive materials that are stored on site or installed will be protected from moisture damage. A dust control plan will be developed and implemented. Whenever permanently installed air handlers are used, filtration media with a Minimum Efficiency Reporting Value (MERV) 8, as determined by ASHRAE 52.2-1999, will be used at each return air inlet. All filtration media will be replaced prior to occupancy. In addition, smoking will be prohibited inside the building and within 25' of building entrances. The Plan will also require that any materials that emit Volatile Organic Compounds (VOCs) or urea formaldehyde and do not comply with the low emissions criteria, as outlined in credits Q3.1R through Q3.4R, will be mechanically exhausted during installation and will continue to be ventilated for at least 72 hours after installation until emissions dissipate. Prior to substantial completion, all carpeted and soft surfaces will be vacuumed with a high-efficiency particulate arrestor (HEPA) vacuum. The Plan will also contain the following minimum requirements to be implemented during construction:

- Building materials, such as wood, porous insulation, paper, and fabric, will be kept dry to prevent the growth of mold or bacteria.
- Deliveries will be scheduled so that materials that are susceptible to mold growth are installed after the construction area is water tight.
- In the event that materials do experience water damage, they will begin being dried within 24 hours. If they are damp or wet for more than 48 hours, they may need to be discarded as determined by the SCA.
- Any materials showing signs of mold and/or mildew will be removed from the site and properly disposed of. The damaged materials will be replaced with new, undamaged materials.

In addition to all these requirements, the sequence of installation will be coordinated to install high VOC-emitting products prior to the installation of porous or fibrous materials (i.e. carpet). In the event that this is not possible, porous materials will be protected with polyethylene vapor retarders. In addition, all carpeting will be installed after the spaces have been painted. With these efforts, the indoor air quality problems that typically result from the construction process will be minimized and the comfort and well-being of both the construction workers and building occupants will be sustained.

Applicable SCA Standard Specifications Include:
G01700 Project Closeout
S01550 Indoor Air Quality Requirements
S01560 Installation Sequence of Finish Materials

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Q2.2R Construction IAQ Management Plan, Before Occupancy
Credit anticipated.

The IAQ Construction Management Plan that has been outlined in Q2.1R will also include requirements for building flush-out at the completion of construction. The Plan will require that all filtration media be replaced at the end of construction with new filters and that a full building flush-out is performed at the end of construction, but prior to occupancy. Prior to occupancy, a total air volume of 14,000 cubic foot of outdoor air per square foot of floor area will be supplied while maintaining an internal temperate of at least 60° F dry bulb and relative humidity no higher than 60%. In the event that there is not enough time to for a full flush-out prior to occupancy, the building will have to first be supplied with 3,500 cubic foot of outdoor air per square foot of floor area prior to occupancy and then, once occupied, the building will need to be ventilated at a rate of 0.3 cubic feet per minute per square foot of outside air or the design minimum outside air rate, as established in Q1.1R, whichever is greatest. During each day of the flush-out period, the ventilation will begin 3 hours prior to occupancy and continue during occupancy until a total of 14,000 cubic foot of outside air per square foot of floor area has been delivered to the space.

Applicable SCA Standard Specifications Include:
G01700 Project Closeout
S01352 Sustainability Requirements
S01550 Indoor Air Quality Requirements

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Low-Emitting Materials

Q3.1R Low-Emitting Materials, Adhesives & Sealants

Credit anticipated.

When choosing adhesives and sealants, the project team will choose products that comply with the requirements of South Coast Air Quality Management District (SCAQMD) Rule #1168 and, for aerosol adhesives, Green Seal Standard for Commercial Adhesives GS-36.

Applicable SCA Standard Specifications Include:

S01352 Sustainability Requirements
G01600 Material and Equipment
06100 Rough Carpentry
06200 Finish Carpentry
06410 Custom Casework
07900 Joint Sealers
08210 Wood Doors
08524 Aluminum Projected Windows
08800 Miscellaneous Glazing
08921 Aluminum Storefront
09260 Gypsum Board Assemblies
09310 Ceramic Tile
09510 Acoustical Ceilings
09626 Resilient Athletic Flooring
09650 Resilient Flooring
10100 Visual Display Boards
10400 Identifying Devices
10415 Bulletin Boards, Glazed Display Boards, Display Cabinets, and Cases
10830 Mirrors
Div. 15 & 16 - All MEP & fire protection adhesives and sealers

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Q3.2R Low-Emitting Materials, Paints & Coatings

Credit anticipated.

When choosing paints and coatings, the project team will choose products that comply with the requirements of the following when applied to Interior elements:

- Clear Wood Finishes, Floor Coating, Stains, Sealers and Shellacs: South Coast Air Quality Management District (SCAQMD) Rule #1113.
- Architectural Paints, Coatings and Primers: Green Seal Standard GS-11
- Anti-Corrosive and Anti-Rust Paints: Green Seal Standard GS-03.

Applicable SCA Standard Specifications Include:

S01352 Sustainability Requirements
G01600 Material and Equipment
09675 Fluid-Applied Equipment Room Flooring
09860 Graffiti Resistant Coatings
09900 Painting
Div. 15 & 16 - All MEP & fire protection paints and coatings

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Q3.3R Low-Emitting Materials, Flooring Systems
Credit anticipated.

When choosing flooring systems, all hard surface flooring, including vinyl, ceramic flooring, rubber/resilient flooring, wall base, and associated sundries, will be certified as compliant with the FloorScore (or California department of Public Health Standard Method for Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1) standard by a third-party. Furthermore, all sealers, stains, finishes, tile setting adhesives, and grout will comply with the requirements outlined in Q3.1R and Q3.2R. Carpet will Green Label Plus compliant.

Applicable SCA Standard Specifications Include:
S01352 Sustainability Requirements
G01600 Material and Equipment
09310 Ceramic Tile
09650 Resilient Flooring

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Q3.4R Low-Emitting Materials, Comp Wood & Agrifiber Products
Credit anticipated.

When choosing composite wood and agrifiber products, the project team will choose products that contain no added urea formaldehyde. In addition, laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies will contain no-added urea formaldehyde. Composite wood and agrifiber products include particleboard, medium density fiberboard, plywood, wheatboard, strawboard, panel substrates, and door cores.

Applicable SCA Standard Specifications Include:
S01352 Sustainability Requirements
06100 Rough Carpentry
06200 Finish Carpentry
06410 Custom Casework
08210 Wood Doors
10100 Visual Display Boards
10415 Bulletin Boards, Glazed Display Boards, Display Cabinets and cases

Applicable SCA Standard Details include:
06200 Finish Carpentry
06410 Custom Casework

The project team has incorporated the above SCA Standard Specifications into the construction documents. Because MEP systems may use wood material, such as for mounting of telephone terminal blocks in the main telecommunications room (MDF Room) and telecommunication closets (IDF Closets), and for roof curbs of fans, a statement has been added to the MEP specification sections 15301, 15401, 15501, and 16010 (revision received 1May2018) stating that any engineered wood used shall not have added urea-formaldehyde.

Pollution Source Control

Q4.1R Indoor Chemical & Pollutant Source Control

Credit anticipated.

The project will be designed to reduce and control the presence of chemicals and pollutants in the building. This includes both the entry of these pollutants into the building as well as the cross-contamination of pollutants between regularly occupied spaces. All entryways that qualify as regular entry points for students and staff and that have a direct access to the outdoors will include permanent entryway systems at least 10 feet long in the primary direction of travel, such as permanently installed grates, grilles, or slotted systems that allow for cleaning underneath, to capture dirt and particulates.

All spaces where hazardous gases or chemicals may be present will be exhausted sufficiently to create negative air balance with respect to adjacent spaces with the doors to the room closed. Each of these spaces will have self-closing doors and deck-to-deck partitions or a hard-lid ceiling. The exhaust rate will provide for at least 0.50 cubic foot per square foot, with no air re-circulation. Any make-up air provided in the area will be a minimum of 10% less than the exhaust rate. Such spaces that require these measures include janitor's sink closets, copy/print rooms, ground equipment storerooms, any others where hazardous gases or chemicals are present.

Additionally, all occupied spaces will have air filtration media that provides at least a MERV of 13. Filtration will be applied to both return and outside air that is to be delivered as supply air. Containment for future off-site disposal will also be provided for the appropriate disposal of hazardous liquid wastes in places where water and chemical concentrate mixing occurs (the GSG states that the use of hazardous materials in schools is limited and a separate containment area will typically not need to be provided). With these various measures, the exposure of building occupants to hazardous particulates and chemical pollutants will be greatly reduced.

The spaces which may contain hazardous gases or chemicals include as follows:

- Janitor's Closet.

Designated entryways with 10' walk-off systems are located at the Jerome Avenue exterior entrance from the new lobby (shown on A441 dated **9July2018**) and playground exterior entrance (shown on A101 dated **9July2018**).

Applicable SCA Design Requirements include:

1.3.4.1 Entrances and Exits
6.2.0 General Overview of Heating Ventilation and Air Conditioning Systems
6.2.28 HVAC Design Requirements for Special Spaces

Applicable SCA Standard Specifications include:

12485 Foot Grilles
15853 Custom Packaged Rooftop Heating and Cooling Units (Variable Air Volume System
15935 Single Zone Variable Air Volume (SZVAV) Air Handling Units for Public Assembly Spaces

The project team has incorporated the above SCA Design Requirements and specifications into the construction documents. The filter ratings for the air handlers are indicated in specification sections 15853 and 15935 dated 9July2018. Dedicated exhaust has been provided for Janitor's Closets.

Q4.2R Electric Ignition Stoves

Credit is not feasible.

The project has only a warming kitchen which does not include a stove; this credit cannot be earned.

Applicable SCA Design Requirements include:
7.3.13 Carbon Monoxide Detection and Alarm Systems

Applicable SCA Standard Specifications include:
11400 Food Service Equipment
15416 Gas Piping System

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

Q4.3R Post Construction Indoor Air Quality

Credit anticipated.

High Efficiency Particulate Arrestor (HEPA) vacuums shall be provided as part of the initial equipment for the school. Carpeted and other soft surface floors will be vacuumed with HEPA vacuums after construction is complete and prior to occupancy.

From: MENDEZ, DIANA
Sent: Tuesday, March 04, 2008 5:57 PM
To: SHAH, ARTI
Cc: MAJOR, NICOLE
Subject: RE: HEPA Vacuums and Recycling Bins

Arti:

The maintenance equipment list provided to new buildings is selected and approved by DOE/DSF, not F&E. The DOE/DSF approved list includes (2) HEPA vacuums. Please note there are other vacuums also provided (backpack vacuum and wet/dry vacuum)..…

Diana Mendez
Manager, Operations - F&E
NYC School Construction Authority

Controllability of Systems

Q5.1R Controllability of Systems, Lighting

Credit anticipated.

The project will comply with the credit requirements. The project will provide individual lighting controls for at least 90% of the occupancy and low voltage lighting control switches for shared multi-occupants' spaces including classrooms.

Lighting Controls will be as follows:

- All interior lighting shall automatically be controlled by a programmable Relay Control Panel with integral clock except for the emergency lighting. The Relay Control Panel shall be provided at the Electric Closet and to control all spaces that do not have automatic shutoff and/or Occupant sensors.
- All stairs, locker/shower rooms and multi-user student toilet luminaries shall be set to 50% power level in the OFF position and use occupancy sensors (Auto-ON) to bring it up to 100% when occupied.
- Student Classroom Toilets: wall mounted vacancy sensor with low-voltage switch at door.

- Emergency lighting controlled from key operated switches located at the main entrance; non-emergency lighting luminaires to have built-in censor; all luminaires in stairs are emergency.
- Cafeteria/Lunch Room: key operated switches for emergency lights and occupancy sensor for non-emergency lights.
- Instructional space: For spaces 2,000 SF or less in area, lighting shall be controlled by one ceiling mounted vacancy sensor/Daylight harvesting Sensor and one control switch located by the classroom entrance door. Control switch to consist of one five-button switch for High, Low, 50%, 100% and Off control of lighting in each classroom.
- Corridor: emergency lighting controlled from key operated switches located at the main entrance; other lights controlled by built-in occupancy sensor in each luminaire.
- All sensors in corridors, student locker rooms, stair and bathrooms to be set for 15 minutes.
- Electrical Closet: toggle switch.
- Library: three-way switches at entrance and at librarian desk, and ceiling mounted vacancy sensors.
- Individual office: wall mounted vacancy/daylight sensor to automatically control lighting with an override switch. Provide daylight room controller to control both near window rows of light. Provide an over-ride three position push button switch set to off, 50% and 100%.
- Janitor’s Closet: wall-mounted vacancy sensor.
- Mechanical Areas – Service Areas: toggle switch.
- Staff Toilets: vacancy sensor and toggle switch.
- Storage: wall-mounted vacancy sensor and toggle switch.
- Staff Locker Room: vacancy sensor and toggle switch.
- Staff Lunchroom/Lounge: ceiling-mounted vacancy sensor and toggle switch.
- Waiting Area: ceiling mounted occupancy sensors.
- Clinic/Exam Areas of medical suites: push-button switch.

Applicable SCA Design Requirements include:
7.2.1 Interior Lighting

Applicable SCA Standard Specifications include:
16140 Wiring Devices
16145 Lighting Control Devices

Applicable SCA Standard Details include:
SCA Room Planning Standards (Standard Room Layouts)

Floor plans indicating the quantity of lighting fixtures, control switches for lights, and furniture layouts for every room have been submitted to the SCA and can be found on drawings E601 for lighting fixture schedule, A801 - A805 for reflected ceiling plans, FF101-FF221 for furniture layouts and E100-E105 for control switches.

Q5.2R Controllability of Systems, Thermal Comfort

Credit anticipated.

A thermal comfort control system will be designed to provide comfort controls for 50% of the building occupants in workspaces. Comfort control is defined by ASHRAE Standard 55-2004 as the control in the occupant's local environment of one or more of these primary factors: air temperature, radiant temperature asymmetry, air speed, and humidity. By following SCA standards, this credit will be achieved by providing thermal comfort control in shared group multi-occupancy spaces including, but not limited to, instructional rooms, exercise, administration, and cafeteria. By providing a thermal comfort control system, the productivity, comfort, and well-being of occupants will be greatly improved.

- Classroom: As per SCA design, room layout standards, a thermostat will be provided in each classroom along with operable windows.
- Special Ed Classroom: As per SCA design room layout standards, a thermostat will be provided in each classroom along with operable windows.
- Office: As per SCA design, room layout standards, thermostat will be provided along with operable windows.

Applicable SCA Design Requirements include:
6.2.0 General Overview of Heating Ventilation and Air Conditioning Systems
6.2.1 HVAC Unit Centralization and Coordination
6.2.3 Non-Assembly Spaces (Classrooms, Offices, etc.)
6.2.4 Public Assembly Spaces

Applicable SCA Standard Specifications include:
15970 Temperature Control System (LONWORKS BMS/DDC with School Operating Console)
15985 Sequence of Operations

Applicable SCA Standard Details include:
15985 HVAC Standard Detail Series

Additional applicable SCA Design Standards include:
SCA Room Planning Standards (Standard Room Layouts)

Floor plans indicating the locations of temperature control devices are found on M101 to M105. The symbol "TS" for Temperature Sensors, "T" for Thermostat, "TL" for Lonworks Thermostat, and "H" for Humidity Sensor are indicated in applicable spaces; these devices provide manual control at the space and also are connected to the BMS system. Operable windows are indicated on elevation drawings A201 through A204 and the window schedule on A920-A921.

Thermal Comfort

Q6.1R Thermal Comfort, Design

Credit anticipated.

All HVAC systems will be designed to comply with ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.

Inside ambient design parameter for heating: 72ºF DB.
Inside ambient design parameter for cooling: 78ºF DB, 50% RH, with the exception of the special education spaces which will be maintained at 75 ºF.

No proposed departures from SCA standards are currently indicated.

Applicable SCA Design Requirements include:

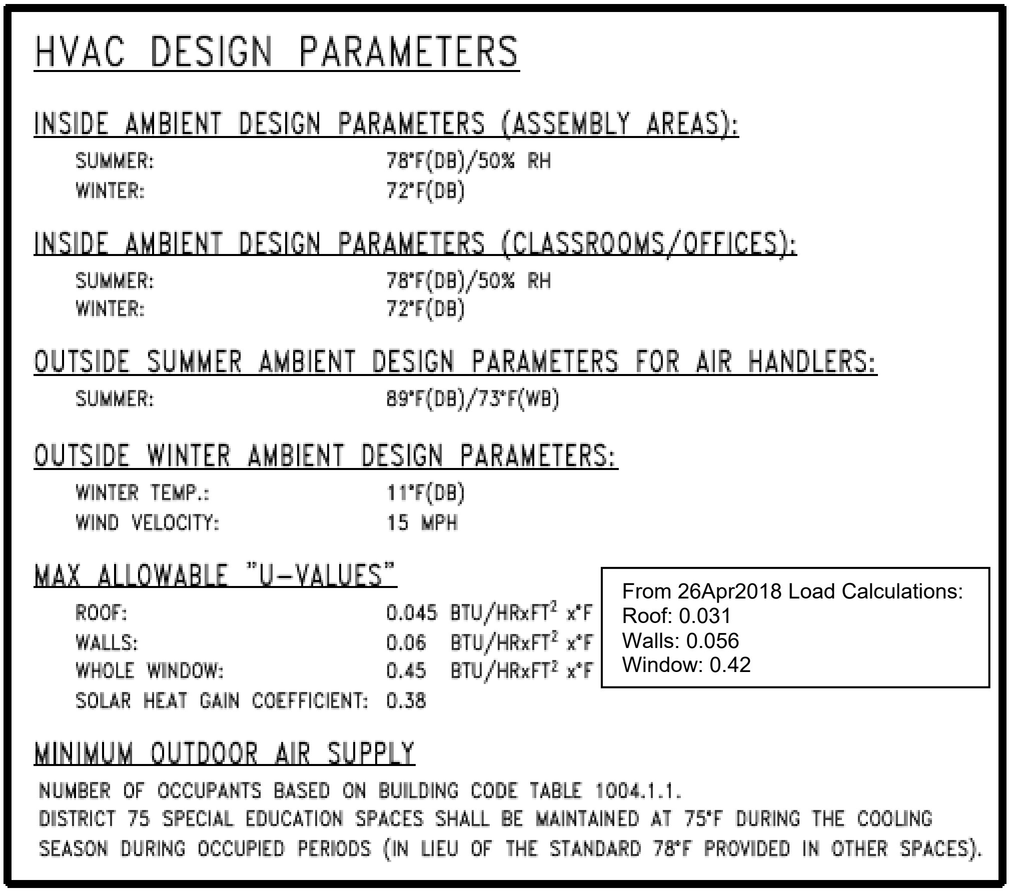
- 6.2.0 General Overview of Heating Ventilation and Air Conditioning Systems
- 6.2.1 HVAC Unit Centralization and Coordination
- 6.2.3 Non-Assembly Spaces (Classrooms, Offices, etc.)
- 6.2.4 Public Assembly Spaces
- 6.2.9 Heating and Cooling Design Parameters (Load Calculations)
- 6.2.22 Kitchen Ventilation
- 6.2.28 HVAC Design Requirement for Special Spaces

Applicable SCA Standard Specifications include:

- 15970 Temperature Control System (LONWORKS BMS/DDC with School Operating Console)
- 15985 Sequence of Operations

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

HVAC Design Parameters copied from M001 dated **9July**2018:



HVAC DESIGN PARAMETERS

INSIDE AMBIENT DESIGN PARAMETERS (ASSEMBLY AREAS):

SUMMER:	78°F(DB)/50% RH
WINTER:	72°F(DB)

INSIDE AMBIENT DESIGN PARAMETERS (CLASSROOMS/OFFICES):

SUMMER:	78°F(DB)/50% RH
WINTER:	72°F(DB)

OUTSIDE SUMMER AMBIENT DESIGN PARAMETERS FOR AIR HANDLERS:

SUMMER:	89°F(DB)/73°F(WB)

OUTSIDE WINTER AMBIENT DESIGN PARAMETERS:

WINTER TEMP.:	11°F(DB)
WIND VELOCITY:	15 MPH

MAX ALLOWABLE "U-VALUES"

ROOF:	0.045 BTU/HRxFT^2 x°F
WALLS:	0.06 BTU/HRxFT^2 x°F
WHOLE WINDOW:	0.45 BTU/HRxFT^2 x°F
SOLAR HEAT GAIN COEFFICIENT:	0.38

From 26Apr2018 Load Calculations:
Roof: 0.031
Walls: 0.056
Window: 0.42

MINIMUM OUTDOOR AIR SUPPLY

NUMBER OF OCCUPANTS BASED ON BUILDING CODE TABLE 1004.1.1.
DISTRICT 75 SPECIAL EDUCATION SPACES SHALL BE MAINTAINED AT 75°F DURING THE COOLING SEASON DURING OCCUPIED PERIODS (IN LIEU OF THE STANDARD 78°F PROVIDED IN OTHER SPACES).

Lighting and Views

Q7.1 Daylight & Views, Daylight 75% of Classrooms

Credit anticipated.

Although the site constrains the new building to an 83’ by 122’ shape at a Northeast to Southwest orientation it provides all the classrooms a perimeter exposure; each classroom has at least one full wall facing the exterior. As per SCA standards, all windows in classrooms will be provided with manually operated window shades for glare control.

The following updated (downloaded from SCA GSG website on 30Apr2018) Daylight Form below includes a breakdown of the day lighted and non-day lighted areas for each space with a result of 77.26% daylit with VLT of 0.67 (08524 spec updated Dec2017) which meets the credit requirement of 75%.

Excluded Spaces:
Classroom toilets and classroom closets are currently excluded from the calculations.

Applicable SCA Design Requirements include:
- 1.3.1.1 Building Location and Orientation
- 1.3.1.2 Planning Guidelines for New Schools and Additions
- 5.7.1 Window Shades and Draperies

Applicable SCA Standard Specifications include:
- 08524 Aluminum Projected Windows

08800 Miscellaneous Glazing
08921 Aluminum Storefront
12501 Chain and Clutch Operated Window Shades

The project team has incorporated the above SCA Standard Specifications into the construction documents dated **9July**2018.

DAYLIGHT & VIEWS
Daylight Calculation Form for Classrooms
Credit Q7.1, Q7.2

School Construction Authority
NYC Green School Rating Systems

Project: **P.S. 347X Bronx Annex at PS33X**
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW: 107340
Design #:
Architect: **Mitchell Giurgola Architects, LLP**
Preparer: **EME Group**
Date: 4/30/18

RM #	Room Name	Room Data			Window Data						Glazing Data		Transmittance-VLT		Daylight Zone		WFR Factor	Daylight Zone Factor		Daylight Area		Compliant Daylight Area	Compliant area %
		Room Area		Room Length	Effective Head Hgt	Sill Hgt	Daylight Hgt	Window Width/ Room	Window Area - WA		Glazing factor	Glass Area	Actual	Min	Daylight Zone Depth	Daylight Area	Actual	Actual/ Greatest	Required		Actual Daylight Zone Factor	Greatest Room Area Allowed	
204	Pre-K	945	SF	64.13	10.00	2.67	7.33	31.20	229	SF	0.87	199	0.67	0.67	20.00	1282.60	0.22	0.15	0.15 - 0.18	*919*	*0.145*	***919***	0.97
205	Readg/Speech	325	SF	19.61	10.00	2.67	7.33	11.75	86	SF	0.86	74	0.67	0.67	20.00	392.20	0.22	0.15	0.15 - 0.18	*325*	*0.153*	***325***	1.00
205	Over Daylit	79	SF	8.44	10.00	2.67	7.33	7.75	57	SF	0.86	49	0.67	0.67	20.00	168.80	0.22	0.15	0.15 - 0.18	*79*	*0.414*	***0***	1.00
206	Pre-K	898	SF	28.96	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	579.20	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.76
207	Kindergarten	902	SF	29.47	10.00	2.67	7.33	19.35	142	SF	0.87	123	0.67	0.67	20.00	589.40	0.22	0.15	0.15 - 0.18	*570*	*0.145*	***570***	0.63
208	Pre-K	927	SF	28.96	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	579.20	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.74
209	Kindergarten	914	SF	65.07	10.00	2.67	7.33	30.75	225	SF	0.87	196	0.67	0.67	20.00	1301.40	0.22	0.15	0.15 - 0.18	*906*	*0.145*	***906***	0.99
210	Pre-K	909	SF	29.45	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	589.00	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.75
310	Kindergarten	909	SF	29.46	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	589.20	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.75
303	Project Room	891	SF	64.82	10.00	2.67	7.33	26.49	194	SF	0.87	169	0.67	0.67	20.00	1296.40	0.22	0.15	0.15 - 0.18	*780*	*0.145*	***780***	0.88
304	Kindergarten	937	SF	64.13	10.00	2.67	7.33	31.20	229	SF	0.87	199	0.67	0.67	20.00	1282.60	0.22	0.15	0.15 - 0.18	*919*	*0.145*	***919***	0.98
306	Kindergarten	898	SF	28.96	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	579.20	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.76
307	Kindergarten	902	SF	29.46	10.00	2.67	7.33	19.35	142	SF	0.87	123	0.67	0.67	20.00	589.20	0.22	0.15	0.15 - 0.18	*570*	*0.145*	***570***	0.63
308	Kindergarten	919	SF	28.96	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	579.20	0.22	0.15	0.15 - 0.18	*684*	*0.145*	***684***	0.74
403	Grade 1	824	SF	64.63	10.00	2.67	7.33	26.67	195	SF	0.87	170	0.67	0.67	20.00	1292.60	0.22	0.15	0.15 - 0.18	*785*	*0.145*	***785***	0.95
404	Grade 1	779	SF	58.39	10.00	2.67	7.33	23.20	170	SF	0.87	148	0.67	0.67	20.00	1167.80	0.22	0.15	0.15 - 0.18	*683*	*0.145*	***683***	0.88
406	Grade 1	719	SF	22.97	10.00	2.67	7.33	15.50	114	SF	0.86	98	0.67	0.67	20.00	459.40	0.22	0.15	0.15 - 0.18	*451*	*0.145*	***451***	0.63
407	Grade 1	806	SF	29.46	10.00	2.67	7.33	19.35	142	SF	0.87	123	0.67	0.67	20.00	589.20	0.22	0.15	0.15 - 0.18	*570*	*0.145*	***570***	0.71
408	Grade 1	755	SF	22.97	10.00	2.67	7.33	15.50	114	SF	0.86	98	0.67	0.67	20.00	459.40	0.22	0.15	0.15 - 0.18	*451*	*0.145*	***451***	0.60
410	Grade 1	726	SF	22.97	10.00	2.67	7.33	15.50	114	SF	0.86	98	0.67	0.67	20.00	459.40	0.22	0.15	0.15 - 0.18	*451*	*0.145*	***451***	0.62
412	Grade 1	765	SF	23.72	10.00	2.67	7.33	15.50	114	SF	0.86	98	0.67	0.67	20.00	474.40	0.22	0.15	0.15 - 0.18	*451*	*0.145*	***451***	0.59
504	Grade 2	779	SF	58.38	10.00	2.67	7.33	23.20	170	SF	0.87	148	0.67	0.67	20.00	1167.60	0.22	0.15	0.15 - 0.18	*683*	*0.145*	***683***	0.88
505	CSD Special Educa	618	SF	34.75	10.00	2.67	7.33	23.50	172	SF	0.86	148	0.67	0.67	20.00	695.00	0.22	0.15	0.15 - 0.18	*618*	*0.161*	***618***	1.00
506	Grade 2	719	SF	22.97	10.00	2.67	7.33	15.50	114	SF	0.86	98	0.67	0.67	20.00	459.40	0.22	0.15	0.15 - 0.18	*451*	*0.145*	***451***	0.63
507	Grade 2	777	SF	29.46	10.00	2.67	7.33	19.35	142	SF	0.87	123	0.67	0.67	20.00	589.20	0.22	0.15	0.15 - 0.18	*570*	*0.145*	***570***	0.73
508	Grade 2	716	SF	23.59	10.00	2.67	7.33	15.50	114	SF	0.87	99	0.67	1.67	20.00	471.80	0.22	0.15	0.15 - 0.19	*456*	*0.145*	***456***	0.64

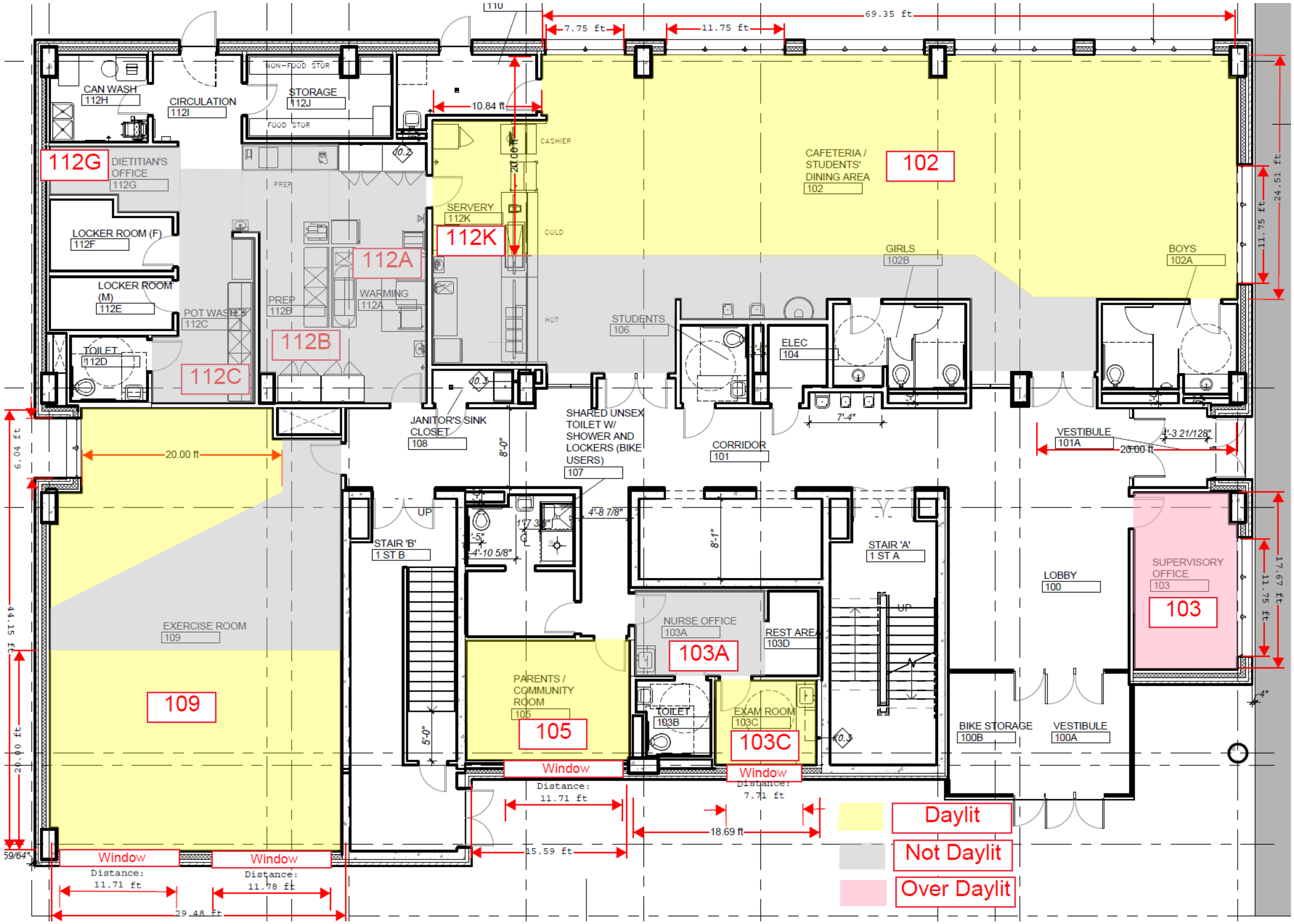
SF OF AREA BEING EVALUATED FOR DAYLIGHT FACTOR: 20,338

SF OF AREA THAT ACHIEVES DAYLIGHT FACTOR: 15,713

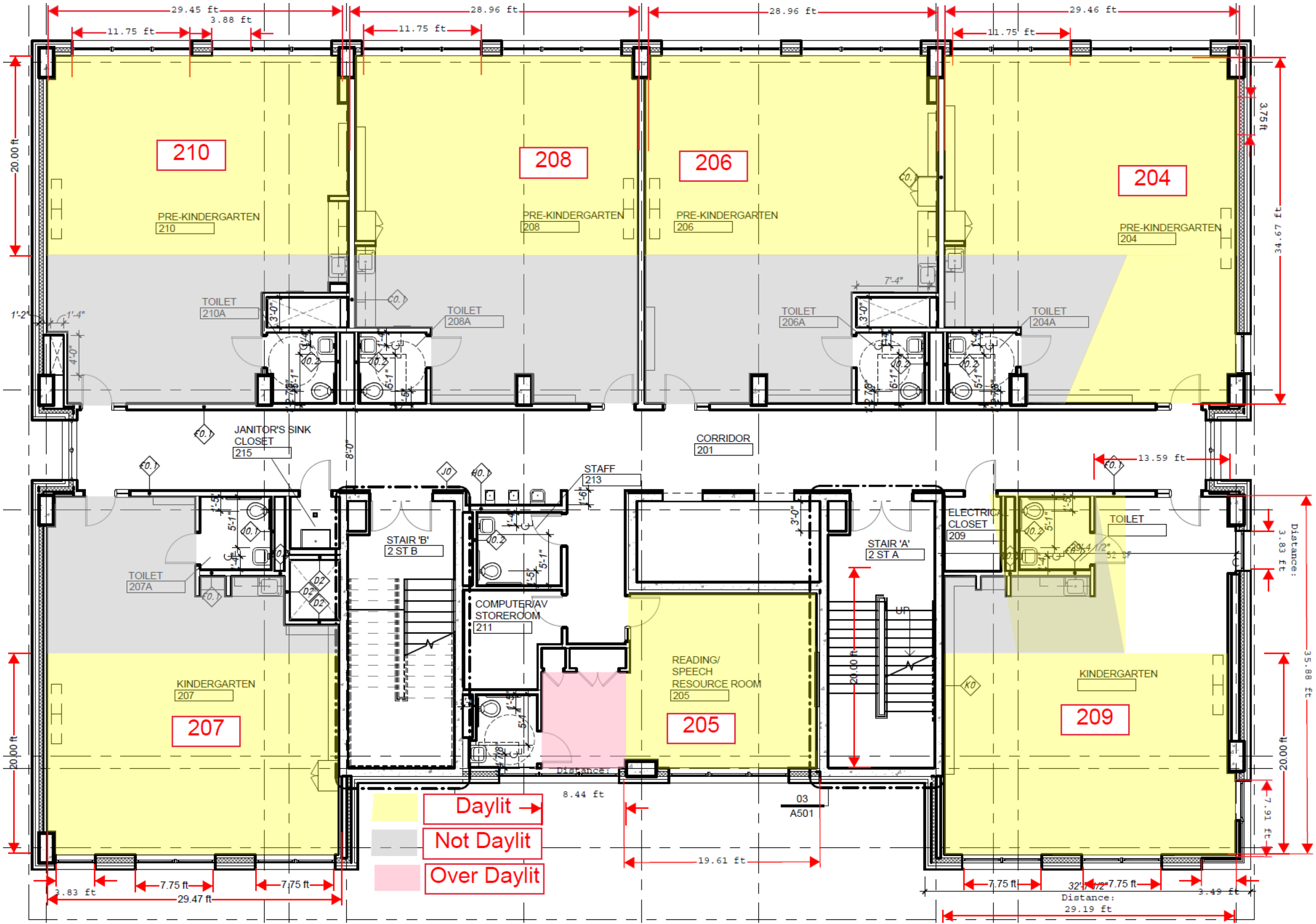
Overall Percentage Achieved: ***77.26%***

Requirement to achieve credit Q7.1 is Daylight in 75% of classroom areas ***Complies? (Y/ N): YES***

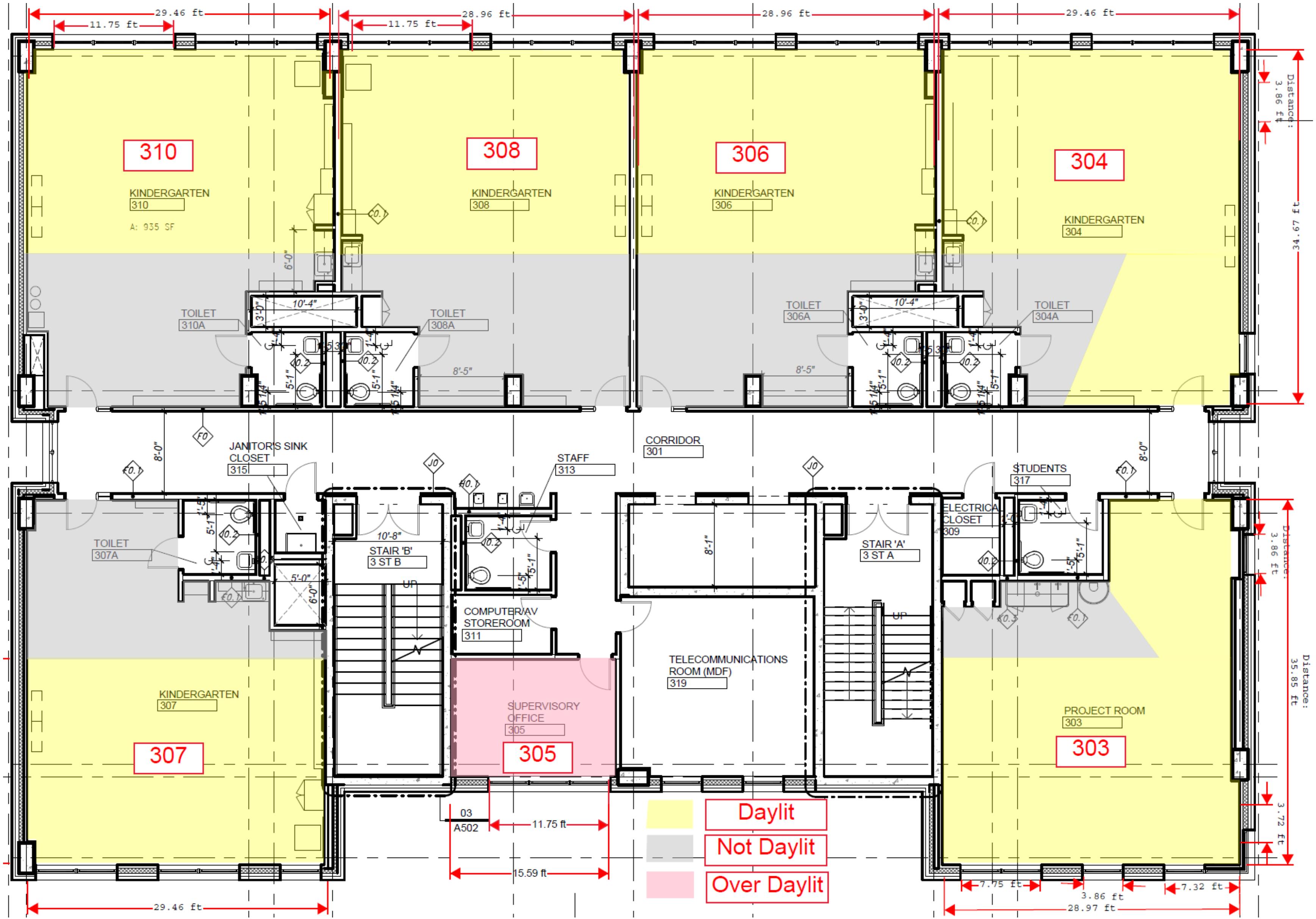
Requirement to achieve credit Q7.2 is Daylight in 90% of classroom areas ***Complies? (Y/ N): NO***



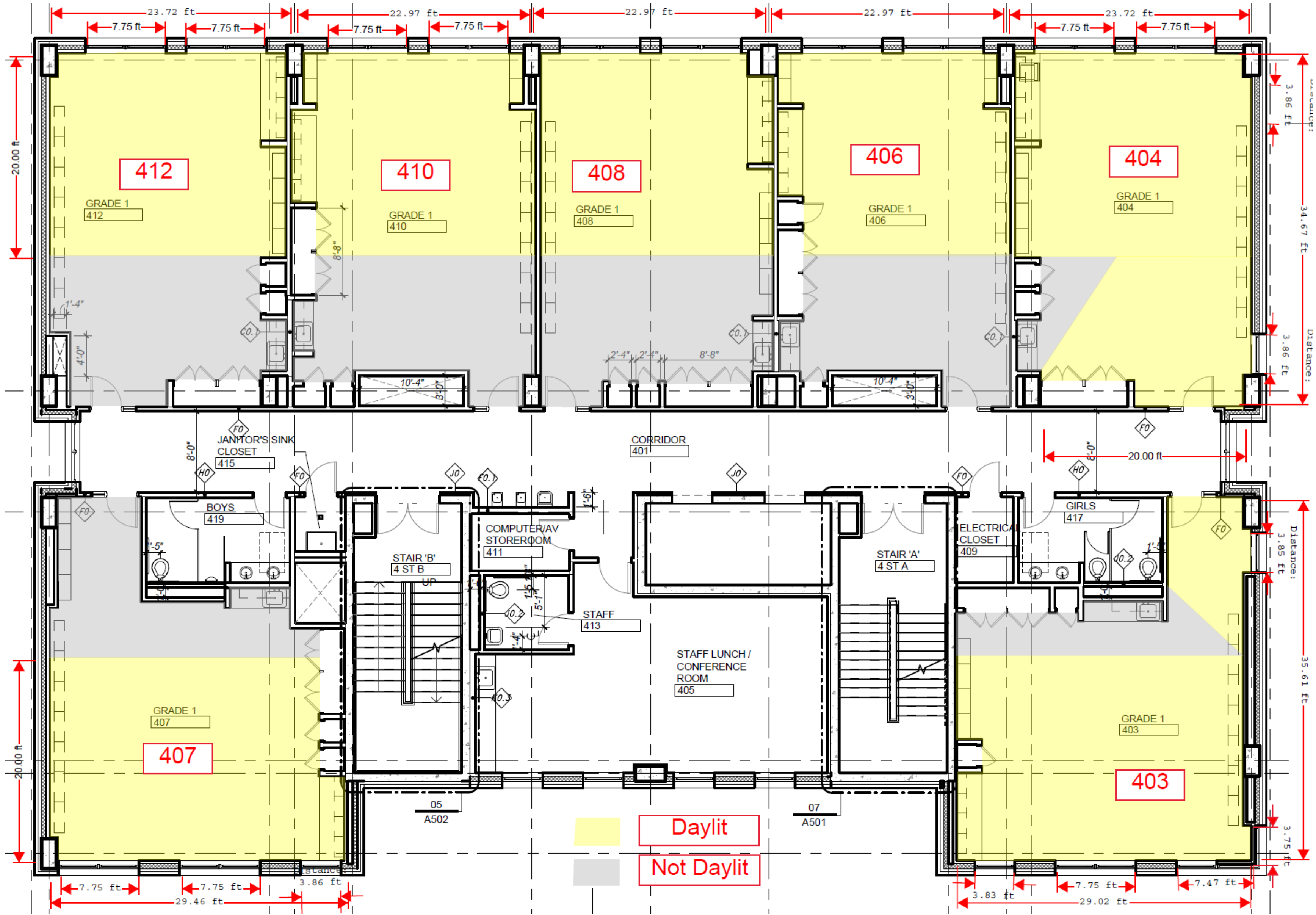
Plan of 1st Fl Dated 19Feb2018



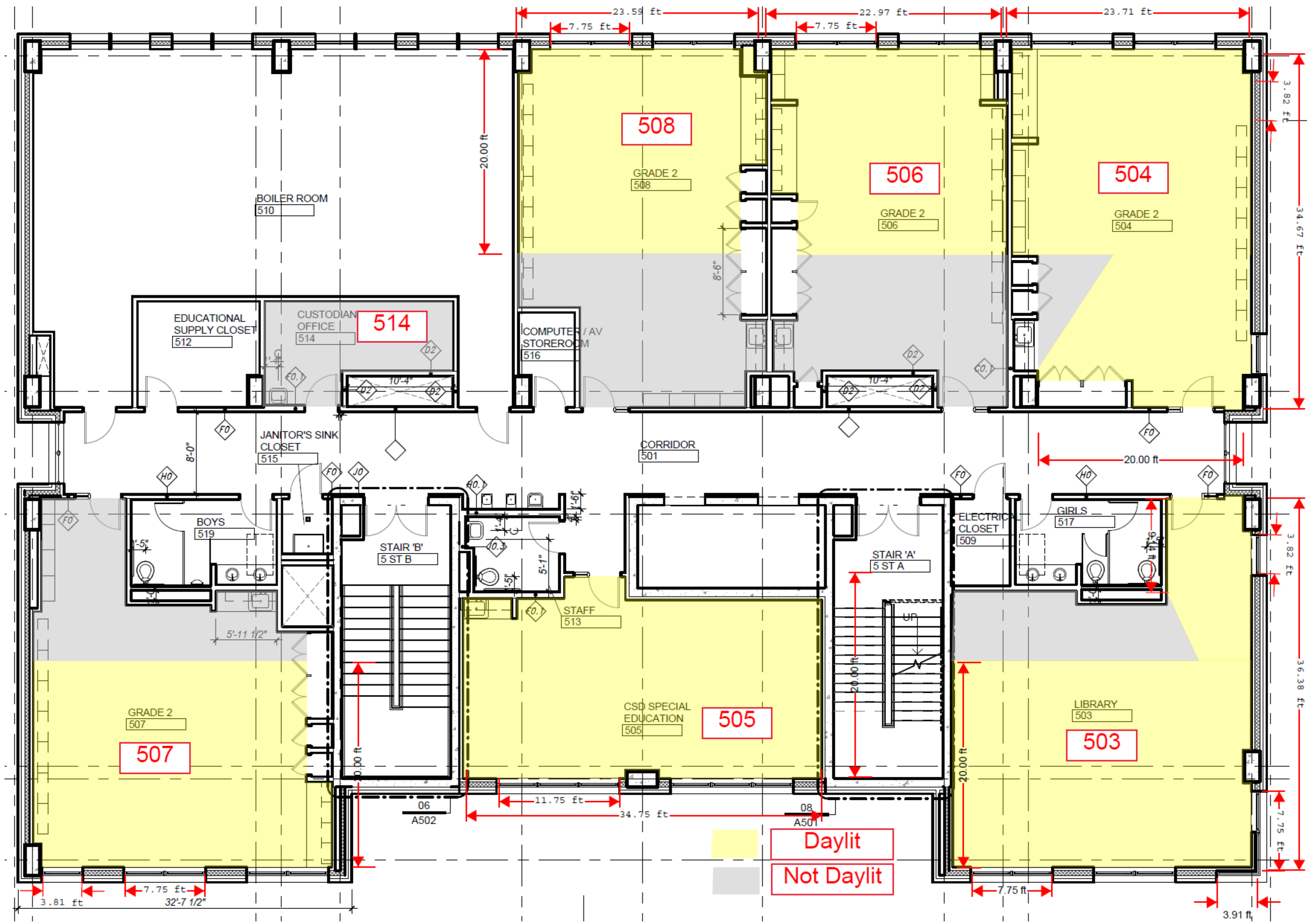
Plan of 2nd Fl Dated 19Feb2018.



Plan of 3rd Fl Dated 19Feb2018.



Plan of 4th Fl Dated 19Feb2018.



Plan of 5th Fl Dated 19Feb2018.

Q7.2 Daylight & Views, Daylight 90% of Classrooms

Credit is not feasible.

See narrative, calculations, plans, and applicable SCA standards above in Q7.1.

The updated (downloaded from SCA GSG website on 30Apr2018) Daylight Form above includes a breakdown of the day lighted and non-day lighted areas for each space with a result of 77% daylit with VLT of 0.67 (08524 spec updated Dec2017) which does not meet the credit requirement of 90%.

Q7.3 Daylight & Views, Daylight for 75% of Other Spaces

Credit is not feasible.

Although the site constrains the new building to an 83' by 122' shape at a Northeast to Southwest orientation it provides all the classrooms a perimeter exposure; most other spaces have at least one full wall facing the exterior. As per SCA standards, all windows will be provided with manually operated window shades for glare control.

The following updated (downloaded from SCA GSG website on 30Apr2018) Daylight Form below includes a breakdown of the day lighted and non-day lighted areas for each space with a result of 64.04% daylit with VLT of 0.67 (08524 spec updated Dec2017) which does not meet the credit requirement of 75%. This calculation was updated with glass block in cafeteria.

Excluded Spaces:
No regularly occupied spaces are currently excluded from the calculations.

Applicable SCA Design Requirements include:

- 1.3.1.1 Building Location and Orientation
- 1.3.1.2 Planning Guidelines for New Schools and Additions
- 5.7.1 Window Shades and Draperies

Applicable SCA Standard Specifications include:

- 08524 Aluminum Projected Windows
- 08800 Miscellaneous Glazing
- 08921 Aluminum Storefront
- 12501 Chain and Clutch Operated Window Shades

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 30Apr2018.

See plans in Q7.1.

DAYLIGHT & VIEWS
Daylight Calculation Form for Other Spaces
Credit Q7.3

School Construction Authority
NYC Green School Rating Systems

Project: **P.S. 347X Bronx Annex at PS33X**
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW: 107340
Design #:

Architect: **Mitchell Giurgola Architects, LLP**
Preparer: **EME Group**
Date: 6/8/18

RM #	Room Name	Room Data				Window Data					Glazing Data		Transmittance-VLT		Daylight Zone		WFR Factor	Daylight Zone Factor		Daylight Area		Compliant Daylight Area	Compliant area %
		Room Area		Room Length	Effective Head Hgt	Sill Hgt	Daylight Hgt	Window Width/ Room	Window Area - WA		Glazing factor	Glass Area	Actual	Min	Daylight Zone Depth	Daylight Area	Actual	Actual/ Greatest	Required		Actual Daylight Zone Factor	Greatest Room Area Allowed	
102	Cafeteria w/ glass block	1959	SF	93.81	10.00	2.67	7.33	58.75	431	SF	0.86	370	0.75	0.67	20.00	1876.20	0.19	0.15	0.15 - 0.18	*1,915*	*0.145*	***1,915***	0.98
112K	Servery	265	SF	10.84	10.00	2.67	7.33	7.75	57	SF	0.86	49	0.67	0.67	20.00	216.80	0.22	0.15	0.15 - 0.18	*225*	*0.145*	***225***	0.85
112 A,B,C	Warming Kit	574	SF	0.00	10.00	2.67	7.33	0.10	1	SF	0.87	1	0.67	0.67	20.00	0.00	0.22	0.15	0.15 - 0.18	*2*	*0.214*	***0***	0.00
112G	Dietician Office	84	SF	0.00	10.00	2.67	7.33	0.10	1	SF	0.87	1	0.67	0.67	20.00	0.00	0.22	0.15	0.15 - 0.18	*2*	*0.214*	***0***	0.02
109	Exercise Room	1251	SF	73.63	10.00	5.00	5.00	29.50	148	SF	0.87	128	0.67	0.67	20.00	1472.60	0.22	0.15	0.15 - 0.18	*592*	*0.145*	***592***	0.47
105	Parents Room	209	SF	15.59	10.00	5.00	5.00	11.75	59	SF	0.86	51	0.67	0.67	20.00	311.80	0.22	0.15	0.15 - 0.18	*209*	*0.162*	***209***	1.00
103	Supervisory Off	176	SF	17.67	10.00	2.67	7.33	11.75	86	SF	0.87	75	0.67	0.67	20.00	353.40	0.22	0.15	0.15 - 0.18	*176*	*0.285*	***0***	1.00
103 A,C	Medical Suite	194	SF	18.69	10.00	5.00	5.00	7.75	39	SF	0.86	33	0.67	0.67	20.00	373.80	0.22	0.15	0.15 - 0.18	*153*	*0.146*	***153***	0.79
305	Supervisory Off	177	SF	15.59	10.00	2.67	7.33	11.75	86	SF	0.87	75	0.67	0.67	20.00	311.80	0.22	0.15	0.15 - 0.18	*177*	*0.284*	***0***	1.00
503	Library	860	SF	65.40	10.00	2.67	7.33	23.26	170	SF	0.87	148	0.67	0.67	20.00	1308.00	0.22	0.15	0.15 - 0.18	*685*	*0.145*	***685***	0.80
514	Custodian Offic	152	SF	0.00	10.00	2.67	7.33	0.10	1	SF	0.87	1	0.67	0.67	20.00	0.00	0.22	0.15	0.15 - 0.18	*2*	*0.214*	***0***	0.01

SF OF AREA BEING EVALUATED FOR DAYLIGHT FACTOR: **5,901**

SF OF AREA THAT ACHIEVES DAYLIGHT FACTOR: **3,779**

Overall Percentage Achieved: ***64.04%***

Requirement to achieve credit Q7.3 is Daylight in 75% of Other Spaces

Complies? (Y/ N): ***NO***

Q7.4 Daylight & Views, Views

The credit is not feasible.

Although the site constrains the new building to an 83' by 122' shape at a Northeast to Southwest orientation it provides all the classrooms a perimeter exposure; each classroom has at least one full wall facing the exterior.

Excluded Spaces:
Classroom toilets and classroom closets are currently excluded from the calculations.

Applicable SCA Design Requirements include:

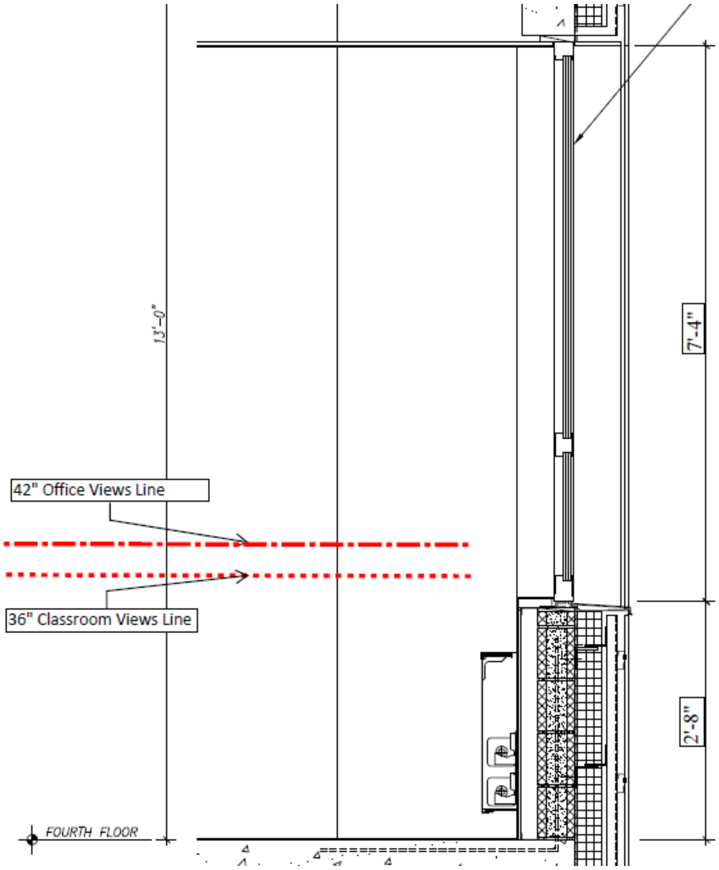
- 1.3.1.1 Building Location and Orientation
- 1.3.1.2 Planning Guidelines for New Schools and Additions
- 5.7.1 Window Shades and Draperies

Applicable SCA Standard Specifications include:

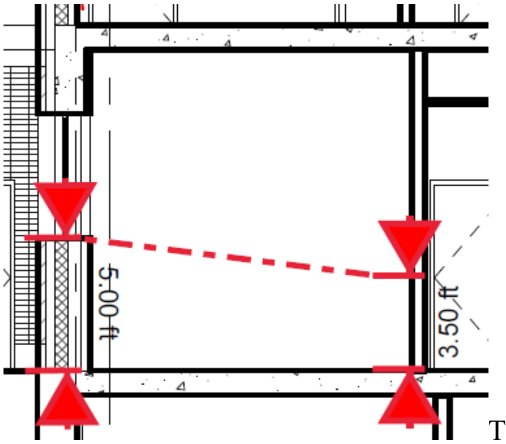
- 08524 Aluminum Projected Windows
- 08800 Miscellaneous Glazing
- 08921 Aluminum Storefront
- 12501 Chain and Clutch Operated Window Shades

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

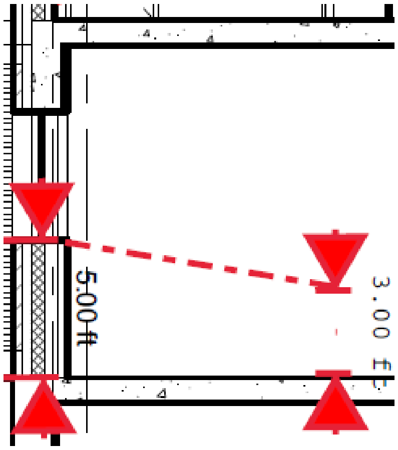
The following Views Form below includes a breakdown of the area for each space with compliant views to the exterior resulting in **87.6% (with glass block in cafeteria)** views which **does not** meet the 90% requirement and thus **not** earn this credit.



Typical view section at classroom and office windows on Floors 2-5.



Typical view section at 1st Fl Parent/Community and Exam Rooms



Typical view section at 1st Fl Exercise Room

LEED Interpretation 10254, made on 10/1/2012, allows sloped view lines starting at 42 inches in IEQc8.2 (GSG Q7.4) and specifically states that the view line is not required to be horizontal: "To determine direct lines of sight in section, provide one or more representative sight lines from a point at eye height (42 inches) in the regularly occupied space to perimeter vision glazing between 30 inches and 90 inches above the finished floor of the building. The direct line of sight may be slope from 42 inches at the seated area to any unobstructed area of the vision glazing. The direct line of sight is not required to be horizontal at 42 inches only.

DAYLIGHT & VIEWS

Views Calculation Form

Credit Q7.4

School Construction Authority

NYC Green Schools Rating System

Project: P.S. 347X Bronx Annex at PS33X

Address: 2424 Jerome Ave, Bronx, NY, 10468

LLW #: 107340

Design #:

Architect: **Mitchell Giurgola Architects**

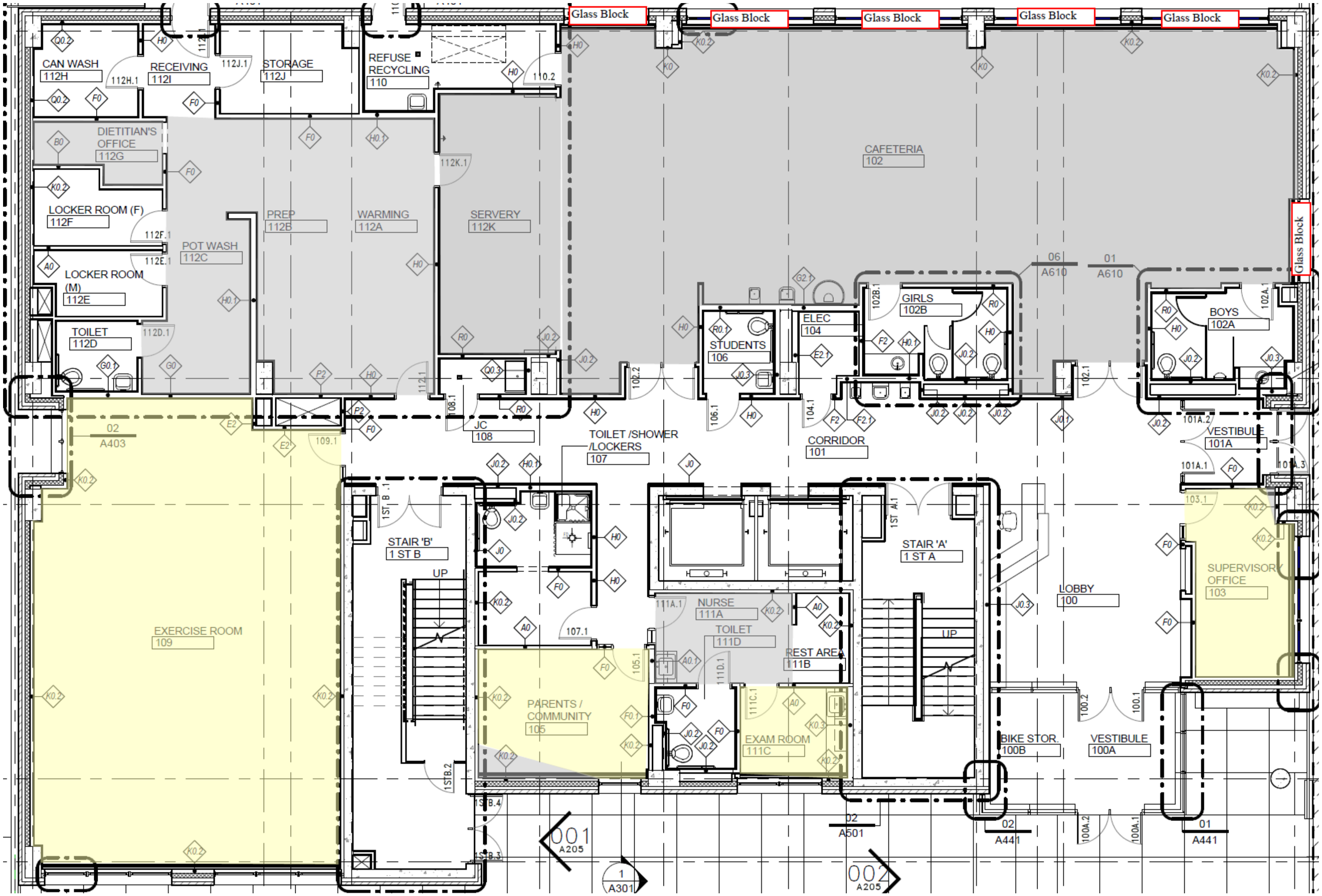
Preparer: **EME Group**

Date: 6/8/18

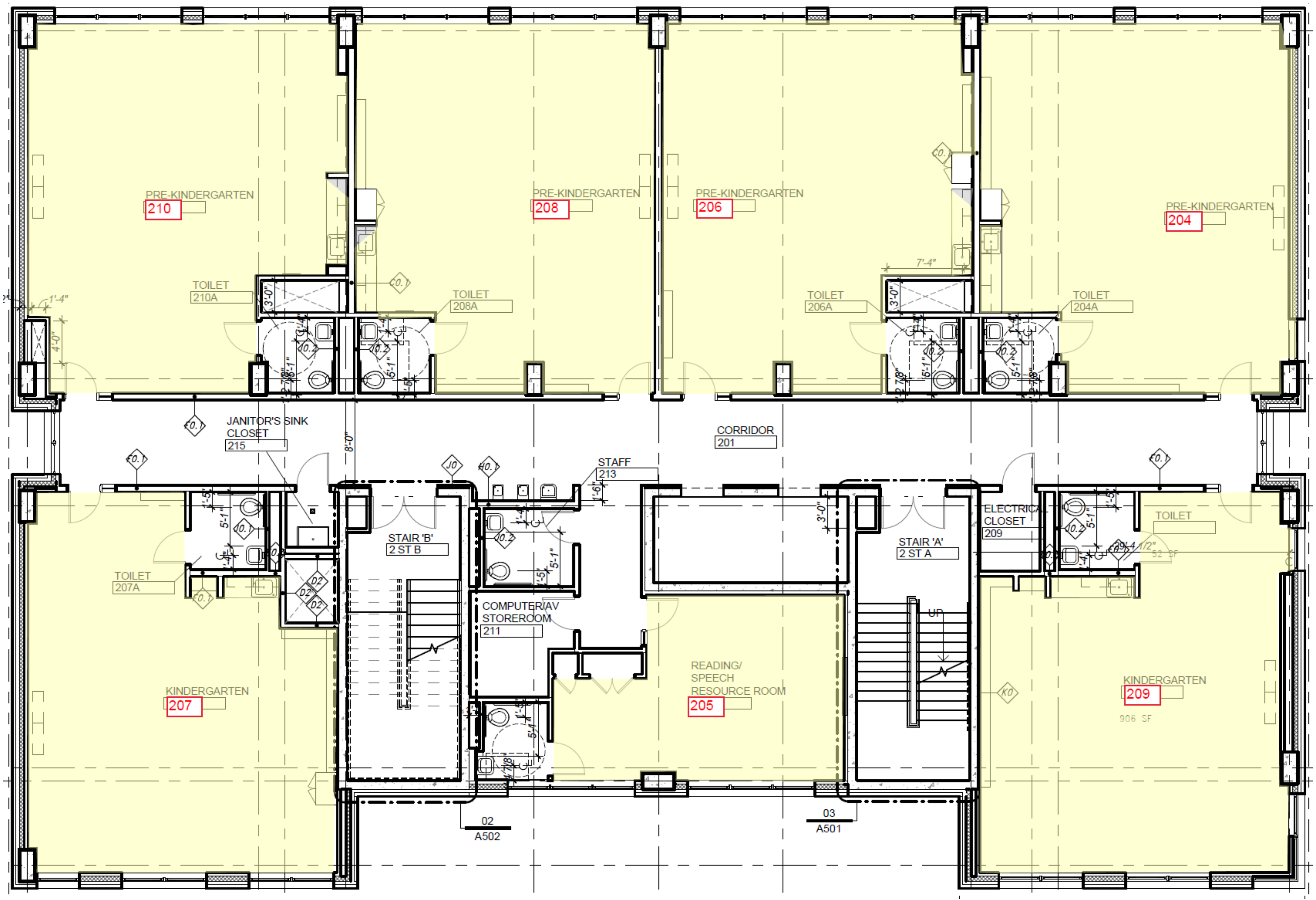
RM #	**RM NAME**	**Total Occupiable Area in SF**	**Step 1: Horizontal View at:** 36" for rooms used by for PK-thru 5 grades	42" for rooms used by for 6-thru 12 grades and offices	**Step 2: Calculated Area of Room that Does Not have Direct Line of Sight to Perimeter Vision Glazing**	**Compliant Area (sf)**
			Y/N/NA	**Y/N/NA**		
1ST FLOOR						
101	Cafeteria	1896	**Y**	**NA**	**1,896**	0
101a	Servery	276	**NA**	**Y**	**276**	0
101b	Warming Kit	658	**N**	**N**	**658**	0
101c	Dietician Office	62	**N**	**N**	**62**	0
102	Exercise Room	1217	**Y**	**NA**	**0**	1,217
105	Parents Room	209	**NA**	**Y**	**33**	176
103	Supervisory Office	164	**NA**	**Y**	1	163
111	Medical Suite	194	**NA**	**Y**	110	84
		4,676				**1640**
2ND FLOOR						
210	Pre-K	909	**Y**	**NA**	**1**	908
208	Pre-K	927	**Y**	**NA**	**2**	925
206	Pre-K	898	**Y**	**NA**	**2**	896
204	Pre-K	945	**Y**	**NA**	**0**	945
209	Kindergarten	914	**Y**	**NA**	**0**	914
205	Reading/Speech	404	**Y**	**NA**	**0**	404
207	Kindergarten	902	**Y**	**NA**	**0**	902
		5,899				**5894**
3RD FLOOR						
310	Kindergarten	909	**Y**	**NA**	**2**	908
308	Kindergarten	919	**Y**	**NA**	**2**	917
306	Kindergarten	898	**Y**	**NA**	**2**	897
304	Kindergarten	937	**Y**	**NA**	**0**	937
307	Kindergarten	902	**Y**	**NA**	**0**	902
303	Project Room	891	**Y**	**NA**	**0**	891
305	Supervisory Office	177	**NA**	**Y**	**0**	177
		5,633				**5628**
4TH FLOOR						
412	Grade 1	765	**Y**	**NA**	**6**	760
410	Grade 1	726	**Y**	**NA**	**9**	717
408	Grade 1	755	**Y**	**NA**	**5**	750
406	Grade 1	719	**Y**	**NA**	**7**	712
404	Grade 1	779	**Y**	**NA**	**0**	779
407	Grade 1	806	**Y**	**NA**	**0**	806
403	Grade 1	824	**Y**	**NA**	**3**	821
		5,374				**5345**
5TH FLOOR						
508	Grade 2	716	**Y**	**NA**	**4**	712
506	Grade 2	719	**Y**	**NA**	**9**	711
504	Grade 2	779	**Y**	**NA**	**0**	779
507	Grade 2	777	**Y**	**NA**	**0**	777
505	CSD Special Education	618	**Y**	**NA**	**0**	618
503	Library	860	**Y**	**NA**	**0**	860
514	Custodian Office	152	**NA**	**N**	**152**	0
		4,621				**4457**
SF OF AREA BEING EVALUATED FOR VIEWS:		**26,203**			**SF OF AREA WITH VIEWS:**	**22,963**
					Percent Access to Views	**87.6%**

Requirement to achieve credit Q 7.4 is Views for 90% of regularly occupied spaces

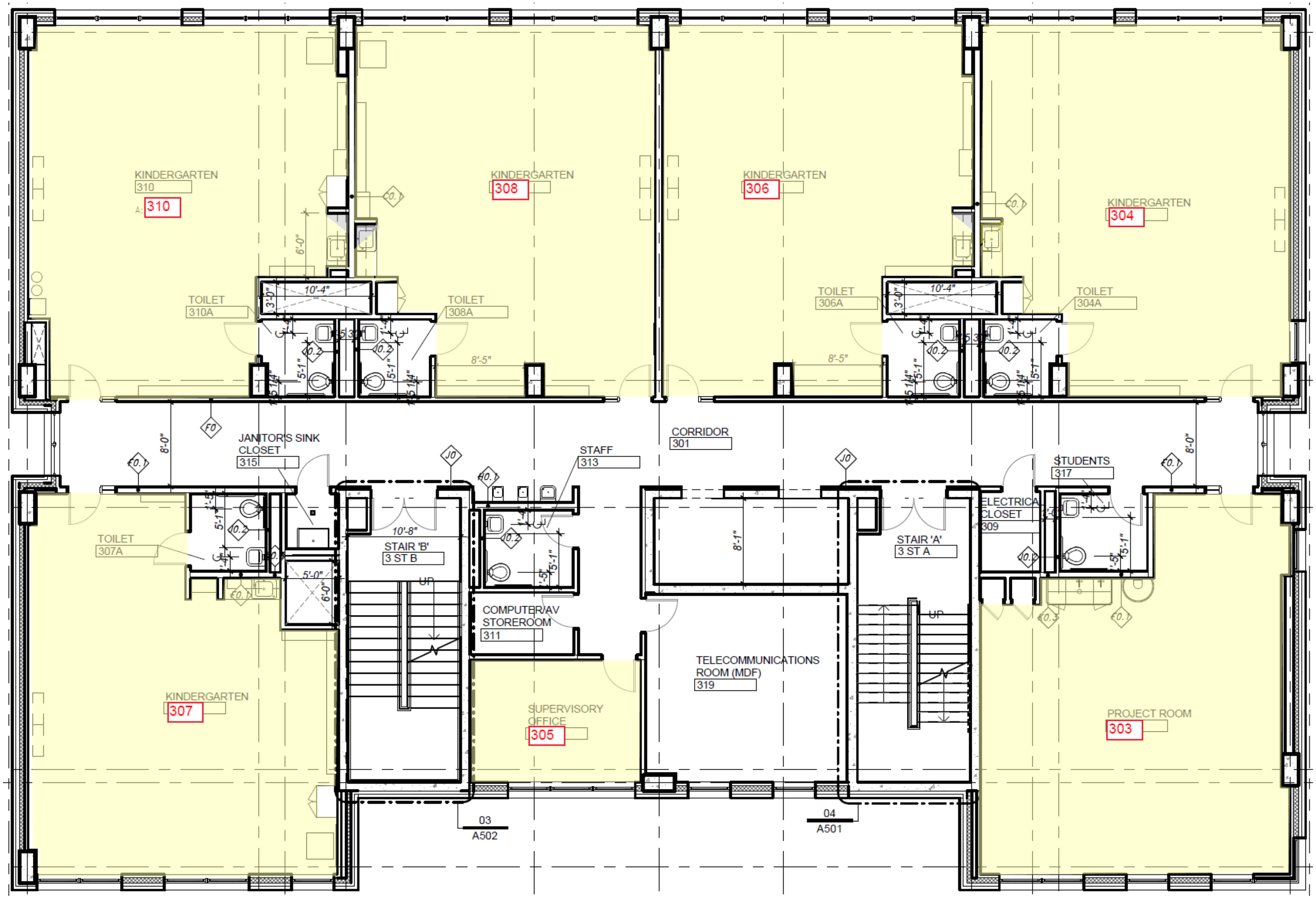
Complies? (Y / N): **N**



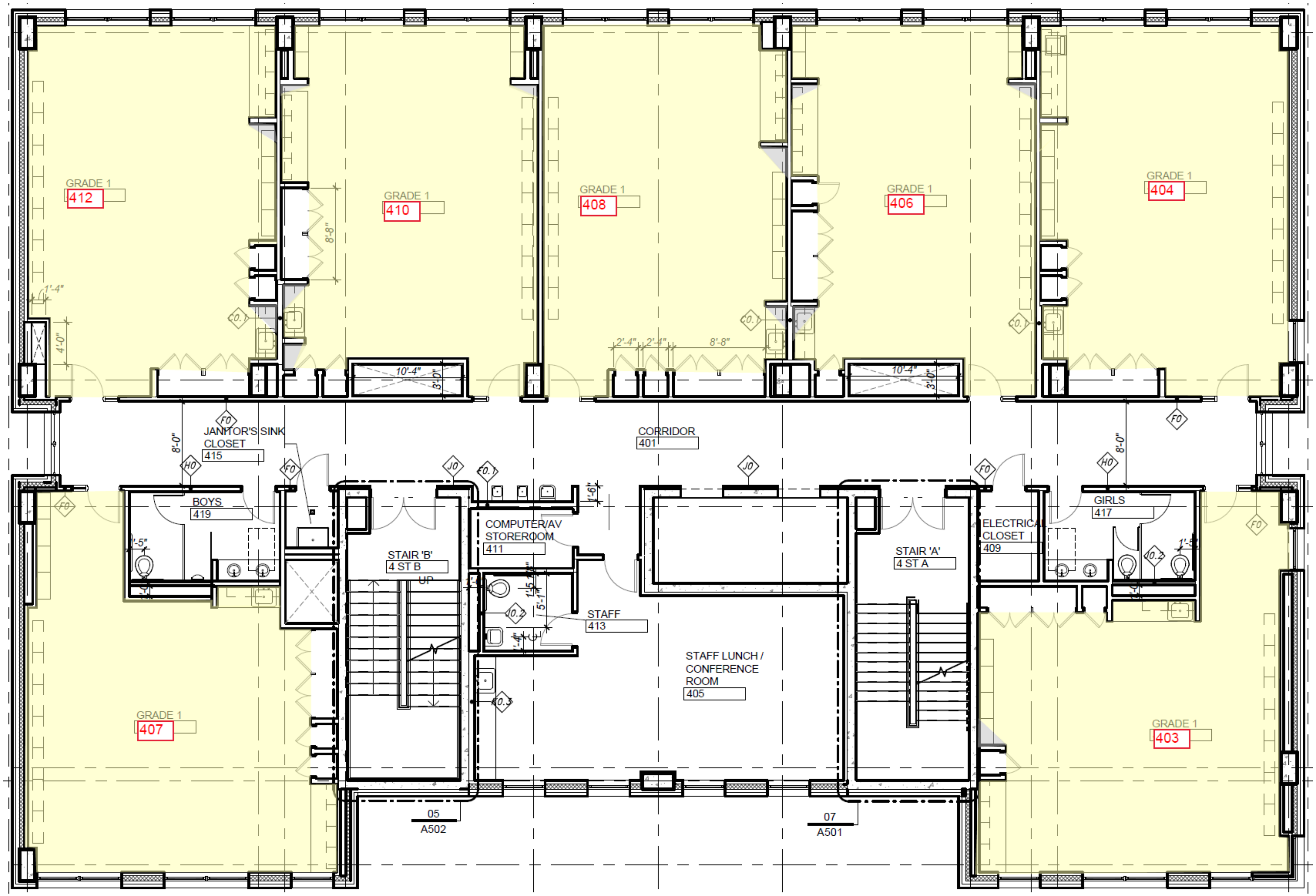
Plan of 1st Fl Dated **30Apr2018** **with glass block**.



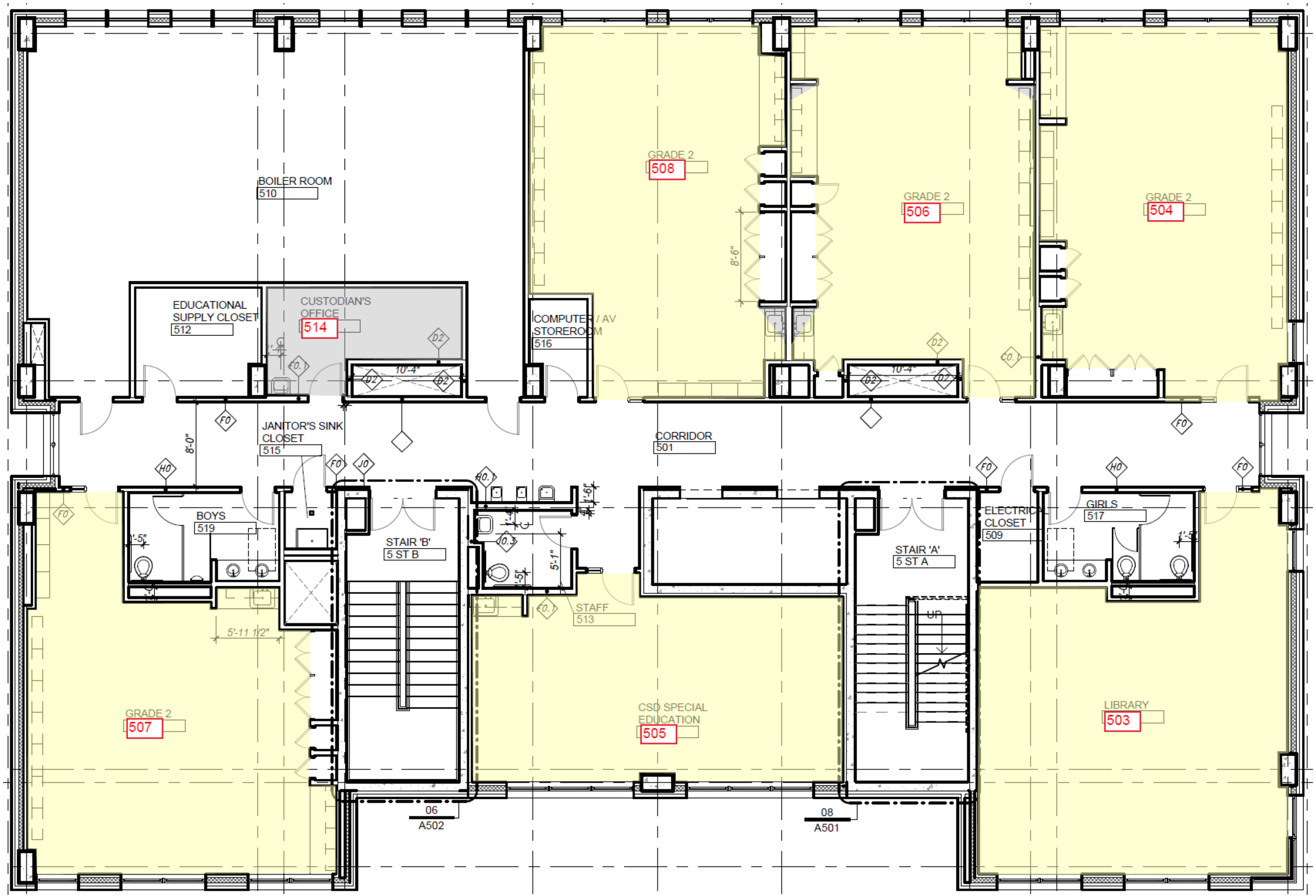
Plan of 2nd Fl Dated 19Feb2018.



Plan of 3rd Fl Dated 19Feb2018.



Plan of 4th Fl Dated 19Feb2018.



Plan of 5th Fl Dated 19Feb2018.

Q7.5R Visual Performance, Direct-Indirect Lighting

Credit anticipated.

In all classrooms and instruction spaces there will be direct/indirect, ceiling pendant LED lamps with a minimum color-rendering index of 82. For typical classrooms measuring 29' by 26', lighting will consist of two rows of direct/indirect ceiling pendant fixtures spaced approximately 12' on center to produce optimum lighting. The total luminary efficiency of the light fixtures will be 90% or better. For non-conventional shaped instructional spaces, the quantity of pendant fixtures, rows of pendant fixtures, and their spacing will vary as necessary to provide the required foot-candle levels and lighting power density.

Per the SCA Design Requirements, mounting shall be such that the bottom of the luminaires shall not be lower than 8'-0" in Early Childhood Centers and Primary Schools with the optimum fixture to ceiling distance ranging from 14" to 24". This requirement is copied directly from the latest available DR 7.2.1 Rev 10-09/30/16 from the SCA website.

Applicable SCA Design Requirements include:
 7.2.1 Interior Lighting

Applicable SCA Standard Specifications include:
 16502 LED Interior Building Lighting

The project team has incorporated the above SCA Standard Specifications into the construction documents dated 9July2018.

The lighting fixture schedule can be found on drawing E601.

The reflected ceiling plans can be found on A801 to A805 and the lighting plans can be found on E100 to E105.

The point-by-point lighting level (photometric) calculations and plans for typical and non-typical areas can be found in Appendix A.

Acoustics

Q8.1P Minimum Acoustical Performance

Credit anticipated.

Following SCA Acoustical Design Standards, the project will be designed to provide classrooms and learning spaces that limit background noise from building HVAC systems and adjacent spaces.

All classrooms will be designed to achieve a maximum background sound level of 40 dB(A). All classroom ceilings will incorporate sufficient areas of acoustical ceiling meeting a minimum NRC of 0.70 such that speech blurring reverberation will be controlled to meet SCA requirements. Classroom-to-classroom partitions shall have a STC of at least 50. Corridor-to-classroom partitions shall have a minimum STC of 45.

Where possible, rooftop air handlers should be located over or adjacent to corridors to eliminate the radiated noise of duct drops over classrooms. Air handler fans should be specified with airfoil or backward-inclined blades; fans with forward-curved blades should be avoided. Duct drops and associated ductwork over classrooms many need to be enclosed. The HVAC design shall limit air velocities in ducts to assure that duct turbulence noised does not exceed NYC SCA standards. Fire dampers should be a style that ordinarily has no vanes or blades in the airstream. Volume dampers shall be kept 10-feet or more upstream of air terminals. If possible, symmetrical, naturally balancing duct layout will be used to minimize the need for volume dampers.

Diffusers and return grilles shall have no integral dampers and be sized to limit velocity. As the project team continues to develop the mechanical design, the acoustical consultant will carry out detailed mechanical system analyses and recommend noise control features needed to meet background sound level criteria.

Applicable SCA Design Requirements include:

- 1.3.1.9 Architectural Acoustic Standards
- 5.4.1 Suspended Ceilings
- 6.2.25 HVAC Acoustical Standards

Applicable SCA Standard Specifications include:

- 09510 Acoustical Ceilings
- 15853 Custom Packaged Rooftop Heating and Cooling Units (Variable Air Volume System)
- 15891 Metal Ductwork
- 15910 Duct Accessories
- 15930 Variable Air Terminals
- 15935 Single Zone Variable Air Volume (SZVAV) Air Handling Units for Public Assembly Spaces
- 15993 Balancing of Systems

The project team has incorporated the above SCA Design Requirements and Standard Specifications into the construction documents dated 9July2018.

Applicable SCA Standard Details include:
0926010a Partition Details

The project team has incorporated the above Standard Details into the construction documents on drawing A701.

The acoustical consultant, AKRF, preliminary suggestions include consider a free-standing stud (i.e., no bracing back to elevator shear wall) with a minimum 1/2-to-1-inch air gap separating the elevator shaft wall from the metal stud when adjacent to reading/speech resource and CSD special Education, 2’x4’ ceiling tile should be specified with minimum acoustic ratings of NRC 0.90 and CAC 40 with 3-inch thick 2.5 pcf density mineral wool loose laid over the top of the ceiling tile in the cafeteria, and minimum 3-inch thick 2.5 pcf density mineral wool batt insulation above acoustic ceiling tile for classrooms below boiler room.

The acoustical 60% review, 100% review, and acoustical compliance memo are in Appendix A.

Q8.2 Enhanced Acoustical Performance & Sound Isolation for Special Spaces

Credit anticipated.

Spaces with special acoustical needs, in addition to classrooms, are limited to the exercise room and cafeteria, but special vertical sound isolating constructions is assumed not to be needed. The Acoustical design issues that will be addressed for all spaces include room acoustics, sound isolating constructions between spaces, HVAC noise control, and community noise. The Acoustic consultant (AKRF) advised that mass back-up walls will be needed to reduce the noise impact from the nearby elevated subway rail. SCA has directed that the project should utilize CMU backup wall construction.

Emergency Generator: The Architectural Scheme that was selected by the SCA has all floors with areas less than 15,000 sq. ft. and is not a high-rise structure. Therefore, an emergency generator is not required.

Applicable SCA Design Requirements include:

- 1.3.1.9 Architectural Acoustic Standards

4.2.1 Exterior Masonry Walls
4.3.1 Window Types
5.1.1 Typical Room Finishes
5.2.2 Interior Partitions
5.3.1 Floor Types
5.5.1 Interior Doors and Frames
6.2.25 HVAC Acoustical Standards

The project team has incorporated the above SCA Design Requirements into the construction documents within the "A" series drawings and "M" series drawings.

Applicable SCA Standard Specifications include:
08524 Aluminum Projected Windows
09260 Gypsum Board Assemblies

The project team has incorporated the above SCA Design Requirements and Standard Specifications into the construction documents dated 9July2018

Applicable SCA Standard Details include:
0926010a Partition Details
0926010b Partition Details

The project team has incorporated the above Standard Details into the construction documents on drawing A701.

See Q8.1R for the description of the location and construction of each special separation.

The acoustical 60%, 100% review, and acoustical compliance memo are in Appendix A.

Q8.3 Acoustic Windows

Credit anticipated.

SCA has noted that acoustic review is required to confirm performance against the nearby elevated subway rail. Acoustical windows are assumed to be needed. Mitchell Giurgola's 7June2018 e-mail indicated special IGU (OITC 37) will be specified on the front façade to meet acoustic performance due to noise level from nearby elevated subway rail.

Applicable SCA Design Requirements include:
1.3.1.9 Architectural Acoustic Standards

Applicable SCA Standard Specifications include:
08524 Aluminum Projected Windows

The acoustical 60%, 100% review, and acoustical compliance memo are in Appendix A.

The basis-of-design Window Acoustical Laboratory Test Report is in Appendix A.

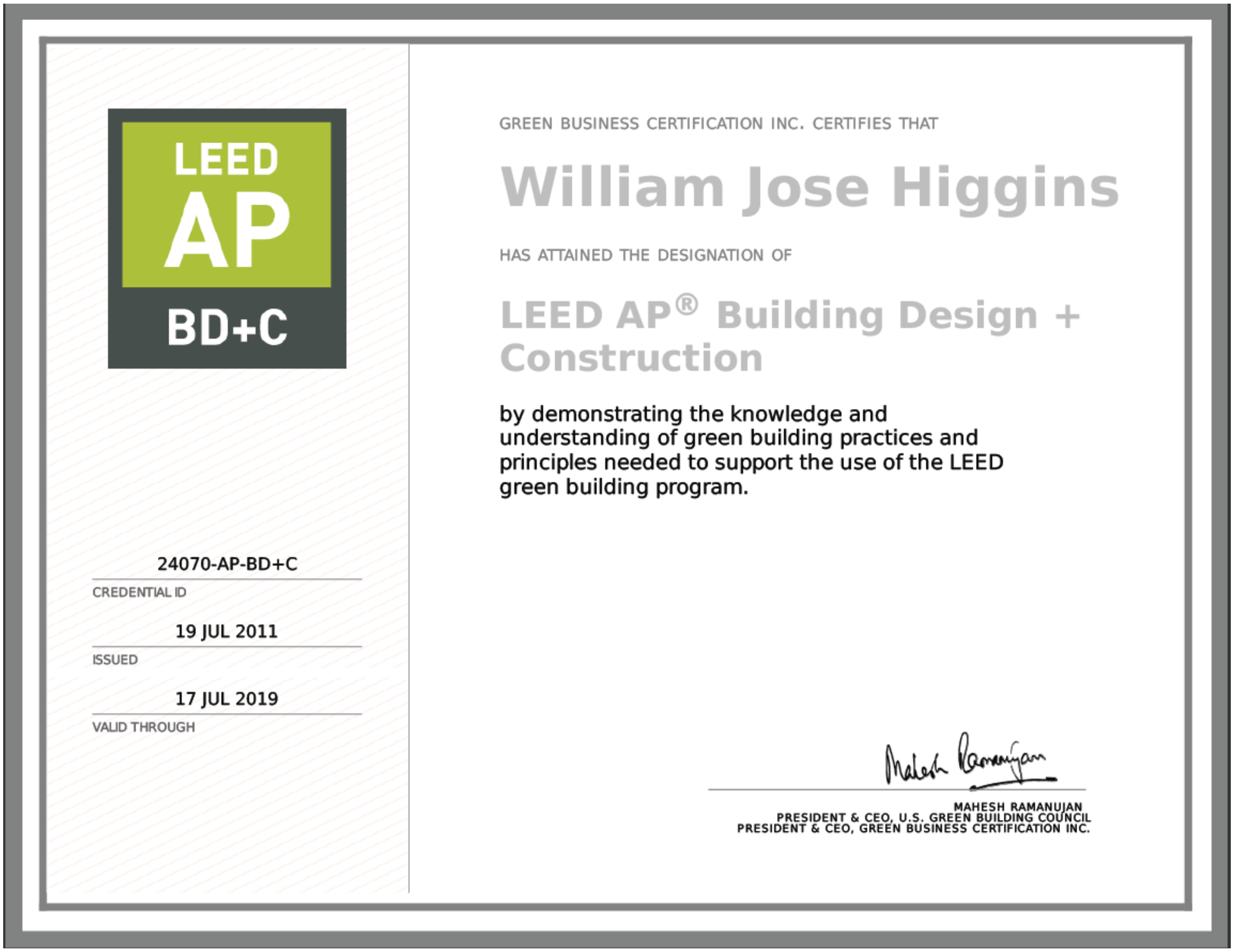
Additional Credits

Required Support

A1.1R LEED® Accredited Professional

Credit anticipated.

William Jose Higgins, EME Consulting Engineers Group – Green Consultant



LEED
AP
BD+C

GREEN BUSINESS CERTIFICATION INC. CERTIFIES THAT

William Jose Higgins

HAS ATTAINED THE DESIGNATION OF

LEED AP® Building Design + Construction

by demonstrating the knowledge and understanding of green building practices and principles needed to support the use of the LEED green building program.

24070-AP-BD+C
CREDENTIAL ID

19 JUL 2011
ISSUED

17 JUL 2019
VALID THROUGH

Mahesh Ramanujan

MAHESH RAMANUJAN
PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.

A1.2 Innovation or Exemplary Performance

Upon SCA request only.

A1.3 Innovation or Exemplary Performance

Upon SCA request only.

Optional - Site Impact

A2.1 Heat Island Effect, Non-Roof

Upon SCA request only.

A2.2 Stormwater Design, Quantity Control

Upon SCA request only.

A2.3 Active Design in a School Environment

Credit anticipated.

SCA GSG Committee, at 8January2014 meeting, requested all projects from this date forward to pursue active design as an innovation credit.

Current design meets 7 of the 10 active design features and complies with the minimum requirement of 7; see Active Design chart below.

Active Design in a School Environment
Active Design Worksheet and Credit Reporting Form
Credit A 2.3

SCA School Construction Authority
NYC Green Schools Rating System - 2016

Project: P.S. 347X Bronx Annex at PS33X
Address: 2424 Jerome Ave, Bronx, NY, 10468
LLW: 107340
Date: 5Feb2018, **Revised 5June2018**

Architect: Mitchell Giurgola Architects, LLP
Preparer: EME Group
Phone: 212-529-5969

#	ITEM	INTENT	DESIGN CASE	DOCUMENTATION METHOD	PROJECT COMPLIES? (use tabs)
	PREREQUISITE				
R	Minimum Accessible Floors	Make active modes of vertical circulation accessible to all users	Building must have at least 1 main stair that enables occupants to travel between the building entrance floors and common use floors.	Floor Plans indicating main entrance and stairs.	**YES**
	Include seven (7) or more of the following features within the project.				
1	Floor re-entry	Make active modes of vertical circulation accessible at all floors	Classify regularly occupied floors for re-entry, allowing all building users to have access to and from these floors. Service floors do not need access for all users.	Floor plans indicating stairs.	**Yes**
2	Stair visibility at all floors	Visual connection to active modes of vertical circulation	Make accessible stair visible from corridor by providing: •vision panels of 10 SF at each door •side light of 10 SF. •providing open stair.	Floor plan, door schedule and door elevation	**No**
3	Stair connectivity to building occupants	Stair accessibility for building occupants	Provide access to at least one (1) open or interconnecting stair to 50% of occupied floors	Floor Plans indicating stairs.	**Yes**
4	Stair visibility from main lobby	Visual connection to main lobby	Position at least one active mode of vertical circulation to be visible from main building lobby with 25 feet maximum travel from edge of lobby to entry of active vertical circulation. No turns should be required to reach stairs from the lobby.	Floor plans indicating travel distance from main lobby to stair.	**No**
5	Location - visibility	Visual connection to active mode of vertical circulation	Position at least one active mode of vertical circulation within the field of vision for users when standing in front of motorized modes of vertical circulation.	Plan drawing showing stair immediately adjacent to elevator	**Yes**
6	Lighting	Make active vertical circulation areas a desirable space through enhanced lighting	Provide level of lighting in staircase consistent with or better than that provided for the building corridor.	Photometrics for stair and adjacent corridor.	**Yes**
7	Daylighting	Make active vertical circulation areas a desirable space through natural lighting	Provide windows/skylight of at least 8 SF at each floor level of the active circulation space.	Building elevation indicating window area at each floor @ stair.	**Yes**
8	Signage prompt at active vertical circulation	Encourage active modes of vertical circulation over motorized modes of vertical circulation	Include permanent signage promoting stair use at elevator call area and at outside of stair door at each floor of the active vertical circulation.	Floor plans indicating sign locations and signage detail.	**Yes**
9	Artwork	Make active vertical circulation areas a desirable space through the addition of artwork	Provide artwork in the active circulation area.	Artwork location	**No**
10	Recreational space	Provide opportunities for on-site recreation	For projects with 10 classrooms or more, provide an on-site recreational space with exercise opportunities for both staff and children. Exercise space must be at least 400 SF and include exercise equipment for use by at least 5% of FTE occupants. Gardening activity can count as staff active recreation space and equipment.	Floor plan showing exercise room with equipment layout, FTE calculation, and narrative. Site plan indicating garden area (if applicable).	**Yes**

Optional - Energy

A3.1 Enhanced Commissioning

Upon SCA request only.

A3.2 Optimize Energy Performance

11 points anticipated.

SCA has indicated that a project specific energy model will be completed to demonstrate compliance.

Based on the **100% CD** Energy Model Report dated **17 August 2018**, there is an energy cost savings of **20.7%,** earning **11 points** under this credit.

See E4.1P for further information.

A3.3 On Site Renewable Energy

Upon SCA request only.

A3.4 Enhanced Energy Management System Controls, HVAC and Hot Water Systems

Upon SCA request only.

Optional - IEQ

A4.1 Low-Emitting Materials, Ceiling and Wall Systems

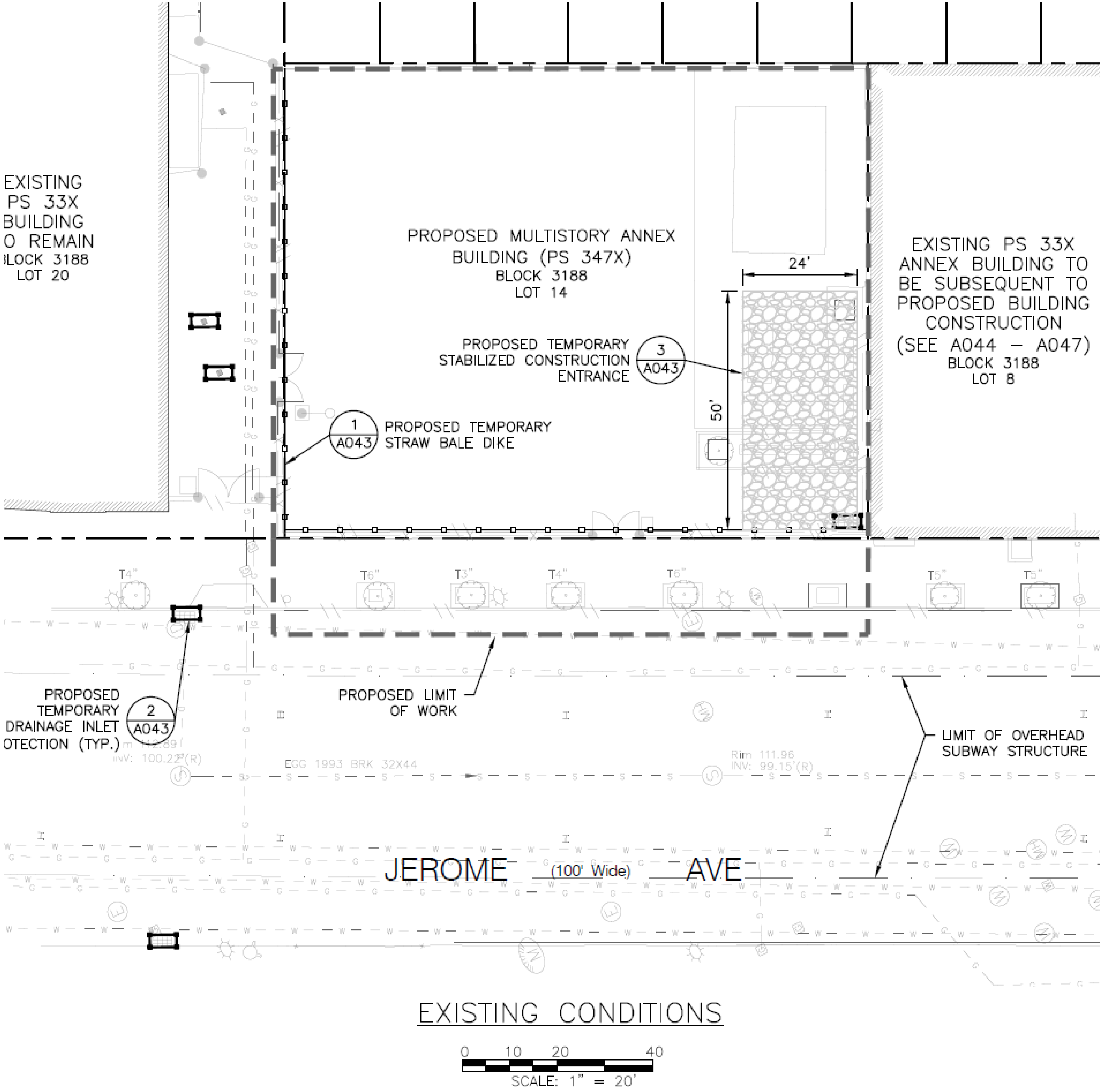
Upon SCA request only.

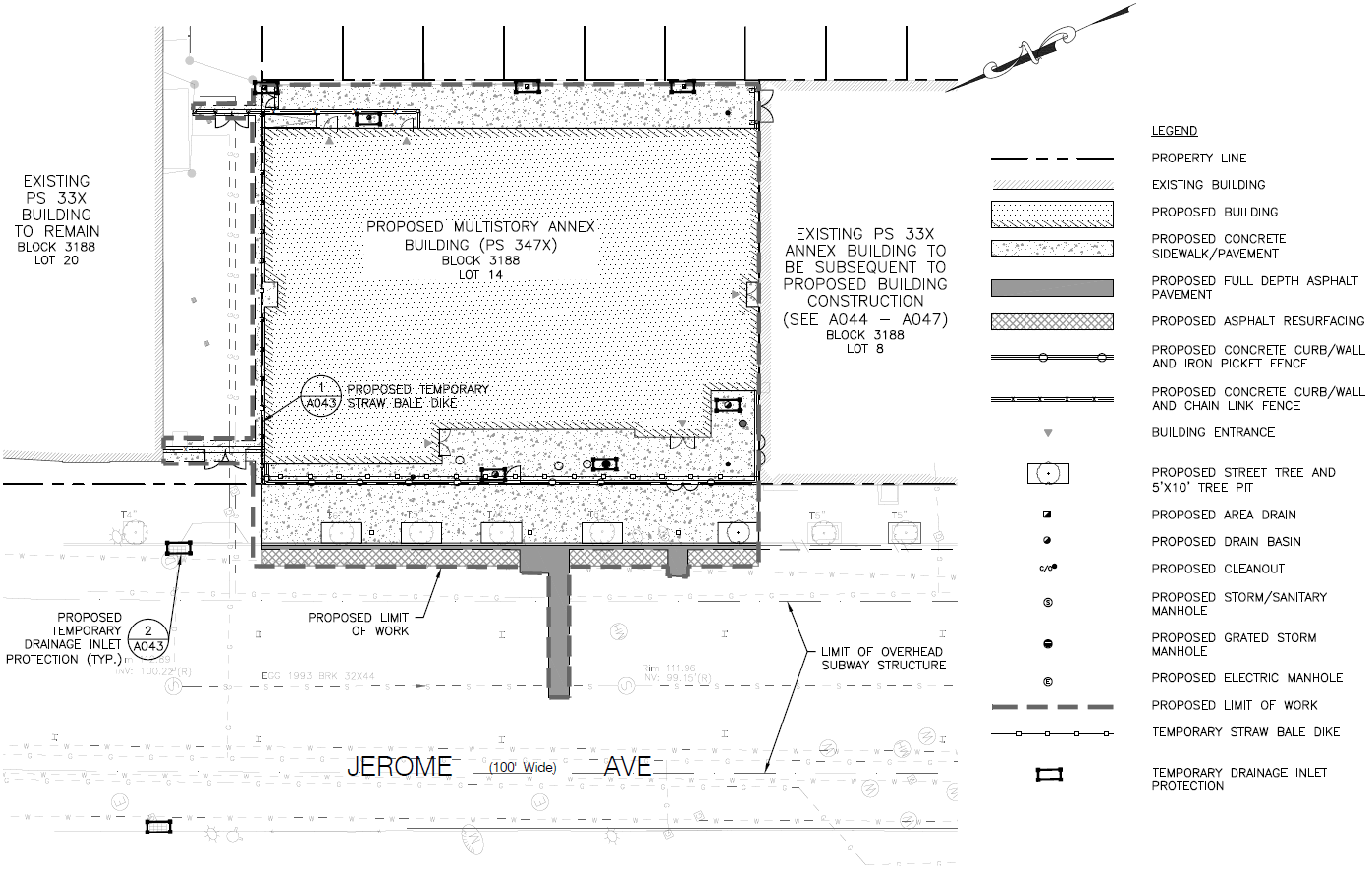
Optional – Education

A5.1 The School Building as a Teaching Tool

Upon SCA request only.

APPENDIX A

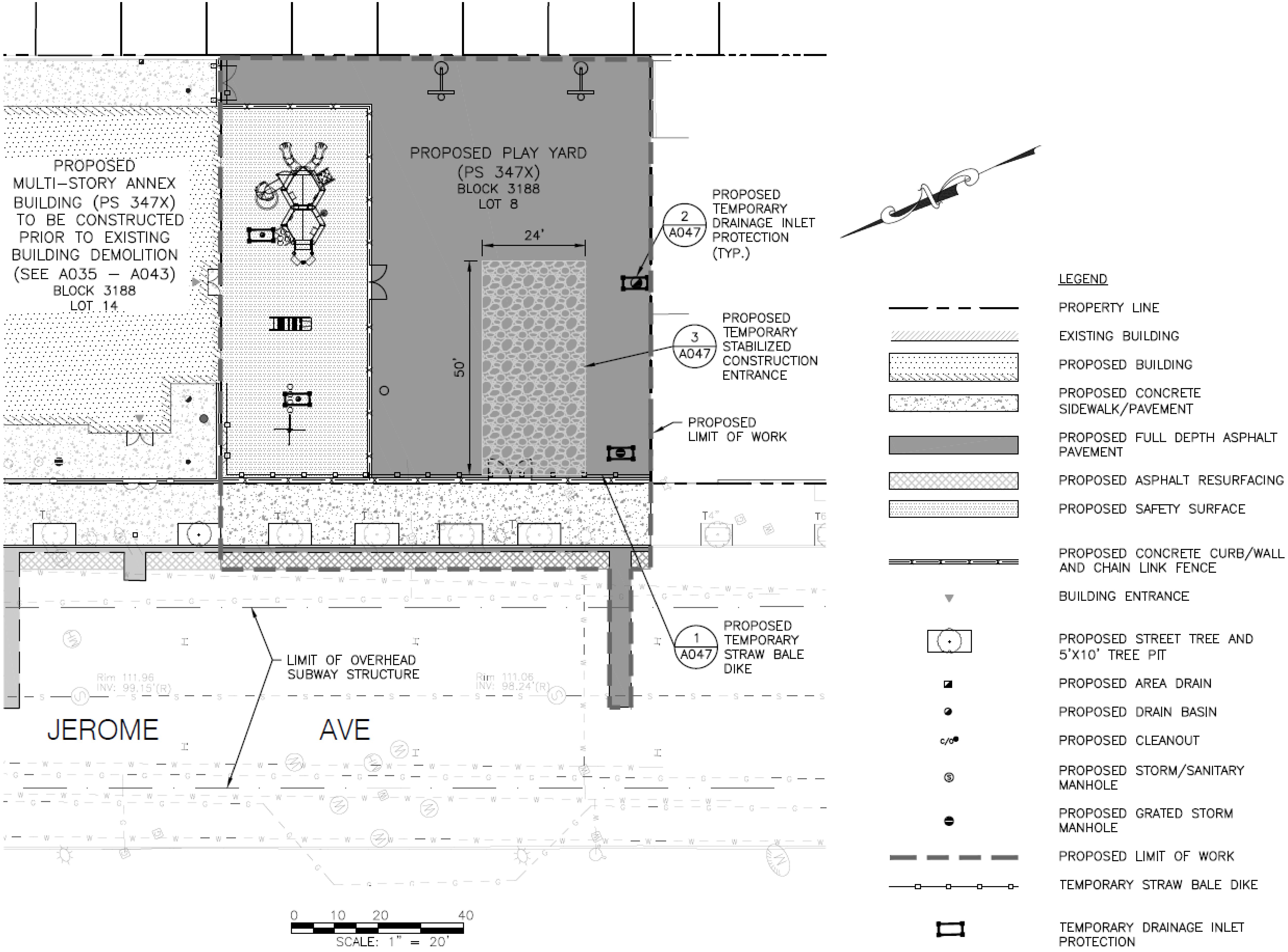

EXISTING
PS 33X
BUILDING
O REMAIN
LOCK 3188
LOT 20
PROPOSED MULTISTORY ANNEX
BUILDING (PS 347X)
BLOCK 3188
LOT 14
24'
50'
PROPOSED TEMPORARY
STABILIZED CONSTRUCTION
ENTRANCE
3
A043
1
A043
PROPOSED TEMPORARY
STRAW BALE DIKE
EXISTING PS 33X
ANNEX BUILDING TO
BE SUBSEQUENT TO
PROPOSED BUILDING
CONSTRUCTION
(SEE A044 – A047)
BLOCK 3188
LOT 8
PROPOSED
TEMPORARY
DRAINAGE INLET
OTECTION (TYP.)
2
A043
PROPOSED LIMIT
OF WORK
LIMIT OF OVERHEAD
SUBWAY STRUCTURE
Rim 111.96
INV: 99.15'(R)
INV: 100.22'(R)
EGG 1993 BRK 32X44
JEROME
(100' Wide)
AVE
EXISTING CONDITIONS
0
10
20
40
SCALE: 1" = 20'



PROPOSED CONDITIONS

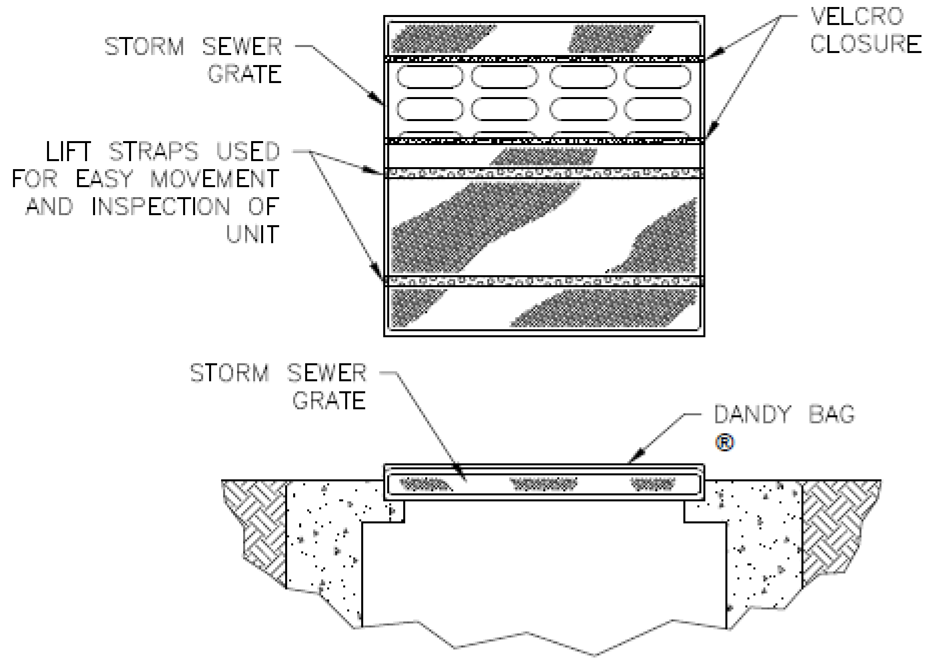
0 10 20 40

SCALE: 1" = 20'

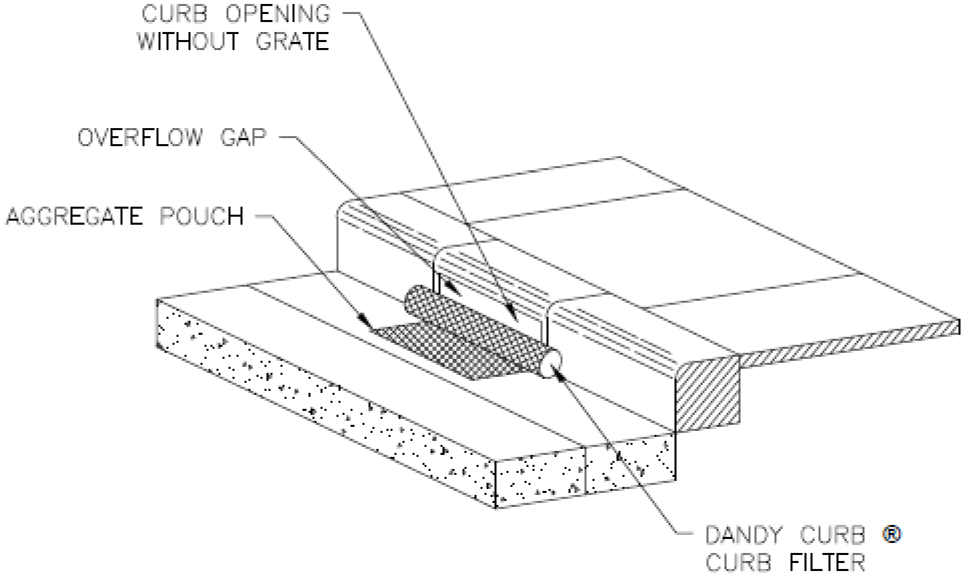


LEGEND

— — —	PROPERTY LINE
▨	EXISTING BUILDING
▒	PROPOSED BUILDING
░	PROPOSED CONCRETE SIDEWALK/PAVEMENT
■	PROPOSED FULL DEPTH ASPHALT PAVEMENT
▩	PROPOSED ASPHALT RESURFACING
░	PROPOSED SAFETY SURFACE
═	PROPOSED CONCRETE CURB/WALL AND CHAIN LINK FENCE
▼	BUILDING ENTRANCE
⊙	PROPOSED STREET TREE AND 5'X10' TREE PIT
◪	PROPOSED AREA DRAIN
●	PROPOSED DRAIN BASIN
C/O●	PROPOSED CLEANOUT
Ⓢ	PROPOSED STORM/SANITARY MANHOLE
⊖	PROPOSED GRATED STORM MANHOLE
▬ ▬ ▬	PROPOSED LIMIT OF WORK
—□—□—	TEMPORARY STRAW BALE DIKE
▭	TEMPORARY DRAINAGE INLET PROTECTION



NON–CURB INLET



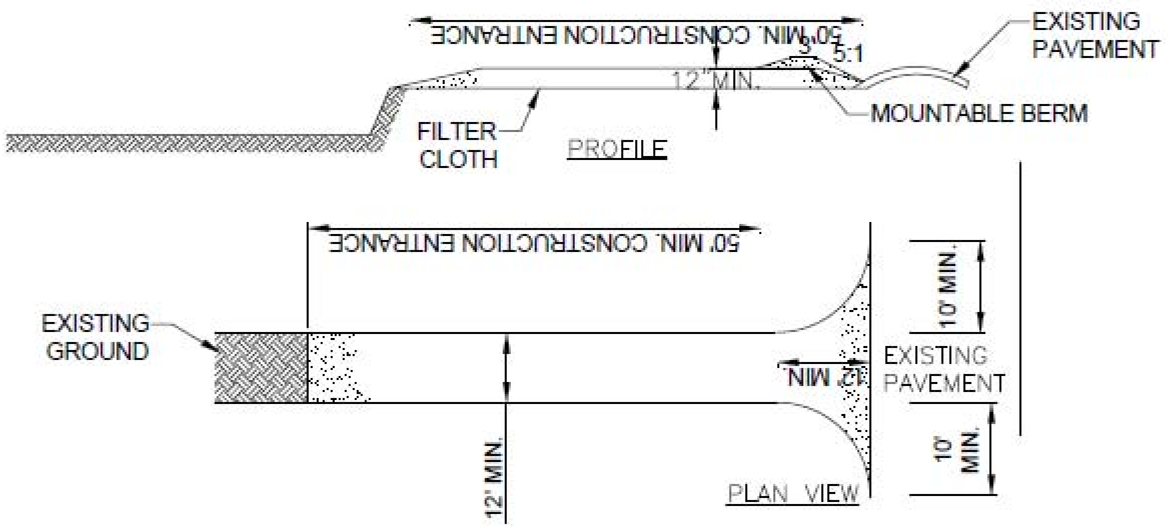
CURB INLET

NOTES:

1. FOR CURB INLET CATCH BASINS, INLET SEDIMENT CONTROL DEVICE SHALL BE DANDY CURB BY DANDY PRODUCTS, OR APPROVED EQUAL.
2. FOR NON–CURB INLET CATCH BASINS, INLET SEDIMENT CONTROL DEVICE SHALL BE DANDY BAG BY DANDY PRODUCTS, OR APPROVED EQUAL.
3. INLET SEDIMENT CONTROL DEVICE SHALL BE MAINTAINED AS PER THE STANDARDS AND SPECIFICATIONS OF THE NYSDEC STANDARDS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK).
4. ONCE THE CONTRIBUTING DRAINAGE AREA HAS BEEN COMPLETELY STABILIZED (GREATER THAN 75% VEGETATIVE COVER) THE INLET SEDIMENT CONTROL DEVICE SHALL BE CLEANED OUT AND REMOVED FROM THE STRUCTURE.

TEMPORARY INLET PROTECTION DETAIL

N.T.S.

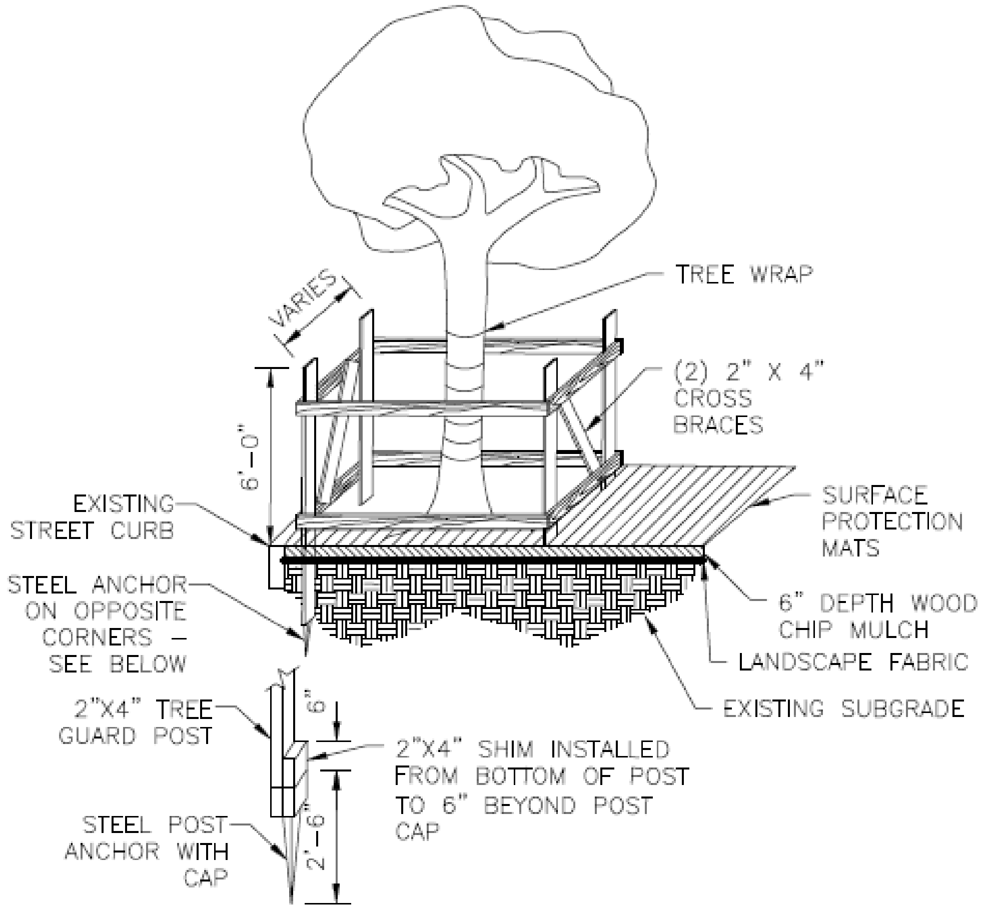


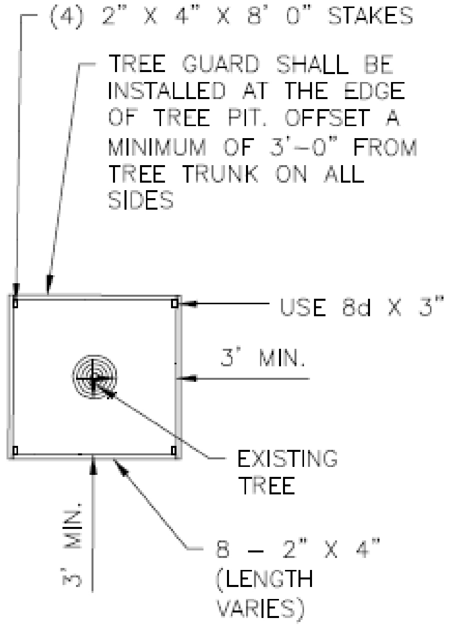
CONSTRUCTION SPECIFICATIONS:

1. STONE SIZE
   - 1.1. CONSTRUCTION ENTRANCE: USE 3" BROKEN STONE BALLAST, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. CONSTRUCTION ENTRANCE
   - 2.1. LENGTH – NOT LESS THAN 50 FEET
   - 2.2. THICKNESS – NOT LESS THAN TWELVE (12) INCHES.
   - 2.3. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
   - 2.4. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
   - 2.5. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
   - 2.6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHT–OF–WAYS MUST BE REMOVED IMMEDIATELY.
   - 2.7. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH BROKEN STONE BALLAST AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
   - 2.8. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED EVERY 7 CALENDAR DAYS AND AFTER EACH RAINFALL OF 0.5" OR GREATER IN A 24 HOUR PERIOD.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.

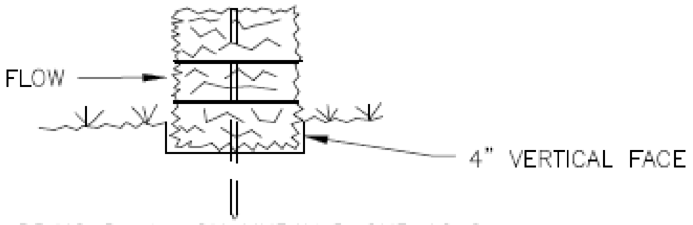




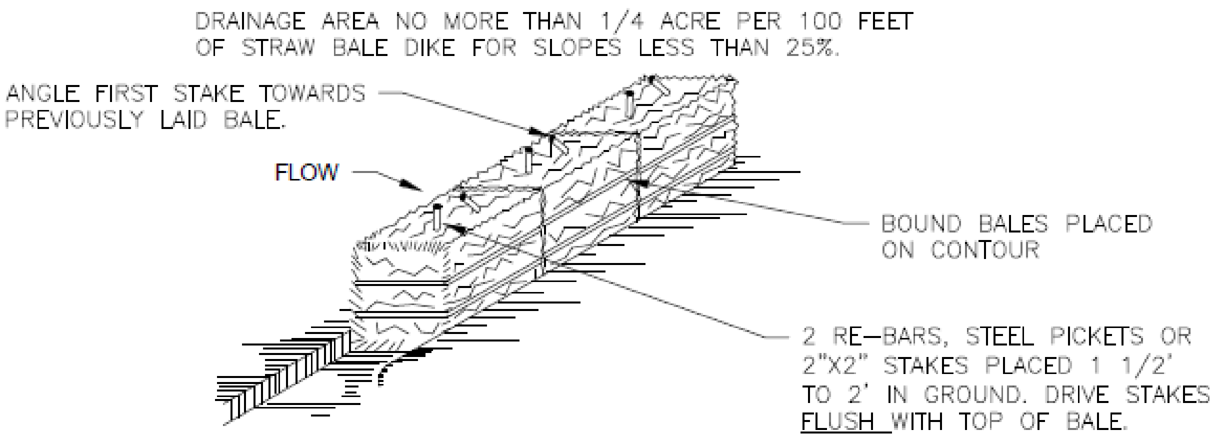
TREE DIAMETER	MINIMUM DISTANCE FROM TRUNK OF TREE
0" - 12"	6'
12.1" - 18"	8'
18.1" - 24"	10'
24.1" - 30"	12'
GREATER THAN 30.1"	14'

TEMPORARY WOODEN TREE GUARD

N.T.S.



BEDDING DETAIL ON UNPAVED SURFACES
(SEE NOTE 3 FOR PAVED SURFACES)
N.T.S.



ANCHORING DETAIL ON UNPAVED SURFACES
(SEE NOTE 3 FOR PAVED SURFACES)
N.T.S.

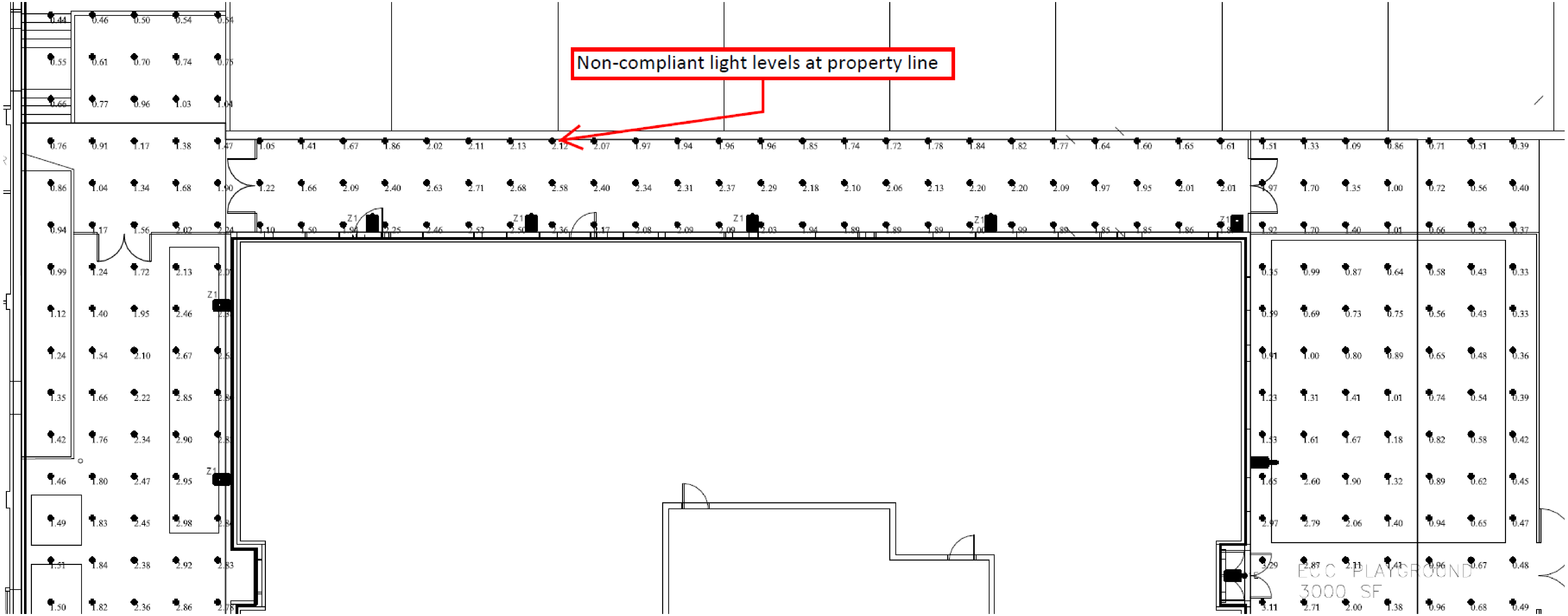
NOTES:

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. IN UNPAVED AREAS, EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. IN PAVED AREAS, ABUT STRAW BALES TOGETHER AND DRIVE STAKE OR REBAR INTO ADJOINING BALE TO FORCE THE BALES TOGETHER.
4. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
5. INSPECTION SHALL BE FREQUENT AND REPAIR/REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

STRAW BALE DIKE

N.T.S.

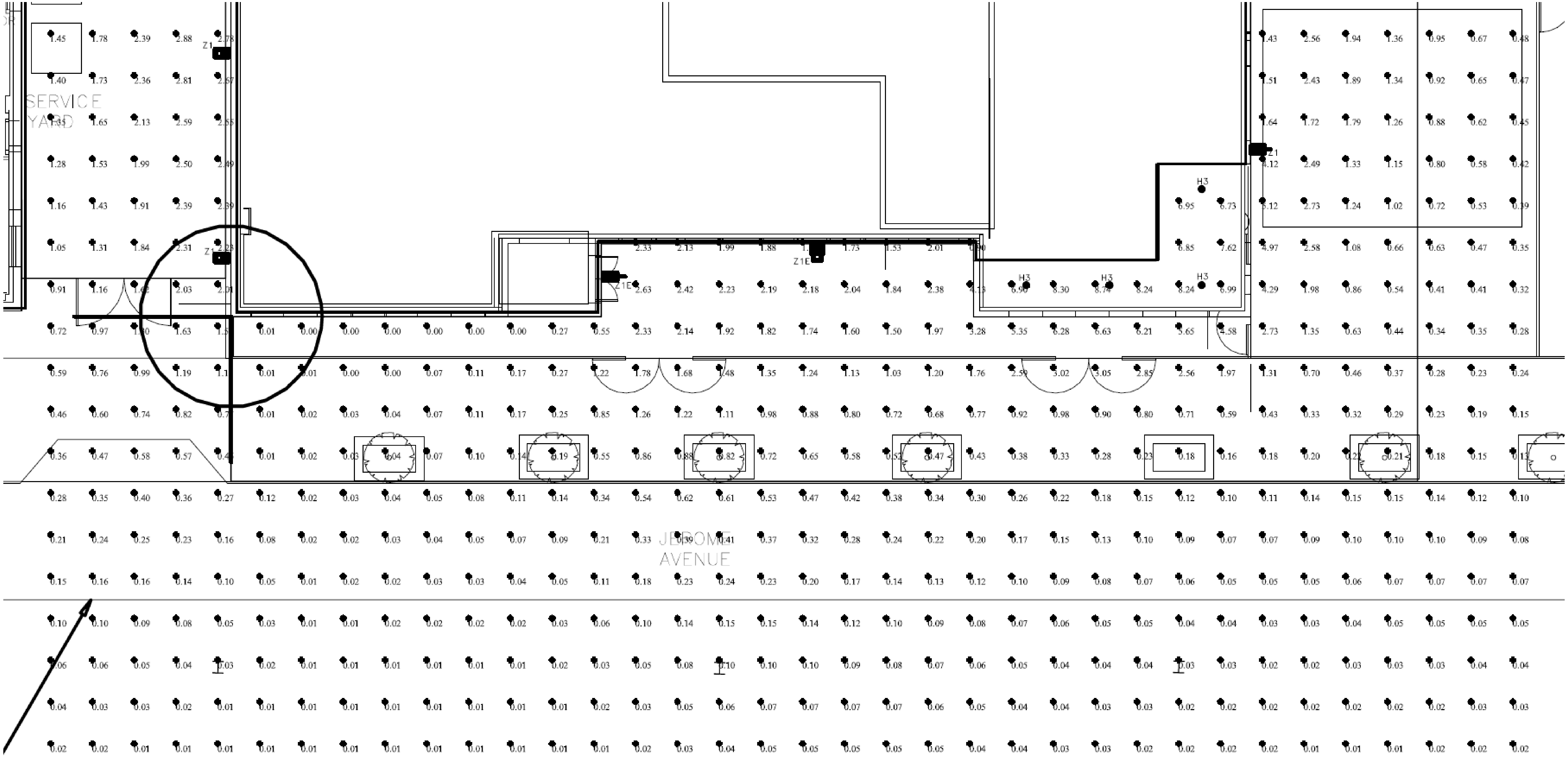
Credit S6.1: Site Photometric Analysis & Plan



Non-compliant light levels at property line

Luminaire Schedule										
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Total Watts	[MANUFAC]	BUG Rating
⊙	4	H3	SINGLE	N.A.	0.900	P6RD15NZ10UVB–P6RD835VB–P6RDCL	15.3	61.2	PHILIPS LIGHTOLIER	N.A.
■	14	Z1	SINGLE	N.A.	0.900	111L-16L-350-NW-G2-3	18.4	257.6	PHILIPS GARDCO	B0-U0-G0

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_1	Illuminance	Fc	1.04	8.74	0.00	N.A.	N.A.


SERVICE YARD
JEROME AVENUE
Z1
Z1
Z1E
Z1E
Z1
H3
H3
H3
H3

Credit E1.1P: Specification Table of Contents modified for project

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
SPECIFICATIONS for PS347X

TABLE OF CONTENTS
07/09/18

VOLUME I

DIVISION 1 - GENERAL & SUPPLEMENTARY REQUIREMENTS

GENERAL REQUIREMENTS

SUPPLEMENTARY REQUIREMENTS

DIVISION 2 - SITEWORK

DIVISION 3 - CONCRETE

DIVISION 4 - MASONRY

DIVISION 5 - METALS

DIVISION 6 - WOOD AND PLASTICS

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

DIVISION 8 - DOORS AND WINDOWS

DIVISION 9 - FINISHES

DIVISION 10 - SPECIALTIES

HEATING, VENTILATING AND AIR CONDITIONING

DIVISION 16 - ELECTRICAL

END OF TABLE OF CONTENTS

EME GROUP
Consulting Engineers

NYC Public School PS347X Annex at PS33X

2400 Jerome Avenue
Bronx, NY 10468

Assessment of Energy Performance for
Compliance with NYC SCA
Green School Guide

August 17, 2018

Project Narrative

EME Consulting Engineering Group (EME Group) analyzed the energy performance of the New York City building for PS-33X. The Proposed Design is a five story (with an additional partial cellar square), 46,390 sq. ft. building. The building includes classrooms, offices and support spaces. The energy model is based on the 100% CD drawing set.

EME Group performed energy modeling for compliance with the NYC SCA Green School Guide System. NYC SCA GSG allows compliance using the Appendix G Method of ASHRAE/IESNA Standard 90.1-2010 (ASHRAE 90.1-10). In addition, EME Group analyzed the performance of the Proposed Design with respect to New York City Local Law 86 (LL86). LL86 mandates 20% regulated energy cost savings[1] for projects with more than $12 Million construction cost. Compliance with LL86 is demonstrated against the Energy Cost Budget Method of ASHRAE/IESNA Standard 90.1-2013 (ASHRAE 90.1-13).

The results are summarized in Table 1 below. The project achieves **20.7%** savings in energy costs compared to the GSG baseline. The project complies with the minimum requirements of E4.1P – Minimum Energy Performance (E4.1P).

In addition, the project achieves **22.4%** savings in regulated energy costs compared with the LL86 Baseline. The project complies with the LL86 requirements.

The energy model was developed for the sole purpose of documenting compliance with the SCA GSG E4.1R requirements and should not be used for predicting the actual energy use of the building. Actual energy use and cost will be greater, since the modeling rules do not account for many real-life issues, such as quality of construction, equipment functionality, building operation and other factors. Please refer to the end of the report for details.

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[1] Note: Regulated energy excludes the energy consumed by equipment that is typically plugged into receptacles: computers, printers, copiers, TVs, radios, electric clocks, etc. It also excludes energy used by elevators and escalators, cooking equipment and process equipment (such as industrial or laboratory equipment).

Table 1 *Energy Modeling Results for Proposed Design; GSG Baseline and Energy Efficiency Measures (EEMs)*

Description	Annual Energy Cost ($)	Energy Cost Savings ($)	% Energy Cost Savings	NYC SCA GSG Compliance
SCA GSG Baseline ASHRAE 90.1-2010 Appendix G	$82,028	-	-	-
Proposed Design	$65,011	$17,017	20.7%	Yes

Description	Electric Use (kWh)	Peak kW	Electric Cost ($)	Gas Use (Therms)	Gas Cost ($)
SCA GSG Baseline ASHRAE 90.1-2010 Appendix G	389,249	173	$73,971	6,987	$8,057
Proposed Design	283,806	144	$58,464	5,636	$6,547

Table 2 *Energy Modeling Results for Proposed Design; LL86 Baseline and Energy Efficiency Measures (EEMs)*

Description	Annual Energy Cost ($)	Annual Regulated Energy Costs ($)	Regulated Energy Cost Savings ($)	% Regulated Energy Cost Savings	LL86 Compliance
NYC LL86 Baseline ASHRAE 90.1-2013 ECB	$79,333	$62,523	-	-	-
Proposed Design	$65,011	$48,543	$13,980	22.4%	Yes

	LL86 Baseline	Proposed Design
Total Annual Electric Use (kWh)	336,059	283,806
Total Annual Electric Cost	$70,764	$58,464
Regulated Annual Electric Use (kWh)	258,648	206,395
Regulated Annual Electric Cost	$54,471	$42,517
Peak Total Demand (kW)	181	144
Peak Regulated Demand (kW)	161	123
Sum of Regulated Monthly Peak Demands (kW)	1,177	924
Total Gas Use (Therms)	7,446	5,636
Total Gas Cost	$8,569	$6,547
Regulated Gas Use (Therms)	6,997	5,187
Regulated Gas Cost ($)	$8,052	$6,026

Details for Energy Simulation

EME Group used the computer software EQUEST to model the building design and evaluate energy efficiency measures. EQUEST is a computer program for detailed energy use analysis of residential and commercial buildings. It was developed James J. Hirsch, in collaboration with the U.S. Department of Energy and other research groups. EQUEST calculates the hour-by-hour energy use of a building based on information on the building's location, construction, HVAC systems, central plant, occupancy, and operation.

The project is located in Staten Island, NY, which is in ASHRAE Climate Zone 4A per ASHRAE 90.1 Table B-1. The design conditions per ASHRAE 90.1 Table D-1 are wet bulb temperature of 73°F, dry bulb temperature of 89°F, HDD65 of 4,910 and CDD50 of 3,547. The analysis was based on climatic data for John F. Kennedy Airport in New York City, using a TMY3 bin weather file. The envelope of the SCA GSG Baseline is modeled to meet the requirements prescribed in Table 5.5-4 of ASHRAE 90.1-2010.

The utility rates used for the SCA Baseline and Proposed Design are based on LL86 energy rates for FY 2012 published by Mayor's Office of Environmental Coordination (MOEC). The electricity rate for NYPA Electric Public Schools consists of a demand charge of $30.64/kW and energy charge of $0.091/kWh. The natural gas rate for Con Edison gas, Firm-heating is $1.1117/therm.

B Building Energy Efficiency Measures included in Current Design

1. Reduced Interior Lighting Power

The Proposed Design interior lighting consists of LED fixtures. Based upon a count of the designed lights we have calculated that the current interior lighting design is 44% better than ASHRAE 90.1-2010 and 40% better than ASHRAE 90.1-2013 Table 9.6.1, using the space-by-space method.

2. Variable Frequency Drives (Pumps & Fans)

All hot water / chilled water pumps and fans are scheduled to be equipped with Variable Frequency Drives controls. VFD controls enable the motor's rotational speed to follow the flow rates. In this way the motor's power consumption will be less than standard damper configurations at partial load.

3. Condensing Boilers

Gas-fired condensing boilers are part of the Proposed Design allowing for significant energy savings relative to conventional boiler versions. The condensing boilers have 88% heating efficiency when operating in condensing mode.

4. High Performance Envelope

The proposed design includes exterior envelope and fenestration components that have thermal insulation superior to the baseline design.

5. High Performance Split Heat Pumps

The proposed design includes high efficiency split heat pumps.

- Heating Efficiency: 10.8 HSPF
- Cooling Efficiency: 14 SEER

6. High Efficiency Energy Recovery

The proposed design includes energy recovery on four of the air handling units with 75% recovery effectiveness.

7. High Efficiency Domestic Hot Water Boiler

The proposed design includes a high efficiency domestic hot water boiler with efficiency of 85%.

C Fan power in the Baseline Model

We took credit for fully ducted return and exhaust air systems, return and exhaust airflow control devices, MERV 13 filters on the supply, heat recovery, sound attenuation, and VAV boxes.

D Side-by-Side Comparison between Proposed Design, SCA GSG Baseline, and LL86

	Proposed Design	**SCA GSG Baseline ASHRAE 90.1-2010 App. G**	**LL86 Baseline ASHRAE 90.1-2013 ECBM**
Climate	Bronx, NY- ASHRAE Climate Zone 4A	ASHRAE Climate Zone 4A	ASHRAE Climate Zone 4A
Exterior Wall Construction	Masonry Wall (1st Floor) • 4” Face Brick • 1 3/8” Air Space • 3” Rigid insulation (R-15) • Continuous Air/Vapor Barrier • 8” CMU • Interior Finish Partition • U-factor$_{unit}$=0.06 BTU/Hr-ft^2-°F Fiber Cement Cladding (Floors 2-5) • Fiber Cement Rainscreen Cladding • 1 1/2” Air Space • Aluminum Cladding • 4” Rigid insulation (R-16) • Continuous Air/Vapor Barrier • 6” CMU • Interior Finish Partition • U-factor$_{unit}$=0.06 BTU/Hr-ft^2-°F	Steel Framed Walls • U-factor = 0.064 Btu/(h-ft^2-F)	Mass Walls • U-factor = 0.104 Btu/(h-ft^2-F)
Vertical Fenestration	Vision Glass Area: 20.6% of Total Wall Area • Type: Aluminum Window Assembly • U-factor$_{unit}$ = 0.45 Btu/h-ft^2-F • Solar Heat Gain Coefficient = 0.38 • Shading Coefficient = 0.45 • Visible Transmittance = 0.68 **Window U-value reported in LV-D account for both frame and glass.*	Vision Glass Area: 20.6% of Total Wall Area • Type: Metal Framing- All Other • U-factor$_{unit}$ =0.55 • Solar Heat Gain Coefficient= 0.4 • Shading Coefficient = 0.46 • Visible Transmittance = 0.44 • Type: Entrance Doors with >50% glazed area • U-factor$_{unit}$ = 0.85 Btu/h-ft^2-F • Solar Heat Gain Coefficient = 0.39 Visible Transmittance = 0.44	Vision Glass Area: 20.6% of Total Wall Area • Type: Metal Framing, Fixed: • U-factor$_{unit}$ =0.42 • Solar Heat Gain Coefficient= 0.4 • Shading Coefficient = 0.46 • Type: Metal Framing, Operable: • U-factor$_{unit}$ =0.50 • Solar Heat Gain Coefficient= 0.4 • Shading Coefficient = 0.46 • Visible Transmittance = 0.44 **Weighted U-value average of windows used: 0.43*

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
	• Type: Entrance Doors with >50% glazed area • U-factor$_{unit}$ = 0.77 Btu/h-ft^2-F • Solar Heat Gain Coefficient = 0.39 • Visible Transmittance = 0.68 • Type: Glass Block* • U-factor$_{unit}$ = 0.51 Btu/h-ft^2-F • Solar Heat Gain Coefficient = 0.39 • Visible Transmittance = 0.68 **Glass Block makes up less than 5% of total exterior wall area.*		• Type: Entrance Doors with >50% glazed area • U-factor$_{unit}$ = 0.77 Btu/h-ft^2-F • Solar Heat Gain Coefficient = 0.39 • Visible Transmittance = 0.44
Below-Grade Wall Construction	Below-Grade Walls • 1’2” Cast-in Place Concrete • 2” continuous rigid insulation • C-factor$_{unit}$ = 0.111 Btu/h-ft^2-F	Below-Grade Walls • C-factor = 1.140 Btu/(h-ft^2-F)	Below-Grade Walls • C-factor = 0.119 Btu/(h-ft^2-F)
Roof Construction	Roof • Insulation entirely above deck, R-30.0 c.i • 6” Insulation • 6” Concrete Slab • U-0.032 BTU/Hr-ft2-°F	Typical Roof Construction • 2” Stone paver • R-20 Continuous Insulation • 10” Roof slab • U-factor = 0.048 Btu/(h-ft^2-F)	Typical Roof Construction • 2” Stone paver • R-30 Continuous Insulation • 10” Roof slab • U-factor = 0.032 Btu/(h-ft^2-F)
Opaque Doors	Swinging Door • U-factor = 0.5 Btu/(h-ft^2-F)	Swinging Door • U-factor = 0.7 Btu/(h-ft^2-F)	Swinging Door • U-factor = 0.5 Btu/(h-ft^2-F)

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
Interior Lighting			

Space Type	Area	Design		GSG Baseline		LL86 Baseline	
	ft2	LPD [W/ft2]	Model LPD (with OS Credit)	LPD [W/ft2]	Model LPD (with OS Credit)	LPD [W/ft2]	Model LPD (with OS Credi
Electrical/Mechanical Room	4,342	0.49	0.49	0.53	0.53	0.42	0.42
Stairwell	4,227	0.28	0.23	0.69	0.69	0.69	0.62
Corridor/All Other	6,438	0.50	0.49	0.66	0.66	0.66	0.66
Gymnasium/Fitness Center/Playing Area	1,284	0.31	0.31	1.20	1.20	1.20	1.20
Restroom/ All Other	2,395	0.63	0.57	0.98	0.88	0.98	0.88
Conference/Meeting/Multipurpose Room	218	1.27	1.14	1.23	1.11	1.23	1.11
Classroom/Lecture Hall/Training Room	22,176	0.65	0.59	1.24	1.12	1.24	1.12
Office/Enclosed ≤250 sqft	400	1.14	1.14	1.11	1.00	1.11	1.00
Office/Enclosed ≤250 sqft with windows	243	0.86	0.86	1.11	1.00	1.11	1.11
Storage Room/≥50 sqft and ≤1000 sqft	1,056	0.70	0.70	0.63	0.57	0.63	0.57
Dining Area/All Other	2,882	0.55	0.51	1.31	1.31	0.65	0.65
Storage Room/<50 sqft	49	0.99	0.99	0.63	0.63	1.24	1.12
Locker Room	165	0.26	0.23	0.75	0.68	0.75	0.68
Food Preperation Area	541	0.87	0.78	0.99	0.99	1.21	1.21
Library/Reading Area	1,370	0.60	0.54	1.06	1.06	1.06	1.06
Overall	**47,786**	**0.58**	**0.53**	**1.01**	**0.95**	**0.97**	**0.89**

	Proposed Design	**SCA GSG Baseline ASHRAE 90.1-2010 App. G**	**LL86 Baseline ASHRAE 90.1-2013 ECBM**
Interior Lighting Controls			

Space Type	Design				GSG Baseline				LL86 Baseline			
	Total Wattage	OS Wattage	DS	Modeled Wattage	Total Wattage	OS Wattage	DS	Modeled Wattage	Total Wattage	OS Wattage	DS	Modeled Wattage
Electrical/Mechanical Room	2,112			2,112	2,301			2,301	1,823			1,823
Stairwell	1,184	1,184		972	2,917	2,917		2,917	2,917	2,917		2,625
Corridor/All Other	3,219			3,134	4,249			4,249	4,249			4,249
Gymnasium/Fitness Center/Playing Area	398		Yes	400	1,540		Yes	1,540	1,540		Yes	1,540
Restroom/ All Other	1,509	1,509		1,366	2,347	2,347		2,113	2,347	2,347		2,113
Conference/Meeting/Multipurpose Room	276	276	Yes	248	268	268	Yes	241	268	268	Yes	241
Classroom/Lecture Hall/Training Room	14,415	14,415	Yes	13,119	27,499	27,499	Yes	24,749	27,499	27,499	Yes	24,749
Office/Enclosed ≤250 sqft	455	455		455	444	444		400	444	444		400
Office/Enclosed ≤250 sqft with windows	210	210	Yes	210	270	270	Yes	243	270	270	Yes	270
Storage Room/≥50 sqft and ≤1000 sqft	739			737	665			599	665			599
Dining Area/All Other	1,585			1,473	3,776			3,776	1,873			1,873
Storage Room/<50 sqft	48			48	31			31	60			54
Locker Room	43	43		39	124	124		111	124	124		111
Food Preperation Area	471			422	536			536	655			655
Library/Reading Area	822	822	Yes	738	1,452	1,452	Yes	1,452	1,452	1,452	Yes	1,452

<table>
<tr><th></th><th>Proposed Design</th><th>SCA GSG Baseline
ASHRAE 90.1-2010 App. G</th><th>LL86 Baseline
ASHRAE 90.1-2013 ECBM</th></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td>Mandatory Lighting Controls</td><td>Vacancy sensors (manual on/automatic off) in offices, locker rooms, restrooms, classrooms.</td><td>Vacancy sensors (manual on/automatic off) in all rooms are required per Section 9.4.1.2b ASHRAE 90.1-2010.</td><td>Vacancy sensors (manual on/automatic off) in all rooms are required per Section 9.4.1.1b,c ASHRAE 90.1 2013.</td></tr>
<tr><td>Daylight Dimming</td><td>Daylight dimming located in all spaces with windows</td><td>Daylight dimming controls as required by Section 9.4.1.5.</td><td>Daylight dimming controls as required by Section 9.4.1.1e</td></tr>
<tr><td>Exterior Lighting</td><td>747 Watt exterior lighting power</td><td>2,408 Watt exterior lighting allowance</td><td>2,408 Watt exterior lighting allowance</td></tr>
<tr><td>Elevators</td><td>(2) elevators</td><td>(2) elevators</td><td>(2) elevators</td></tr>
<tr><td>Equipment Power</td><td><table>
<tr><th>Space Type</th><th>Equip. Power Density</th></tr>
<tr><td>Gymnasium</td><td>0.25 W/ft^2</td></tr>
<tr><td>Conference</td><td>1.25 W/ft^2</td></tr>
<tr><td>Classroom</td><td>0.25 W/ft^2</td></tr>
<tr><td>Office</td><td>1.25 W/ft^2</td></tr>
<tr><td>Dining</td><td>0.25 W/ft^2</td></tr>
<tr><td>Kitchen</td><td>3.0 W/ft^2</td></tr>
<tr><td>Library</td><td>0.5 W/ft^2</td></tr>
<tr><td>MDF/IDF</td><td>7.5 W/ft^2</td></tr>
<tr><td>Other Spaces</td><td>0 W/ft^2</td></tr>
</table></td><td>Same as proposed design</td><td>Same as proposed design</td></tr>
</table>

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
HVAC System Description	(2) Variable volume air handling units (AHU) supply ventilation, heating and cooling to classrooms, offices and corridors. (1) AHU unit serves the kitchen and cafeteria. Heating and cooling to these units is provided by 2 central boilers and a chiller. Classrooms, Offices, other non-assembly areas and corridor VAV boxes shall be provided with supply air from Variable Air Volume (VAV) central recirculating air handling units. The VAV air handling units provide tempered heating ventilation air (normally discharge air at 65 F°) and provide all of the space cooling capacity. The fin tube radiation units located in classrooms, offices, and other non-assembly areas provide the balance of the space heating capacity in order to heat ventilation air from 65 F° to space temperature set point of 72 F°. Kitchen/ Cafeteria Air Handling Unit provides tempered heating ventilation air (normally discharge air at 65 F°) and provide all of the space cooling capacity. The fin tube radiation units located in each cafeteria area and reheat coil in kitchen area shall provide the balance of the space heating capacity in order to heat ventilation air from 65 F° to space temperature set point of 72 F°. All Air Handling Units shall have operating nighttime set-back mode (unoccupied mode) to maintain space	Main systems are System #7: Rooftop Variable Air Volume (VAV), with those zones that fall under the exceptions to G3.1.1 modeled as PSZ-AC systems (System #3) per Tables G3.1.1A and B. Zones which are heated only are served by System 9 and System 10- Heating and Ventilation.	Main system is a System #4 – Packaged VAV with reheat provided by a central boiler. Zones served by the HW and electric unit heaters in the proposed case modeled as individual System #11 (Packaged Rooftop air conditioner with Fossil Fuel Furnace) and System #9 (packaged Rooftop Heat Pump) respectively.

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
	temperature at 55 F° (adj). Hot water unit heaters and water cabinet unit heaters serve minimally heated spaces such as the large mechanical rooms, stairs, and restrooms. Electric unit heaters provide additional heat to mechanical rooms. Air curtains serve the front and side vestibules. Hot water convectors provide added heat to corridors, locker rooms, restrooms, and can wash room. Split type heat pumps serve areas which may require cooling during unoccupied hours in the MDF Rooms, elevator machinery room, and storage room.		

	Proposed Design	**SCA GSG Baseline ASHRAE 90.1-2010 App. G**	**LL86 Baseline ASHRAE 90.1-2013 ECBM**
HVAC Systems: Classrooms, offices, toilets, corridors, reading and exercise rooms	AHU-1 • Variable volume • Supply Flow, Primary 11,900 CFM • Max Outside Air Flow 11,900 CFM • Min Outside Air Flow 7,140 CFM • Max Return Flow 10,150 CFM • Min Return Flow 5,390 CFM • Supply fan 30 HP • Relief fan 15 HP • Cooling Capacity 528 MBH • Heating Capacity 332 MBH • Economizer with enthalpy controls • Demand Controlled Ventilation Cooling: • Chilled water, 30% glycol Heating: • Preheat – HW coil, 30% glycol • Supplemental CUHs in toilets • Fin Tube Radiation Energy Recovery • 75% energy recovery effectiveness AHU-2 • Variable volume • Supply Flow, Primary 11,000 CFM • Max Outside Air Flow 11,000 CFM • Min Outside Air Flow 6,600 CFM • Max Return Flow 9,380 CFM • Min Return Flow 4,980 CFM • Supply fan 30 HP • Relief fan 10 HP • Cooling Capacity 493 MBH • Heating Capacity 294 MBH • Economizer with enthalpy controls • Demand Controlled Ventilation	Classroom Systems • System #7 - VAV with reheat • Hot water reheat coils on VAV boxes • DX cooling coil • No economizer • 50% energy recovery effectiveness • Fan Power Credits: (AHU 1 and AHU 2) Energy Recovery 1.15” MERV 13 0.90” Sound Attenuator 0.15” Cellar VAV (Cellar) • Supply Flow 300 CFM • Max Outside Air Flow 300 CFM • Minimum Flow 150 CFM • Return Flow 90% of supply • Total Fan Power 0.6 kW • Cooling capacity 12.5 kBtu/h • Heating capacity 16.4 kBtu/h FL1 VAV (1st Floor) • Supply Flow 3,245 CFM • Max Outside Air Flow 2,570 CFM • Minimum Flow 1,281 CFM • Return Flow 90% of supply • Total Fan Power 5.6 kW • Cooling capacity 136 kBtu/h • Heating capacity 178 kBtu/h FL2 VAV (2rd Floor) • Supply Flow 6,212 CFM • Max Outside Air Flow 5,160 CFM • Minimum Flow 2,503 CFM • Return Flow 90% of supply • Total Fan Power 10.5 kW	Classroom System • System #4: Packaged VAV with reheat • Hot water reheat coils on VAV boxes • DX cooling coil • Economizer with fixed drybulb controls with high-limit of t(OA) > 65°F • 50% energy recovery effectiveness • Demand Controlled Ventilation • Fan Power Credits: (AHU 1 and AHU 2) Energy Recovery 1.15” MERV 13 0.90” Sound Attenuator 0.15” AHU 1 • Supply Flow 14,326 CFM • Max Outside Air Flow 11,900 CFM • Minimum Flow 5,372 CFM • Total Fan Power 23.8 kW • Cool capacity 583 kBtu/h • Cooling Efficiency 9.8 EER • Heating capacity 1,214 kBtu/h AHU 2 • Supply Flow 13,025 CFM • Max Outside Air Flow 11,012 CFM • Minimum Flow 5,731 CFM • Total Fan Power 21.7 kW • Cool capacity 521 kBtu/h • Cooling Efficiency 9.8 EER • Heating capacity 1,055 kBtu/h

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
	Cooling: • Chilled water, 30% glycol Heating: • Preheat – HW coil, 30% glycol • Supplemental CUHs in toilets • Fin Tube Radiation Energy Recovery 75% energy recovery effectiveness	• Cooling capacity 254 kBtu/h • Heating capacity 340 kBtu/h FL3 VAV (3rd Floor) • Supply Flow 5,709 CFM • Max Outside Air Flow 4,840 CFM • Minimum Flow 2,272 CFM • Return Flow 90% of supply • Total Fan Power 9.6 kW • Cooling capacity 234 kBtu/h • Heating capacity 313 kBtu/h FL4 VAV (4th Floor) • Supply Flow 6,269 CFM • Max Outside Air Flow 5,882 CFM • Minimum Flow 2,864 CFM • Return Flow 90% of supply • Total Fan Power 10.6 kW • Cooling capacity 255 kBtu/h • Heating capacity 344 kBtu/h FL5 VAV (5th Floor) • Supply Flow 5,699 CFM • Max Outside Air Flow 4,540 CFM • Minimum Flow 2,228 CFM • Return Flow 90% of supply • Total Fan Power 9.6 kW • Cooling capacity 174 kBtu/h • Heating capacity 327 kBtu/h	

<table>
<tr><th></th><th>Proposed Design</th><th>SCA GSG Baseline
ASHRAE 90.1-2010 App. G</th><th>LL86 Baseline
ASHRAE 90.1-2013 ECBM</th></tr>
<tr>
<td>HVAC Systems: Kitchen/Cafeteria</td>
<td>AHU-3
• Variable volume
• Supply Flow, Primary 3,920 CFM
• Max Outside Air Flow 3,920 CFM
• Min Outside Air Flow 2,000 CFM
• Return Flow 1,920 CFM
• Supply fan 10 HP
• Relief fan 1 HP
• Cooling Capacity 218 MBH
• Heating Capacity 187 MBH
• Economizer with enthalpy controls
• Demand Controlled Ventilation
<u>Cooling:</u>
• Chilled water, 30% glycol
<u>Heating:</u>
• Preheat – HW coil, 30% glycol
• Supplemental CUHs in toilets
• Hot Water Convectors</td>
<td>Kitchen/Cafeteria System
• #7 VAV with reheat
• Hot water reheat coils on VAV boxes
• DX cooling coil
• No economizer
• Fan Power Credits: (AHU 3)
MERV 13 0.90”
Ducted Return 0.50”
Sound Attenuator 0.15”

Cafeteria/Kitchen PSZ
• Supply Flow 4,068 CFM
• Max Outside Air Flow3,490 CFM
• Return Flow 90% of supply
• Total Fan Power 4.8 kW
• Cooling capacity 138 kBtu/h
• Heating capacity 463 kBtu/h</td>
<td>Kitchen/Cafeteria
• System #4: Packaged VAV with reheat
• Hot water reheat coils on VAV boxes
• DX cooling coil
• Economizer with fixed drybulb controls with high-limit of t(OA) > 65°F
• Demand Controlled Ventilation
• Fan Power Credits: (AHU 3)
MERV 13 0.90”
Ducted Return 0.50”
Sound Attenuator 0.15”

AHU-3
• Supply Flow 4,565 CFM
• Max Outside Air Flow 3,870 CFM
• Minimum Flow 1,981 CFM
• Return Flow 90% of supply
• Total Fan Power 8 kW
• Cool capacity 412 kBtu/h
• Cooling Efficiency 9.8 EER
• Heating capacity 621 kBtu/h</td>
</tr>
<tr>
<td>HVAC Systems: Air source heat pumps</td>
<td>Air source heat pumps serve the elevator machine room, MDF room and 112J storage room.
<table>
<tr><th>Unit</th><th>Service</th><th>SEER</th></tr>
<tr><td>AC-1</td><td>112J Storage</td><td>14.0</td></tr>
<tr><td>AC-2</td><td>319 Telecom (MDF)</td><td>14.0</td></tr>
<tr><td>AC-3</td><td>602 Elevator Machine Room</td><td>14.0</td></tr>
</table>
Heating via 10.8 HSPF heat pump in model (no heating demand).</td>
<td>System 3- PSZ
<table>
<tr><th>Unit</th><th>Service</th><th>SEER</th></tr>
<tr><td>AC-1</td><td>112J Storage</td><td>14.0</td></tr>
<tr><td>AC-2</td><td>319 Telecom (MDF)</td><td>14.0</td></tr>
<tr><td>AC-3</td><td>602 Elevator Machine Room</td><td>14.0</td></tr>
</table>
Heating from 80% efficient furnaces (no heating demand).</td>
<td>System 9- Packaged Roof top heat pump (Split unit)
<table>
<tr><th>Unit</th><th>Service</th><th>SEER</th></tr>
<tr><td>AC-1</td><td>112J Storage</td><td>14.0</td></tr>
<tr><td>AC-2</td><td>319 Telecom (MDF)</td><td>14.0</td></tr>
<tr><td>AC-3</td><td>602 Elevator Machine Room</td><td>14.0</td></tr>
</table>
Heating from 9 HSPF split system heat pump (no heating demand).</td>
</tr>
</table>

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
HVAC Systems, Hot water /Water Cabinet unit heaters	WCUH/WUH unit heaters serve restrooms, stairs, mechanical rooms, and vestibules.	System 9- Heating & Ventilation Heating from 80% efficient furnaces	System 11- Packaged rooftop air conditioner. Heating from 80% efficient furnaces. No cooling provided.
HVAC Systems, Electric Unit Heaters	Electric unit heaters serve the mechanical rooms.	System 9- Heating & Ventilation Heating from electric furnaces	System 9- Packaged rooftop heat pump. No cooling provided.
Boiler Plant	Two (2) gas-fired condensing boilers (One on stand-by) • Reset based on outdoor temperature 1,584 MBH each (output capacity) • 88.0% minimum efficiency	Two (2) gas-fired boilers • 1,033 MBH (each) • 80% thermal efficiency per Table 6.8.1F	Two (2) gas-fired boilers • 2,010 MBH (each) • 80% thermal efficiency per Table 6.8.1F
Chiller Plant	One (1) 103.3-ton modular air-cooled chiller (with 4 modules, each 25.8 tons) • FL: 10.16 EER • IPLV: 14.26 EER (<150 tons)	One (1) 91-ton water-cooled chiller • FL: 0.775 kW/ton • IPLV: 0.615 kW/ton	No chillers (all DX cooling).
Domestic Hot Water	One gas fired hot water heater • 200 MBtu/h • 85% estimated modeled efficiency	One gas fired hot water heater • 200 MBtu/h • 80% thermal efficiency per Table 7.8	One gas fired hot water heater • 200 kBtu/h • 80% thermal efficiency per Table 7.8

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
Pumps	Primary Hot Water Pumps • Two pumps plus one standby • 101 GPM • 5 HP • Variable Speed Secondary Hot Water Pump • One pump plus one standby • 110 GPM • 5 HP • Variable Speed Chilled Water Pump • One pump plus one standby • 263 GPM • 7.5 HP • Variable Speed	Hot Water Pumps • 19 W/gpm • Constant speed, rides pump curve.	Primary Hot Water Pumps • 19 W/gpm • Constant speed, rides pump curve.
Equipment Sizing	• Equipment capacities based on mechanical schedule (actual sizes)	• Equipment capacities based on temperature difference of 20°F between supply air temperature and the temperature set point in the space. • Cooling equipment oversized for 15% and heating equipment oversized by 25%.	• Equipment capacities based on temperature difference of 20°F between supply air temperature and the temperature set point in the space. • The equipment capacities are sized proportionally to the capacities in the Proposed Design based on sizing runs; i.e., the ratio between the capacities used in the annual simulations and the capacities determined by the sizing runs are the same as in the Proposed Design

	Proposed Design	SCA GSG Baseline ASHRAE 90.1-2010 App. G	LL86 Baseline ASHRAE 90.1-2013 ECBM
HVAC Summary	Cooling Capacity • System Total = 1,332 MBH • Chiller = 1,240 MBH • Heat Pumps = 92.4 MBH Heating Capacity • System Total = 3,326 MBH • Boiler = 3,168 MBH • Electric = 58.0 MBH • Heat Pumps = 100 MBH Fan Power • VAV supply = 26,820 cfm • VAV supply fan power = 70 HP • VAV return fan power = 26 HP • CV supply = 17,578 cfm • CV fan power = 3.2 HP	Cooling Capacity • System Total = 1,230 MBH • Chiller = 1,088 MBH • Packaged Units = 165 MBH Heating Capacity • System Total = 2,644 MBH • Boiler = 2,066 MBH • Furnace = 576 MBH • Electric = 2 MBH Fan Power • VAV supply = 27,434 cfm • VAV supply fan power = 32.5 kW • Return fan power = 13.9 KW • CV supply = 6,989 cfm • CV fan power = 6.1 kW	Cooling Capacity • System Total = 1,552 MBH • Chiller = 0 MBH • Heat Pumps = 21 MBH Heating Capacity • System Total = 4,118 MBH • Boiler = 4,020 MBH • Furnace = 80 MBH • Electric = 1.7 MBH • Heat pumps = 16.3 MBH Fan Power • VAV supply = 31,916 cfm • VAV supply fan power = 37.4 kW • VAV return fan power = 16.0 kW • CV supply = 3,633 cfm • CV fan power = 1.8 kW

<table>
<tr><th></th><th>Proposed Design</th><th>SCA GSG Baseline
ASHRAE 90.1-2010 App. G</th><th>LL86 Baseline
ASHRAE 90.1-2013 ECBM</th></tr>
<tr><td>Electric usage summary</td>
<td>
<table>
<tr><th>Month</th><th>Peak kW</th></tr>
<tr><td>January</td><td>65</td></tr>
<tr><td>February</td><td>62</td></tr>
<tr><td>March</td><td>64</td></tr>
<tr><td>April</td><td>95</td></tr>
<tr><td>May</td><td>124</td></tr>
<tr><td>June</td><td>144</td></tr>
<tr><td>July</td><td>126</td></tr>
<tr><td>August</td><td>121</td></tr>
<tr><td>September</td><td>135</td></tr>
<tr><td>October</td><td>99</td></tr>
<tr><td>November</td><td>73</td></tr>
<tr><td>December</td><td>64</td></tr>
</table>
Annual electric consumption =
283,806 kWh
</td>
<td>
<table>
<tr><th>Month</th><th>Peak kW</th></tr>
<tr><td>January</td><td>86</td></tr>
<tr><td>February</td><td>83</td></tr>
<tr><td>March</td><td>88</td></tr>
<tr><td>April</td><td>125</td></tr>
<tr><td>May</td><td>152</td></tr>
<tr><td>June</td><td>173</td></tr>
<tr><td>July</td><td>144</td></tr>
<tr><td>August</td><td>135</td></tr>
<tr><td>September</td><td>168</td></tr>
<tr><td>October</td><td>132</td></tr>
<tr><td>November</td><td>96</td></tr>
<tr><td>December</td><td>85</td></tr>
</table>
Annual electric consumption =
389,249 kWh
</td>
<td>
<table>
<tr><th>Month</th><th>Peak kW</th></tr>
<tr><td>January</td><td>71</td></tr>
<tr><td>February</td><td>69</td></tr>
<tr><td>March</td><td>79</td></tr>
<tr><td>April</td><td>118</td></tr>
<tr><td>May</td><td>157</td></tr>
<tr><td>June</td><td>181</td></tr>
<tr><td>July</td><td>146</td></tr>
<tr><td>August</td><td>140</td></tr>
<tr><td>September</td><td>172</td></tr>
<tr><td>October</td><td>130</td></tr>
<tr><td>November</td><td>90</td></tr>
<tr><td>December</td><td>71</td></tr>
</table>
Annual electric consumption =
336,059 kWh
</td></tr>
<tr><td>Natural gas usage summary</td><td>Annual gas consumption =
5,636 therms</td><td>Annual gas consumption =
6,987 therms</td><td>Annual gas consumption =
7,446 therms</td></tr>
</table>

Note:

This report is developed for the purpose of calculating the energy performance per requirements ASHRAE 90.1-2010 Appendix G and ASHRAE 90.1-2013 Section 11. Actual energy use and cost will be greater, since the modeling rules do not account for many real-life issues, such as quality of construction, equipment functionality, building operation and other factors. Reasons include, but are not limited to the following:

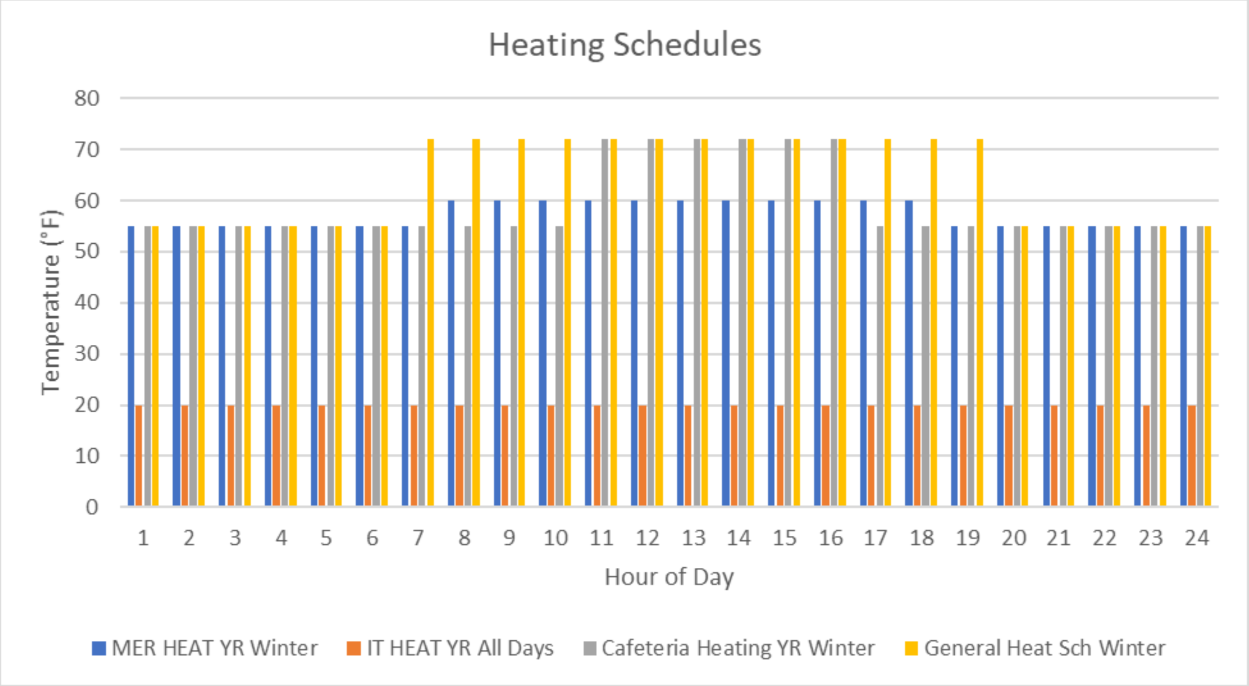
- The ECBM Baseline assumes perfection, as noted in the bullets below, so the design model also must assume perfection:
  - The HVAC equipment is manufactured per standards. The design of the HVAC systems is such that the each individual piece of equipment performs optimally. The installation is flawless, and the operation optimum.
  - Lighting and lighting controls are perfectly manufactured/installed and function as such.
  - The insulation is installed perfectly. There are no gaps and no rips caused by pipes and wiring. The windows are put in place with perfect caulking.
- Certain real-life effects are not included in the baseline calculations, and therefore are not included in the design calculations either. For instance, the three-dimensional heat loss effect that occurs at the roof parapet
- Occupant behavior is idealized
- Other effects, such as uncertainties in equipment (plug load) operation.

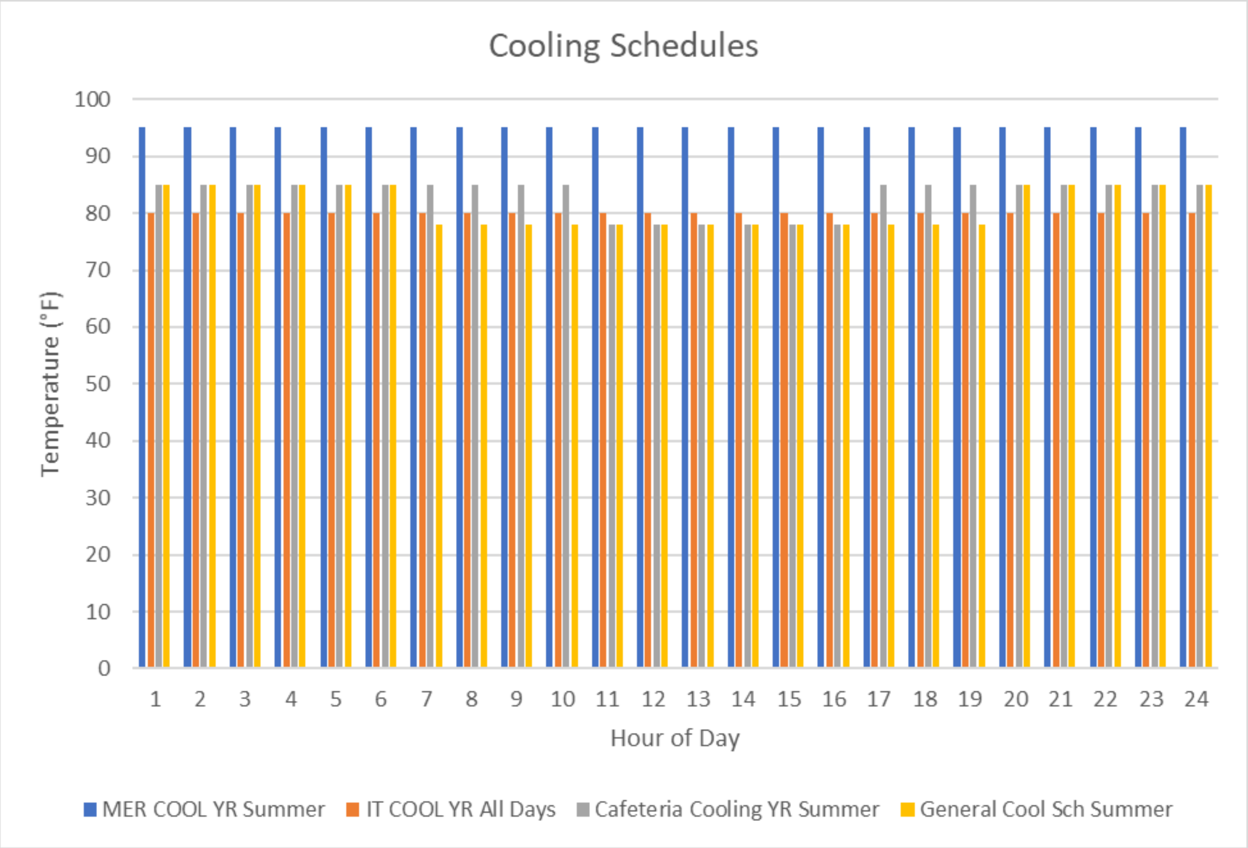
Please refer to the Informative Note in ASHRAE 90.1-2013 Section 11.1: "*The energy cost budget and the design energy cost calculations are applicable only for determining compliance with this standard. They are not predictions of actual energy consumption or costs of the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this standard, changes in energy rates between design of the building and occupancy, and precision of the calculation tool.*"

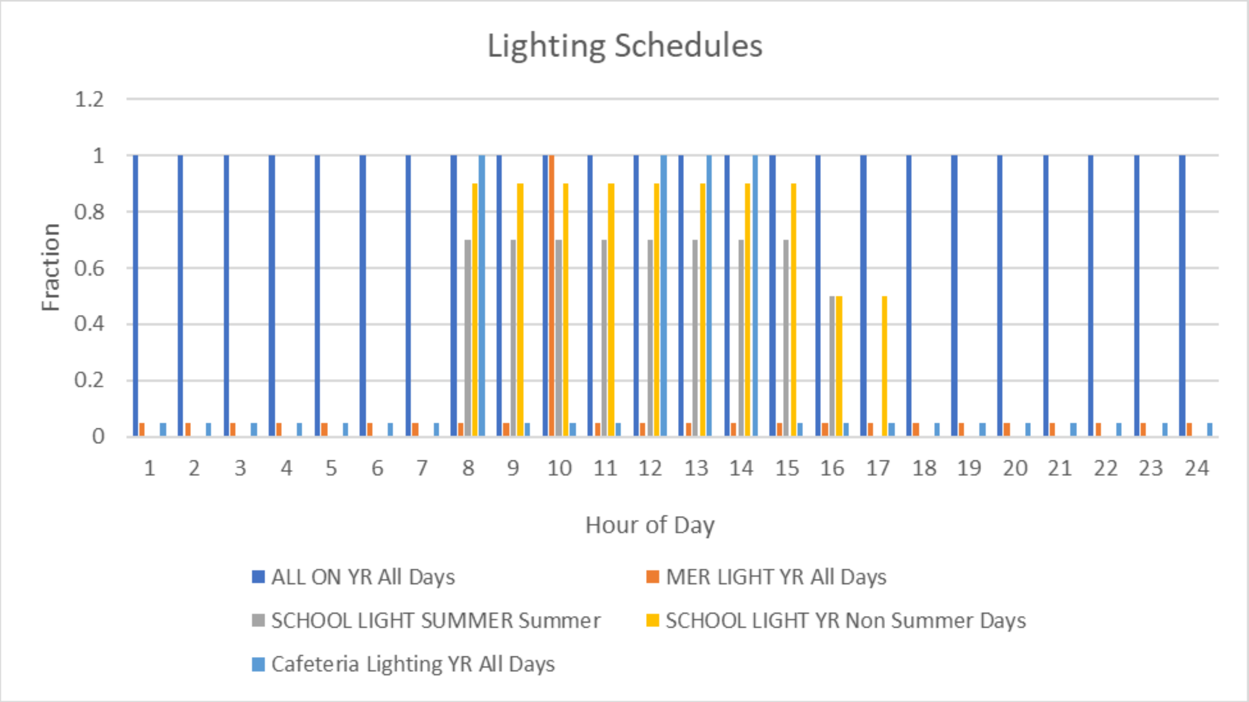
To fully comply with ASHRAE 90.1, Section 11 and/or Appendix G, the design must comply with all mandatory provisions of ASHRAE 90.1 Sections 5.4 (Building Envelope), 6.4 (HVAC Equipment), 7.4 (Service Water Heating), 8.4 (Power), 9.4 (Lighting) and 10.4 (Other Equipment). Compliance with these provisions is not part of EME Group's energy analysis. Typically, this compliance is certified by the Architect (Section 5.4) and the HVAC Engineer (Sections 6.4, 7.4, 8.4, 9.4 and 10.4).

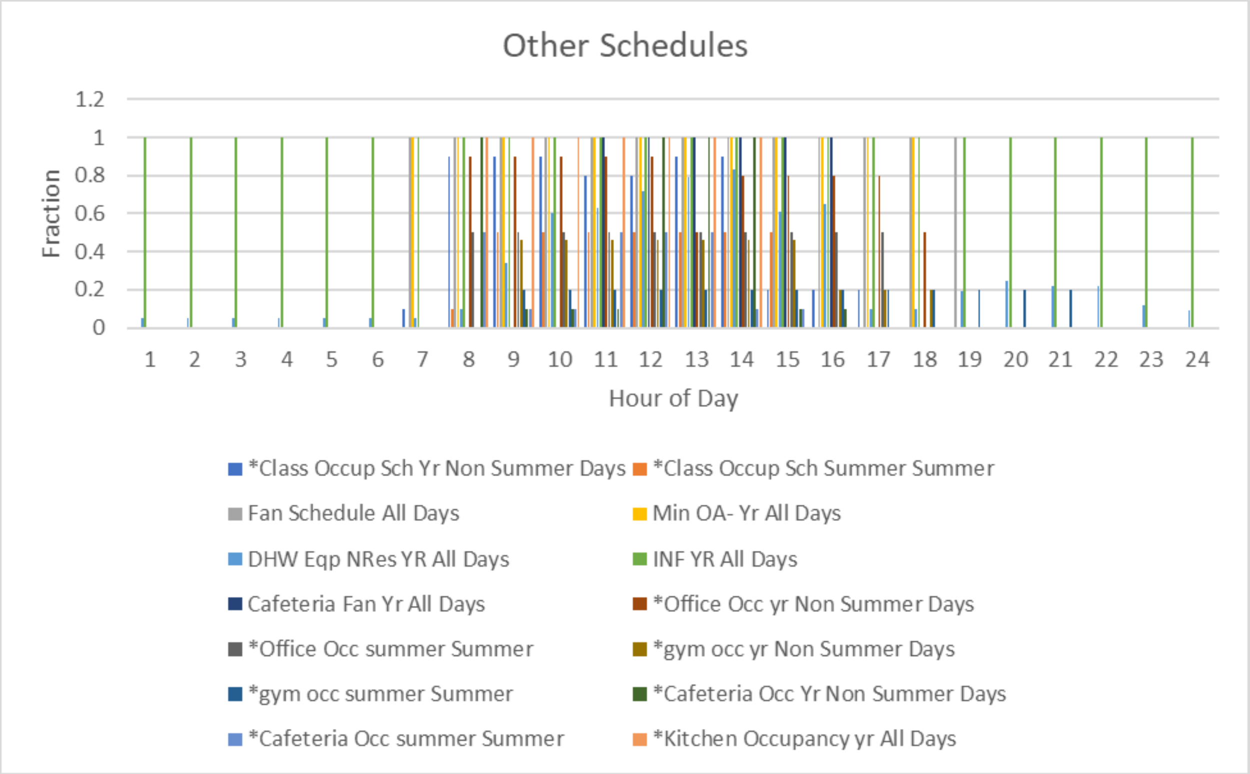
APPENDIX A. SCHEDULE DETAILS

A1. SCHEDULE FOR TYPICAL SPACES






Lighting Schedules
Fraction
1.2
1
0.8
0.6
0.4
0.2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day
ALL ON YR All Days
MER LIGHT YR All Days
SCHOOL LIGHT SUMMER Summer
SCHOOL LIGHT YR Non Summer Days
Cafeteria Lighting YR All Days


Other Schedules
Fraction
1.2
1
0.8
0.6
0.4
0.2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour of Day
*Class Occup Sch Yr Non Summer Days
*Class Occup Sch Summer Summer
Fan Schedule All Days
Min OA- Yr All Days
DHW Eqp NRes YR All Days
INF YR All Days
Cafeteria Fan Yr All Days
*Office Occ yr Non Summer Days
*Office Occ summer Summer
*gym occ yr Non Summer Days
*gym occ summer Summer
*Cafeteria Occ Yr Non Summer Days
*Cafeteria Occ summer Summer
*Kitchen Occupancy yr All Days

Schedule Name	Effective	12-1 am	1-2 am	2-3 am	3-4 am	4-5 am	5-6 am	6-7 am	7-8 am	8-9 am	9-10 am	10-11 am	11-12 pm	12-1 pm	1-2 pm	2-3 pm	3-4 pm	4-5 pm	5-6 pm	6-7 pm	7-8 pm	8-9 pm	9-10 pm	10-11 pm	11-12 am
Heating Schedules																									
MER HEAT YR	Winter	55	55	55	55	55	55	55	60	60	60	60	60	60	60	60	60	60	60	55	55	55	55	55	55
IT HEAT YR	All Days	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cafeteria Heating YR	Winter	55	55	55	55	55	55	55	55	55	55	72	72	72	72	72	72	55	55	55	55	55	55	55	55
General Heat Sch	Winter	55	55	55	55	55	55	72	72	72	72	72	72	72	72	72	72	72	72	72	55	55	55	55	55
Cooling Schedules																									
MER COOL YR	Summer	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
IT COOL YR	All Days	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Cafeteria Cooling YR	Summer	85	85	85	85	85	85	85	85	85	85	78	78	78	78	78	78	85	85	85	85	85	85	85	85
General Cool Sch	Summer	85	85	85	85	85	85	78	78	78	78	78	78	78	78	78	78	78	78	78	85	85	85	85	85
Lighting Schedules																									
ALL ON YR	All Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MER LIGHT YR	All Days	0	0	0	0	0	0	0	0.2	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0	0	0	0	0	0
SCHOOL LIGHT SUMMER	Summer	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.15	0.15	0.15	0.15	0.15	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SCHOOL LIGHT YR	Non Summer Days	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.3	0.85	0.95	0.95	0.95	0.8	0.8	0.8	0.7	0.5	0.5	0.35	0.35	0.35	0.3	0.05	0.05
Cafeteria Lighting YR	All Days	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.6	0.6	0.6	0.6	0.6	0.6	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Occupancy, Fan, and Other Schedules																									
*Class Occup Sch Yr	Non Summer Days	0	0	0	0	0	0	0.1	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.2	0.2	0.2	0	0	0	0	0	0	0
*Class Occup Sch Summer	Summer	0	0	0	0	0	0	0	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0
Fan Schedule	All Days	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
Min OA- Yr	All Days	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
DHW Eqp NRes YR	All Days	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.34	0.6	0.63	0.72	0.79	0.83	0.61	0.65	0.1	0.1	0.19	0.25	0.22	0.22	0.12	0.09
INF YR	All Days	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cafeteria Fan Yr	All Days	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0

*Office Occ yr	Non Summer Days	0	0	0	0	0	0	0	0.9	0.9	0.9	0.9	0.9	0.5	0.8	0.8	0.8	0.8	0.5	0	0	0	0	0	0
*Office Occ summer	Summer	0	0	0	0	0	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0	0	0	0	0
*gym occ yr	Non Summer Days	0	0	0	0	0	0	0	0	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.2	0.2	0.2	0	0	0	0	0	0
*gym occ summer	Summer	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0	0	0
*Cafeteria Occ Yr	Non Summer Days	0	0	0	0	0	0	0	1	0.1	0.1	0.1	1	1	1	0.1	0.1	0	0	0	0	0	0	0	0
*Cafeteria Occ summer	Summer	0	0	0	0	0	0	0	0.5	0.1	0.1	0.5	0.5	0.5	0.1	0.1	0	0	0	0	0	0	0	0	0
*Kitchen Occupancy yr	All Days	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0

*Building Occupancy schedules are based on intermediate school occupancy schedules from SCA energy modeling use guide and experience with similar buildings.

APPENDIX B. ENERGY MODEL OUTPUT REPORTS

ASHRAE 90.1 APPENDIX G ENERGY MODEL FOR GSG COMPLIANCE (BASELINE):

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PS 33X Jerome Ave 3                                                             DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- BEPS Building Energy Performance                                                    WEATHER FILE- NEW YORK LAGUARDI NY
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                         TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT    REFRIG  HT PUMP   DOMEST     EXT
               LIGHTS   LIGHTS   EQUIP   HEATING  COOLING   REJECT   & AUX     FANS   DISPLAY  SUPPLEM  HOT WTR   USAGE     TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    MBTU        349.5      0.0    264.2      0.7    228.1      5.3    163.0    281.4      0.0      0.0      0.0     36.3    1328.5

FM1  NATURAL-GAS
    MBTU          0.0      0.0     44.9    600.7      0.0      0.0      0.0      0.0      0.0      0.0     53.2      0.0     698.7
              =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  ========

    MBTU        349.5      0.0    309.1    601.4    228.1      5.3    163.0    281.4      0.0      0.0     53.2     36.3    2027.2



                   TOTAL SITE ENERGY      2027.24 MBTU     41.5 KBTU/SQFT-YR GROSS-AREA     41.5 KBTU/SQFT-YR NET-AREA
                   TOTAL SOURCE ENERGY    4684.23 MBTU     95.8 KBTU/SQFT-YR GROSS-AREA     95.8 KBTU/SQFT-YR NET-AREA

                   PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  2.97
                   PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
                   HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =    77
                   HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =   151

                   NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
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PS 33X Jerome Ave 3                                                  DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- BEPU Building Utility Performance                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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                         TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT   REFRIG  HT PUMP   DOMEST    EXT
               LIGHTS   LIGHTS   EQUIP   HEATING  COOLING   REJECT   & AUX     FANS   DISPLAY  SUPPLEM  HOT WTR   USAGE    TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    KWH       102408.       0.   77411.     212.   66824.    1555.   47755.   82449.       0.       0.       0.   10635.   389249.

FM1  NATURAL-GAS
    THERM          0.       0.     449.    6007.       0.       0.       0.       0.       0.       0.     532.       0.     6987.


           TOTAL ELECTRICITY    389249. KWH         7.961 KWH     /SQFT-YR GROSS-AREA    7.961 KWH     /SQFT-YR NET-AREA
           TOTAL NATURAL-GAS      6987. THERM       0.143 THERM   /SQFT-YR GROSS-AREA    0.143 THERM   /SQFT-YR NET-AREA


           PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  2.97
           PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
           HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =    77
           HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =   151

           NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.


PS 33X Jerome Ave 3                                                  DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- ES-D Energy Cost Summary                                                            WEATHER FILE- NEW YORK LAGUARDI NY
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                                                                           METERED             TOTAL      VIRTUAL
                                                                            ENERGY            CHARGE         RATE   RATE USED
UTILITY-RATE                       RESOURCE           METERS              UNITS/YR               ($)     ($/UNIT)   ALL YEAR?
--------------------------------   ----------------   -----------   -------------------   ----------   ----------   ---------

ConEd SmGen SC-2 Non-TOU Elec      ELECTRICITY        EM1              389249. KWH            73971.       0.1900      YES

ConEd Gen SC-2 Heating Gas         NATURAL-GAS        FM1                6987. THERM           8057.       1.1531      YES

                                                                                          ==========
                                                                                              82028.


                                                             ENERGY COST/GROSS BLDG AREA:      1.68
                                                               ENERGY COST/NET BLDG AREA:      1.68
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PS 33X Jerome Ave 3                                                                DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                                WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF SPACES  112           EXTERIOR   76     INTERIOR   36


                                                        LIGHTS           EQUIP
                              SPACE*FLOOR SPACE        (WATT /         (WATT / INFILTRATION               AREA       VOLUME
SPACE                          MULTIPLIER  TYPE   AZIM  SQFT ) PEOPLE  SQFT )       METHOD   ACH      (SQFT )      (CUFT )



Spaces on floor: C Below-Grade Flr

C Gas Meter Room                      1.0   INT    0.0    0.42     0.0    0.00   NO-INFILT.  0.00        414.8       4977.0
C Mech Equipment Room                 1.0   INT  -90.0    0.42     0.0    0.00   NO-INFILT.  0.00        281.2       3374.1
C Stairs B                            1.0   INT    0.0    0.69     0.0    0.00   NO-INFILT.  0.00        130.7       1568.6
C Electrical Room                     1.0   INT    0.0    0.42     0.0    0.00   NO-INFILT.  0.00        333.4       4000.8
C Water Service/Sewage Ejector        1.0   INT    0.0    0.42     0.0    0.00   NO-INFILT.  0.00        336.7       4040.0
C Elevators                           1.0   INT    0.0    0.00     0.0    0.00   NO-INFILT.  0.00        186.7       2240.5
C Stairs A                            1.0   INT  -90.0    0.69     0.0    0.00   NO-INFILT.  0.00        316.8       3801.9
C Sprinkler Booster Pump              1.0   INT  180.0    0.42     0.0    0.00   NO-INFILT.  0.00        347.2       4165.8
C Corridor                            1.0   INT   90.0    0.66     0.0    0.00   NO-INFILT.  0.00        758.3       9099.3

Spaces on floor: FL1 Ground Flr

FL1 Exercise Room                     1.0   EXT    0.0    0.72    74.4    0.25   AIR-CHANGE  0.31       1283.6      16686.3
FL1 Stairs B                          1.0   EXT  -90.0    0.69     0.0    0.00   AIR-CHANGE  0.31        432.5       5622.8
FL1 Toilet/Shower/Lockers             1.0   INT    0.0    0.99     0.0    0.00   NO-INFILT.  0.00        188.3       2448.4
FL1 Parents/Community                 1.0   EXT    0.0    1.11     2.2    0.50   AIR-CHANGE  0.31        217.7       2830.7
FL1 Toilet A                          1.0   EXT    0.0    0.99     0.0    0.00   AIR-CHANGE  0.31         70.1        911.2
FL1 Exam Room                         1.0   EXT    0.0    1.12     4.0    0.00   AIR-CHANGE  0.31         91.2       1185.1
FL1 Stairs A                          1.0   EXT    0.0    0.69     0.0    0.00   AIR-CHANGE  0.31        362.8       4716.3
FL1 Nurse's Office                    1.0   INT    0.0    1.00     1.7    1.25   NO-INFILT.  0.00        166.9       2169.4
FL1 Elevators                         1.0   INT    0.0    0.00     0.0    0.00   NO-INFILT.  0.00        193.1       2510.6
FL1 Bike Storage                      1.0   EXT   90.0    0.63     0.0    0.00   AIR-CHANGE  0.31         97.6       1268.8
FL1 Vestibule A                       1.0   EXT  -90.0    0.66     0.0    0.00   AIR-CHANGE  0.31        118.4       1539.0
FL1 Supervisory Office                1.0   EXT    0.0    1.00     2.0    1.25   AIR-CHANGE  0.31        203.7       2648.3
FL1 Vestibule B                       1.0   EXT  -90.0    0.66     0.0    0.00   AIR-CHANGE  0.31         65.4        850.1
FL1 Boys                              1.0   EXT    1.1    0.99     0.0    0.00   AIR-CHANGE  0.31        153.2       1992.2
FL1 Cafeteria                         1.0   EXT  180.0    0.65   110.1    0.00   AIR-CHANGE  0.31       1981.6      25760.2
FL1 Girls                             1.0   EXT    0.0    0.99     0.0    0.00   NO-INFILT.  0.00        125.4       1630.5
FL1 Students                          1.0   EXT    0.0    0.99     0.0    0.00   NO-INFILT.  0.00         64.2        834.1
FL1 Electrical                        1.0   EXT    0.0    0.42     0.0    0.00   NO-INFILT.  0.00         66.7        867.5
FL1 Servery                           1.0   EXT    0.0    0.65    15.8    0.00   NO-INFILT.  0.00        284.8       3702.1
FL1 Janitor's Closet                  1.0   INT    0.0    1.24     0.0    0.00   NO-INFILT.  0.00         48.7        633.4
FL1 Refuse Recycling                  1.0   EXT  180.0    0.63     0.0    0.00   AIR-CHANGE  0.31        145.0       1885.3
FL1 Can Wash                          1.0   EXT   90.0    1.21     0.5    3.00   AIR-CHANGE  0.31         94.3       1226.5
FL1 Dietition's Office                1.0   EXT   90.0    1.00     0.8    1.25   AIR-CHANGE  0.31         75.7        983.7
FL1 Locker Rooms                      1.0   EXT   90.0    0.99     0.0    0.00   AIR-CHANGE  0.31        164.7       2140.6
FL1 Toilet B                          1.0   EXT    0.0    0.99     0.0    0.00   AIR-CHANGE  0.31         74.2        965.1
FL1 Pot Wash                          1.0   EXT    0.0    1.21     0.8    3.00   NO-INFILT.  0.00        168.4       2189.4
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FL1 Prep/Warming                     1.0    EXT    0.0    1.21    2.7    3.00    NO-INFILT.  0.00       541.2       7036.1
FL1 Corridor                         1.0    EXT  -90.0    0.66    0.0    0.00    NO-INFILT.  0.00      1183.0      15378.8
FL1 Storage                          1.0    EXT  180.0    0.63    0.0    0.00    AIR-CHANGE  0.31       124.9       1623.4
FL1 Receiving                        1.0    EXT  180.0    0.63    0.0    0.00    AIR-CHANGE  0.31        78.6       1022.1

Spaces on floor: FL2 Ground Flr

FL2 Classroom A                      1.0    EXT   90.0    1.12   43.3    0.25    AIR-CHANGE  0.31       994.9      12933.2



PS 33X Jerome Ave 3                                                  DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                  WEATHER FILE- NEW YORK LAGUARDI NY
----------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL2 Classroom B                      1.0    EXT   90.0    1.12   42.7    0.25    AIR-CHANGE  0.31       983.0      12778.4
FL2 Classroom C                      1.0    EXT    0.0    1.12   44.0    0.25    AIR-CHANGE  0.31      1013.0      13168.9
FL2 Toilets A                        1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       133.6       1736.3
FL2 Toilets B                        1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       125.3       1629.3
FL2 Classroom D                      1.0    EXT   90.0    1.12   41.3    0.25    AIR-CHANGE  0.31       949.2      12339.5
FL2 Stairs B                         1.0    EXT    0.0    0.69    0.0    0.00    AIR-CHANGE  0.31       349.1       4538.8
FL2 Toilets C                        1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       119.1       1548.9
FL2 Staff                            1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00        84.1       1093.0
FL2 Comp / AV                        1.0    INT    0.0    0.42    0.0    7.50    NO-INFILT.  0.00        86.6       1126.2
FL2 Toilet D                         1.0    EXT    0.0    0.99    0.0    0.00    AIR-CHANGE  0.31        61.2        795.0
FL2 Reading / Speech Resource        1.0    EXT    0.0    1.06    8.1    0.50    AIR-CHANGE  0.31       469.0       6097.4
FL2 Elevators                        1.0    INT    0.0    0.00    0.0    0.00    NO-INFILT.  0.00       196.5       2554.0
FL2 Stairs A                         1.0    EXT    0.0    0.69    0.0    0.00    AIR-CHANGE  0.31       322.3       4190.4
FL2 Classroom E                      1.0    EXT    0.0    1.12   41.1    0.25    AIR-CHANGE  0.31       946.1      12299.9
FL2 Toilet E                         1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00        62.6        814.1
FL2 Elec                             1.0    INT    0.0    0.42    0.0    0.00    NO-INFILT.  0.00        61.8        803.3
FL2 Corridor                         1.0    EXT   90.0    0.66    0.0    0.00    AIR-CHANGE  0.31      1089.6      14165.3
FL2 Classroom F                      1.0    EXT   90.0    1.12   43.7    0.25    AIR-CHANGE  0.31      1005.6      13073.0

Spaces on floor: FL3 Ground Flr

FL3 Classroom A                      1.0    EXT   90.0    1.12   43.3    0.25    AIR-CHANGE  0.31       994.9      12933.2
FL3 Classroom B                      1.0    EXT   90.0    1.12   42.7    0.25    AIR-CHANGE  0.31       983.0      12778.4
FL3 Classroom C                      1.0    EXT    0.0    1.12   44.0    0.25    AIR-CHANGE  0.31      1013.0      13168.9
FL3 Toilets A                        1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       133.6       1736.3
FL3 Toilets B                        1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       125.3       1629.3
FL3 Classroom D                      1.0    EXT   90.0    1.12   41.3    0.25    AIR-CHANGE  0.31       949.2      12339.5
FL3 Stairs B                         1.0    EXT    0.0    0.69    0.0    0.00    AIR-CHANGE  0.31       349.1       4538.8
FL3 Toilet C                         1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00       119.1       1548.9
FL3 Toilet D                         1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00        84.1       1093.0
FL3 MDF                              1.0    EXT    0.0    0.42    0.0    7.50    AIR-CHANGE  0.31       358.7       4662.7
FL3 Elevators                        1.0    INT    0.0    0.00    0.0    0.00    AIR-CHANGE  0.31       196.5       2554.0
FL3 Stairs A                         1.0    EXT    0.0    0.69    0.0    0.00    AIR-CHANGE  0.31       322.3       4190.4
FL3 Classroom E                      1.0    EXT    0.0    1.12   41.1    0.25    AIR-CHANGE  0.31       946.1      12299.9
FL3 Toilet E                         1.0    INT    0.0    0.99    0.0    0.00    NO-INFILT.  0.00        62.6        814.1
FL3 Elec                             1.0    INT    0.0    0.42    0.0    0.00    NO-INFILT.  0.00        61.8        803.3
FL3 Corridor                         1.0    EXT   90.0    0.66    0.0    0.00    AIR-CHANGE  0.31      1093.1      14209.7
FL3 Comp / AV                        1.0    INT    0.0    0.42    0.0    7.50    NO-INFILT.  0.00        59.2        769.6
FL3 Supervisory                      1.0    EXT    0.0    1.00    2.0    1.25    AIR-CHANGE  0.31       195.8       2544.8
FL3 Classroom F                      1.0    EXT   90.0    1.12   43.7    0.25    AIR-CHANGE  0.31      1005.6      13073.0
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Spaces on floor: FL4 Ground Flr

FL4 Classroom A                      1.0   EXT    90.0    1.12   38.2    0.25   AIR-CHANGE  0.31       877.5      11407.1
FL4 Classroom B                      1.0   EXT    90.0    1.12   64.4    0.25   AIR-CHANGE  0.31      1480.3      19244.5
FL4 Classroom C                      1.0   EXT     0.0    1.12   46.8    0.25   AIR-CHANGE  0.31      1077.2      14003.1
FL4 Classroom D                      1.0   EXT    90.0    1.12   41.3    0.25   AIR-CHANGE  0.31       949.2      12339.5
FL4 Stairs B                         1.0   EXT     0.0    0.69    0.0    0.00   AIR-CHANGE  0.31       349.1       4538.8
FL4 Toilet C                         1.0   INT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00       119.1       1548.9
FL4 Comp / AV                        1.0   INT     0.0    0.42    0.0    7.50   NO-INFILT.  0.00        67.2        873.1
FL4 Staff Lunch / Conf               1.0   EXT   -90.0    0.65   34.2    0.00   AIR-CHANGE  0.31       615.8       8005.2
FL4 Elevators                        1.0   INT     0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5       2554.0
FL4 Stairs A                         1.0   EXT     0.0    0.69    0.0    0.00   AIR-CHANGE  0.31       322.3       4190.4
FL4 Classroom E                      1.0   EXT     0.0    1.12   39.2    0.25   AIR-CHANGE  0.31       901.1      11713.8
FL4 Toilet D                         1.0   INT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00       107.7       1400.3
FL4 Elec                             1.0   INT     0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        803.3
FL4 Corridor                         1.0   EXT    90.0    0.66    0.0    0.00   AIR-CHANGE  0.31      1032.4      13421.4




PS 33X Jerome Ave 3                                                               DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                               WEATHER FILE- NEW YORK LAGUARDI NY
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL4 Staff                            1.0   INT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00        76.1        989.5
FL4 Classroom F                      1.0   EXT    90.0    1.12   35.5    0.25   AIR-CHANGE  0.31       817.3      10624.6

Spaces on floor: FL5 Ground Flr

FL5 Classroom A                      1.0   EXT     0.0    1.12   33.7    0.25   AIR-CHANGE  0.27       775.0      11624.8
FL5 Classroom B                      1.0   EXT    90.0    1.12   41.3    0.25   AIR-CHANGE  0.27       949.2      14237.9
FL5 Stairs B                         1.0   EXT     0.0    0.69    0.0    0.00   AIR-CHANGE  0.27       349.1       5237.1
FL5 Toilet A                         1.0   EXT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00       119.1       1787.2
FL5 Toilet B                         1.0   EXT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00        79.6       1194.0
FL5 Classroom C                      1.0   EXT   -90.0    1.12   29.5    0.25   AIR-CHANGE  0.27       679.5      10192.0
FL5 Elevators                        1.0   INT     0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5       2946.9
FL5 Stairs A                         1.0   EXT     0.0    0.69    0.0    0.00   AIR-CHANGE  0.27       322.3       4835.0
FL5 Library                          1.0   EXT     0.0    1.06   15.5    0.50   AIR-CHANGE  0.27       901.1      13515.9
FL5 Toilet C                         1.0   EXT     0.0    0.99    0.0    0.00   NO-INFILT.  0.00       107.7       1615.7
FL5 Elec                             1.0   EXT     0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        926.9
FL5 Corridor                         1.0   EXT    90.0    0.66    0.0    0.00   AIR-CHANGE  0.27      1032.4      15486.3
FL5 Classroom D                      1.0   EXT   180.0    1.12   78.1    0.25   AIR-CHANGE  0.27      1795.3      26929.1
FL5 Boiler Room                      1.0   EXT    90.0    0.42    0.0    0.00   AIR-CHANGE  0.27      1339.7      20096.0
FL5 Closets                          1.0   EXT     0.0    0.63    0.0    0.00   NO-INFILT.  0.00       347.1       5206.7

Spaces on floor: R Ground Flr

R Elevator Machine Room              1.0   EXT   180.0    0.42    0.0    0.00   AIR-CHANGE  0.34       403.0       4836.5
R Elevators                          1.0   EXT     0.0    0.00    0.0    0.00   AIR-CHANGE  0.34       178.1       2137.1
R Corridor                           1.0   EXT    90.0    0.66    0.0    0.00   AIR-CHANGE  0.34        65.5        786.5
R Stairs A                           1.0   EXT    90.0    0.69    0.0    0.00   AIR-CHANGE  0.34       298.7       3584.4
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BUILDING TOTALS                                                1234.9                                49128.7     652732.6
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PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF EXTERIOR SURFACES 182
(U-VALUE INCLUDES OUTSIDE FILM; WINDOW INCLUDES FRAME AND CURB, IF DEFINED)


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE          AREA       U-VALUE          AREA       U-VALUE        AREA    AZIMUTH
                                   (BTU/HR-SQFT-F)     (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)     (SQFT)


FL1 NE Wall (G.NNE1.E2)                   0.551         45.00        0.064          62.90      0.267           107.90 NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNE1.E4)                   0.000          0.00        0.064         473.20      0.064           473.20 NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNW10.E11)                 0.000          0.00        0.064          42.90      0.064            42.90 NORTH-EAST
  in space: FL1 Bike Storage
FL1 NE Wall (G.E22.E24)                   0.000          0.00        0.064         120.25      0.064           120.25 NORTH-EAST
  in space: FL1 Can Wash
FL1 NE Wall (G.NE23.E26)                  0.000          0.00        0.064          68.90      0.064            68.90 NORTH-EAST
  in space: FL1 Dietition's Office
FL1 NE Wall (G.NE24.E27)                  0.000          0.00        0.064         180.05      0.064           180.05 NORTH-EAST
  in space: FL1 Locker Rooms
FL1 NE Wall (G.NNE25.E29)                 0.000          0.00        0.064          95.55      0.064            95.55 NORTH-EAST
  in space: FL1 Toilet B
FL2 NE Wall (G.E1.E1)                     0.000          0.00        0.064         462.15      0.064           462.15 NORTH-EAST
  in space: FL2 Classroom A
FL2 NE Wall (G.N6.E8)                     0.000          0.00        0.064         473.20      0.064           473.20 NORTH-EAST
  in space: FL2 Classroom D
FL2 NE Wall (G.W15.E19)                   0.000          0.00        0.064         113.75      0.064           113.75 NORTH-EAST
  in space: FL2 Classroom E
FL2 NE Wall (G.C18.E20)                   0.551         45.00        0.064          65.50      0.263           110.50 NORTH-EAST
  in space: FL2 Corridor
FL3 NE Wall (G.E1.E1)                     0.000          0.00        0.064         462.15      0.064           462.15 NORTH-EAST
  in space: FL3 Classroom A
FL3 NE Wall (G.N6.E8)                     0.000          0.00        0.064         473.20      0.064           473.20 NORTH-EAST
  in space: FL3 Classroom D
FL3 NE Wall (G.W13.E18)                   0.000          0.00        0.064         113.75      0.064           113.75 NORTH-EAST
  in space: FL3 Classroom E
FL3 NE Wall (G.C16.E19)                   0.551         45.00        0.064          65.50      0.263           110.50 NORTH-EAST
  in space: FL3 Corridor
FL4 NE Wall (G.E1.E1)                     0.000          0.00        0.064         462.15      0.064           462.15 NORTH-EAST
  in space: FL4 Classroom A
FL4 NE Wall (G.N6.E8)                     0.000          0.00        0.064         473.20      0.064           473.20 NORTH-EAST
  in space: FL4 Classroom D
FL4 NE Wall (G.W13.E18)                   0.000          0.00        0.064         113.75      0.064           113.75 NORTH-EAST
  in space: FL4 Classroom E
FL4 NE Wall (G.NE16.E19)                  0.551         45.00        0.064          65.50      0.263           110.50 NORTH-EAST
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  in space: FL4 Corridor
FL5 NE Wall (G.N2.E5)                     0.000          0.00        0.064        546.00      0.064           546.00  NORTH-EAST
  in space: FL5 Classroom B
FL5 NE Wall (G.W9.E22)                    0.000          0.00        0.064        131.25      0.064           131.25  NORTH-EAST
  in space: FL5 Library
FL5 NE Wall (G.NE12.E26)                  0.551         45.00        0.064         82.50      0.236           127.50  NORTH-EAST
  in space: FL5 Corridor
FL5 NE Wall (G.E14.E31)                   0.000          0.00        0.064        533.25      0.064           533.25  NORTH-EAST
  in space: FL5 Boiler Room
R NE Wall (G.E1.E2)                       0.000          0.00        0.064        235.20      0.064           235.20  NORTH-EAST
  in space: R Elevator Machine Room


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
R NE Wall (G.W4.E11)                      0.000          0.00        0.064        197.40      0.064           197.40  NORTH-EAST
  in space: R Stairs A
Exterior Wall 145                         0.551        180.00        0.064        212.60      0.288           392.60  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 149                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 150                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL2 Classroom F
FL1 SE Wall (G.SE21.E23)                  0.551         21.00        0.064        219.50      0.107           240.50  SOUTH-EAST
  in space: FL1 Refuse Recycling
FL3 SE Wall (G.SE2.E4)                    0.551        180.00        0.064        200.25      0.295           380.25  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 152                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 153                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 154                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL3 Classroom B
FL3 SE Wall (G.S3.E7)                     0.551        180.00        0.064        213.90      0.287           393.90  SOUTH-EAST
  in space: FL3 Classroom C
Exterior Wall 143                         0.000          0.00        0.064        175.50      0.064           175.50  SOUTH-EAST
  in space: FL1 Storage
FL3 SE Wall (G.N6.E11)                    0.000          0.00        0.064         40.95      0.064            40.95  SOUTH-EAST
  in space: FL3 Classroom D
FL3 SE Wall (G.W13.E17)                   0.000          0.00        0.064         33.15      0.064            33.15  SOUTH-EAST
  in space: FL3 Classroom E
Exterior Wall 144                         0.551         21.00        0.064         89.50      0.157           110.50  SOUTH-EAST
  in space: FL1 Receiving
FL1 SE Wall (G.NNE1.E3)                   0.000          0.00        0.064         40.95      0.064            40.95  SOUTH-EAST
  in space: FL1 Exercise Room
Exterior Wall 151                         0.551        180.00        0.064        212.60      0.288           392.60  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 155                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 156                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL3 Classroom F
FL2 SE Wall (G.SE2.E4)                    0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
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  in space: FL2 Classroom B
FL4 SE Wall (G.SE2.E4)                    0.551        210.00        0.064        330.15      0.254           540.15  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 158                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 159                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 160                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL4 Classroom B
FL4 SE Wall (G.S3.E7)                     0.551        150.00        0.064        243.90      0.250           393.90  SOUTH-EAST
  in space: FL4 Classroom C
Exterior Wall 146                         0.551        180.00        0.064        200.25      0.295           380.25  SOUTH-EAST
  in space: FL2 Classroom B
FL4 SE Wall (G.N6.E11)                    0.000          0.00        0.064         40.95      0.064            40.95  SOUTH-EAST
  in space: FL4 Classroom D
FL4 SE Wall (G.W13.E17)                   0.000          0.00        0.064         33.15      0.064            33.15  SOUTH-EAST
  in space: FL4 Classroom E
Exterior Wall 147                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL2 Classroom B
Exterior Wall 148                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL2 Classroom B



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
Exterior Wall 157                         0.551        120.00        0.064        177.70      0.261           297.70  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 161                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 162                         0.000          0.00        0.064          0.65      0.064             0.65  SOUTH-EAST
  in space: FL4 Classroom F
FL5 SE Wall (G.SSW1.E3)                   0.551        120.00        0.064        207.00      0.243           327.00  SOUTH-EAST
  in space: FL5 Classroom A
FL2 SE Wall (G.S3.E7)                     0.551        180.00        0.064        213.90      0.287           393.90  SOUTH-EAST
  in space: FL2 Classroom C
FL5 SE Wall (G.N2.E8)                     0.000          0.00        0.064         47.25      0.064            47.25  SOUTH-EAST
  in space: FL5 Classroom B
FL5 SE Wall (G.W9.E21)                    0.000          0.00        0.064         38.25      0.064            38.25  SOUTH-EAST
  in space: FL5 Library
FL1 SE Wall (G.E22.E25)                   0.000          0.00        0.064        132.60      0.064           132.60  SOUTH-EAST
  in space: FL1 Can Wash
FL2 SE Wall (G.N6.E11)                    0.000          0.00        0.064         40.95      0.064            40.95  SOUTH-EAST
  in space: FL2 Classroom D
FL5 SE Wall (G.SE13.E29)                  0.551        240.00        0.064        517.50      0.219           757.50  SOUTH-EAST
  in space: FL5 Classroom D
FL2 SE Wall (G.W15.E18)                   0.000          0.00        0.064         33.15      0.064            33.15  SOUTH-EAST
  in space: FL2 Classroom E
FL5 SE Wall (G.E14.E33)                   0.551        240.00        0.064        471.75      0.229           711.75  SOUTH-EAST
  in space: FL5 Boiler Room
R SE Wall (G.E1.E1)                       0.000          0.00        0.064        355.80      0.064           355.80  SOUTH-EAST
  in space: R Elevator Machine Room
FL1 SE Wall (G.WSW12.E17)                 0.000          0.00        0.064         33.15      0.064            33.15  SOUTH-EAST
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  in space: FL1 Supervisory Office
R SE Wall (G.SSE3.E9)                     0.000          0.00        0.064        140.40      0.064           140.40  SOUTH-EAST
  in space: R Corridor
FL1 SE Wall (G.SSE15.E21)                 0.551        277.50        0.064        626.00      0.214           903.50  SOUTH-EAST
  in space: FL1 Cafeteria
FL2 SE Wall (G.E1.E3)                     0.551        180.00        0.064        206.75      0.291           386.75  SOUTH-EAST
  in space: FL2 Classroom A
FL3 SE Wall (G.E1.E3)                     0.551        180.00        0.064        206.75      0.291           386.75  SOUTH-EAST
  in space: FL3 Classroom A
FL4 SE Wall (G.E1.E3)                     0.551        120.00        0.064        201.10      0.246           321.10  SOUTH-EAST
  in space: FL4 Classroom A
R SW Wall (G.W4.E13)                      0.000          0.00        0.064        309.01      0.064           309.01  SOUTH
  in space: R Stairs A
FL1 SW Wall (G.WSW14.E20)                 0.000          0.00        0.064        139.13      0.064           139.13  SOUTH
  in space: FL1 Boys
FL4 SW Wall (G.NE16.E20)                  0.551         30.00        0.064         74.00      0.205           104.00  SOUTH-WEST
  in space: FL4 Corridor
FL1 SW Wall (G.C28.E30)                   0.000          0.00        0.064         12.35      0.064            12.35  SOUTH-WEST
  in space: FL1 Corridor
FL1 SW Wall (G.SW13.E18)                  0.000          0.00        0.064        104.00      0.064           104.00  SOUTH-WEST
  in space: FL1 Vestibule B
FL1 SW Wall (G.W11.E13)                   0.000          0.00        0.064        150.15      0.064           150.15  SOUTH-WEST
  in space: FL1 Vestibule A
FL5 SW Wall (G.SSW1.E2)                   0.551         30.00        0.064        503.25      0.092           533.25  SOUTH-WEST
  in space: FL5 Classroom A
FL3 SW Wall (G.S3.E6)                     0.551         30.00        0.064        432.15      0.096           462.15  SOUTH-WEST
  in space: FL3 Classroom C
FL2 SW Wall (G.C18.E21)                   0.551         30.00        0.064         74.00      0.205           104.00  SOUTH-WEST
  in space: FL2 Corridor
FL5 SW Wall (G.N2.E7)                     0.000          0.00        0.064        131.25      0.064           131.25  SOUTH-WEST
  in space: FL5 Classroom B



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                  WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL2 SW Wall (G.S3.E6)                     0.551         30.00        0.064        432.15      0.096           462.15  SOUTH-WEST
  in space: FL2 Classroom C
FL5 SW Wall (G.W9.E20)                    0.551         90.00        0.064        463.50      0.143           553.50  SOUTH-WEST
  in space: FL5 Library
FL3 SW Wall (G.N6.E10)                    0.000          0.00        0.064        113.75      0.064           113.75  SOUTH-WEST
  in space: FL3 Classroom D
FL1 SW Wall (G.WSW12.E16)                 0.551         90.00        0.064        156.35      0.242           246.35  SOUTH-WEST
  in space: FL1 Supervisory Office
FL4 SW Wall (G.S3.E6)                     0.551         30.00        0.064        432.15      0.096           462.15  SOUTH-WEST
  in space: FL4 Classroom C
FL5 SW Wall (G.NE12.E27)                  0.551         30.00        0.064         90.00      0.186           120.00  SOUTH-WEST
  in space: FL5 Corridor
FL3 SW Wall (G.W13.E16)                   0.551         60.00        0.064        419.70      0.125           479.70  SOUTH-WEST
  in space: FL3 Classroom E
FL1 SW Wall (G.SSE15.E22)                 0.551         52.50        0.064        271.20      0.143           323.70  SOUTH-WEST
  in space: FL1 Cafeteria
FL4 SW Wall (G.N6.E10)                    0.000          0.00        0.064        113.75      0.064           113.75  SOUTH-WEST
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  in space: FL4 Classroom D
FL2 SW Wall (G.N6.E10)                    0.000          0.00        0.064        113.75      0.064           113.75  SOUTH-WEST
  in space: FL2 Classroom D
FL4 SW Wall (G.W13.E16)                   0.551         60.00        0.064        419.70      0.125           479.70  SOUTH-WEST
  in space: FL4 Classroom E
R SW Wall (G.E1.E4)                       0.000          0.00        0.064         55.80      0.064            55.80  SOUTH-WEST
  in space: R Elevator Machine Room
FL1 SW Wall (G.W2.E5)                     0.000          0.00        0.064        113.10      0.064           113.10  SOUTH-WEST
  in space: FL1 Stairs B
FL3 SW Wall (G.C16.E20)                   0.551         30.00        0.064         74.00      0.205           104.00  SOUTH-WEST
  in space: FL3 Corridor
FL2 SW Wall (G.W15.E17)                   0.551         90.00        0.064        389.70      0.156           479.70  SOUTH-WEST
  in space: FL2 Classroom E
R SW Wall (G.SSE3.E8)                     0.000          0.00        0.064         67.84      0.064            67.84  SOUTH-WEST
  in space: R Corridor
FL3 NW Wall (G.N6.E9)                     0.551        150.00        0.064        231.55      0.256           381.55  NORTH-WEST
  in space: FL3 Classroom D
FL4 NW Wall (G.NW7.E12)                   0.551         36.00        0.064        128.45      0.171           164.45  NORTH-WEST
  in space: FL4 Stairs B
FL4 NW Wall (G.NW10.E13)                  0.551        120.00        0.064        355.80      0.187           475.80  NORTH-WEST
  in space: FL4 Staff Lunch / Conf
FL4 NW Wall (G.NW12.E14)                  0.551         36.00        0.064        116.10      0.180           152.10  NORTH-WEST
  in space: FL4 Stairs A
FL4 NW Wall (G.W13.E15)                   0.551        150.00        0.064        232.85      0.255           382.85  NORTH-WEST
  in space: FL4 Classroom E
FL2 NW Wall (G.W15.E16)                   0.551        150.00        0.064        232.85      0.255           382.85  NORTH-WEST
  in space: FL2 Classroom E
FL2 NW Wall (G.E1.E2)                     0.000          0.00        0.064         40.95      0.064            40.95  NORTH-WEST
  in space: FL2 Classroom A
FL3 NW Wall (G.NW7.E12)                   0.551         36.00        0.064        128.45      0.171           164.45  NORTH-WEST
  in space: FL3 Stairs B
FL3 NW Wall (G.NW10.E13)                  0.551         60.00        0.064        201.95      0.176           261.95  NORTH-WEST
  in space: FL3 MDF
FL3 NW Wall (G.NW12.E14)                  0.551         36.00        0.064        116.10      0.180           152.10  NORTH-WEST
  in space: FL3 Stairs A
FL3 NW Wall (G.W13.E15)                   0.551        150.00        0.064        232.85      0.255           382.85  NORTH-WEST
  in space: FL3 Classroom E
FL1 NW Wall (G.W11.E14)                   0.551         50.00        0.064         83.25      0.247           133.25  NORTH-WEST
  in space: FL1 Vestibule A
FL1 NW Wall (G.WSW12.E15)                 0.000          0.00        0.064        139.75      0.064           139.75  NORTH-WEST
  in space: FL1 Supervisory Office


PS 33X Jerome Ave 3                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL5 NW Wall (G.SSW1.E1)                   0.000          0.00        0.064         38.25      0.064            38.25  NORTH-WEST
  in space: FL5 Classroom A
FL1 NW Wall (G.NW4.E7)                    0.551         30.00        0.064        195.55      0.129           225.55  NORTH-WEST
  in space: FL1 Parents/Community
FL1 NW Wall (G.NW5.E8)                    0.000          0.00        0.064        105.95      0.064           105.95  NORTH-WEST
  in space: FL1 Toilet A
FL1 NW Wall (G.NNE25.E28)                 0.000          0.00        0.064         40.95      0.064            40.95  NORTH-WEST
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  in space: FL1 Toilet B
FL5 NW Wall (G.N2.E6)                    0.551      150.00        0.064       290.25      0.230           440.25  NORTH-WEST
  in space: FL5 Classroom B
FL3 NW Wall (G.NW18.E21)                 0.551       90.00        0.064       123.85      0.269           213.85  NORTH-WEST
  in space: FL3 Supervisory
FL2 NW Wall (G.S3.E5)                    0.000        0.00        0.064        33.15      0.064            33.15  NORTH-WEST
  in space: FL2 Classroom C
FL5 NW Wall (G.NW3.E10)                  0.551       36.00        0.064       153.75      0.157           189.75  NORTH-WEST
  in space: FL5 Stairs B
FL5 NW Wall (G.NW6.E14)                  0.551      180.00        0.064       369.00      0.224           549.00  NORTH-WEST
  in space: FL5 Classroom C
FL5 NW Wall (G.NW8.E17)                  0.551       36.00        0.064       139.50      0.164           175.50  NORTH-WEST
  in space: FL5 Stairs A
FL5 NW Wall (G.W9.E19)                   0.551      150.00        0.064       291.75      0.230           441.75  NORTH-WEST
  in space: FL5 Library
FL1 NW Wall (G.NW6.E9)                   0.551       60.00        0.064        77.80      0.276           137.80  NORTH-WEST
  in space: FL1 Exam Room
FL1 NW Wall (G.NW7.E10)                  0.000        0.00        0.064       169.65      0.064           169.65  NORTH-WEST
  in space: FL1 Stairs A
FL3 NW Wall (G.E1.E2)                    0.000        0.00        0.064        40.95      0.064            40.95  NORTH-WEST
  in space: FL3 Classroom A
FL4 NW Wall (G.E1.E2)                    0.000        0.00        0.064        40.95      0.064            40.95  NORTH-WEST
  in space: FL4 Classroom A
FL1 NW Wall (G.NNE1.E1)                  0.551      180.00        0.064       200.90      0.294           380.90  NORTH-WEST
  in space: FL1 Exercise Room
FL2 NW Wall (G.N6.E9)                    0.551      150.00        0.064       231.55      0.256           381.55  NORTH-WEST
  in space: FL2 Classroom D
FL1 NW Wall (G.NNW10.E12)                0.000        0.00        0.064       109.85      0.064           109.85  NORTH-WEST
  in space: FL1 Bike Storage
FL5 NW Wall (G.E14.E32)                  0.000        0.00        0.064        47.25      0.064            47.25  NORTH-WEST
  in space: FL5 Boiler Room
FL1 NW Wall (G.W2.E6)                    0.000        0.00        0.064       154.05      0.064           154.05  NORTH-WEST
  in space: FL1 Stairs B
FL2 NW Wall (G.NW7.E12)                  0.551       18.00        0.064       146.45      0.118           164.45  NORTH-WEST
  in space: FL2 Stairs B
FL4 NW Wall (G.S3.E5)                    0.000        0.00        0.064        33.15      0.064            33.15  NORTH-WEST
  in space: FL4 Classroom C
R NW Wall (G.E1.E3)                      0.000        0.00        0.064       126.00      0.064           126.00  NORTH-WEST
  in space: R Elevator Machine Room
FL3 NW Wall (G.S3.E5)                    0.000        0.00        0.064        33.15      0.064            33.15  NORTH-WEST
  in space: FL3 Classroom C
R NW Wall (G.NW2.E6)                     0.000        0.00        0.064       229.80      0.064           229.80  NORTH-WEST
  in space: R Elevators
FL2 NW Wall (G.NW11.E13)                 0.551       37.50        0.064        60.65      0.250            98.15  NORTH-WEST
  in space: FL2 Toilet D
FL2 NW Wall (G.NW12.E14)                 0.551      142.50        0.064       235.15      0.248           377.65  NORTH-WEST
  in space: FL2 Reading / Speech Resource
FL4 NW Wall (G.N6.E9)                    0.551      150.00        0.064       231.55      0.256           381.55  NORTH-WEST
  in space: FL4 Classroom D
R NW Wall (G.W4.E12)                     0.000        0.00        0.064       140.40      0.064           140.40  NORTH-WEST
  in space: R Stairs A
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REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL2 NW Wall (G.NW14.E15)                  0.551         36.00        0.064        116.10      0.180           152.10  NORTH-WEST
  in space: FL2 Stairs A
FL1 NW Wall (G.WSW14.E19)                 0.000          0.00        0.064         33.15      0.064            33.15  NORTH-WEST
  in space: FL1 Boys
Exterior Wall 175                         0.000          0.00        0.055         94.35      0.055            94.35  FLOOR
  in space: FL1 Can Wash
Exterior Wall 168                         0.000          0.00        0.055        153.25      0.055           153.25  FLOOR
  in space: FL1 Boys
Exterior Wall 176                         0.000          0.00        0.055         75.67      0.055            75.67  FLOOR
  in space: FL1 Dietition's Office
Exterior Wall 166                         0.000          0.00        0.055        203.71      0.055           203.71  FLOOR
  in space: FL1 Supervisory Office
Exterior Wall 177                         0.000          0.00        0.055        164.66      0.055           164.66  FLOOR
  in space: FL1 Locker Rooms
Exterior Wall 163                         0.000          0.00        0.055       1283.56      0.055          1283.56  FLOOR
  in space: FL1 Exercise Room
Exterior Wall 169                         0.000          0.00        0.055       1981.56      0.055          1981.56  FLOOR
  in space: FL1 Cafeteria
Exterior Wall 178                         0.000          0.00        0.055         74.24      0.055            74.24  FLOOR
  in space: FL1 Toilet B
Exterior Wall 179                         0.000          0.00        0.055        168.42      0.055           168.42  FLOOR
  in space: FL1 Pot Wash
Exterior Wall 180                         0.000          0.00        0.055        541.24      0.055           541.24  FLOOR
  in space: FL1 Prep/Warming
Exterior Wall 170                         0.000          0.00        0.055        125.43      0.055           125.43  FLOOR
  in space: FL1 Girls
Exterior Wall 181                         0.000          0.00        0.055       1182.98      0.055          1182.98  FLOOR
  in space: FL1 Corridor
Exterior Wall 171                         0.000          0.00        0.055         64.16      0.055            64.16  FLOOR
  in space: FL1 Students
Exterior Wall 182                         0.000          0.00        0.055        124.88      0.055           124.88  FLOOR
  in space: FL1 Storage
Exterior Wall 172                         0.000          0.00        0.055         66.73      0.055            66.73  FLOOR
  in space: FL1 Electrical
Exterior Wall 183                         0.000          0.00        0.055         78.62      0.055            78.62  FLOOR
  in space: FL1 Receiving
Exterior Wall 173                         0.000          0.00        0.055        284.78      0.055           284.78  FLOOR
  in space: FL1 Servery
Exterior Wall 167                         0.000          0.00        0.055         65.40      0.055            65.40  FLOOR
  in space: FL1 Vestibule B
Exterior Wall 174                         0.000          0.00        0.055        145.02      0.055           145.02  FLOOR
  in space: FL1 Refuse Recycling
Exterior Wall 164                         0.000          0.00        0.055         97.60      0.055            97.60  FLOOR
  in space: FL1 Bike Storage
Exterior Wall 165                         0.000          0.00        0.055        118.39      0.055           118.39  FLOOR
  in space: FL1 Vestibule A
Exterior Wall 142                         0.000          0.00        0.048        103.10      0.048           103.10  ROOF
  in space: FL1 Stairs B
FL5 Roof (G.NW3.E11)                      0.000          0.00        0.048        349.14      0.048           349.14  ROOF
  in space: FL5 Stairs B
FL5 Roof (G.C4.E12)                       0.000          0.00        0.048        119.15      0.048           119.15  ROOF
  in space: FL5 Toilet A
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FL5 Roof (G.E14.E34)                      0.000          0.00        0.048       1339.73      0.048          1339.73  ROOF
  in space: FL5 Boiler Room
FL5 Roof (G.C15.E35)                      0.000          0.00        0.048        347.11      0.048           347.11  ROOF
  in space: FL5 Closets
FL5 Roof (G.C5.E13)                       0.000          0.00        0.048         79.60      0.048            79.60  ROOF
  in space: FL5 Toilet B


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
-------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL5 Roof (G.W9.E23)                       0.000          0.00        0.048        901.06      0.048           901.06  ROOF
  in space: FL5 Library
FL5 Roof (G.C10.E24)                      0.000          0.00        0.048        107.72      0.048           107.72  ROOF
  in space: FL5 Toilet C
FL5 Roof (G.C11.E25)                      0.000          0.00        0.048         61.79      0.048            61.79  ROOF
  in space: FL5 Elec
R Roof (G.E1.E5)                          0.000          0.00        0.048        403.05      0.048           403.05  ROOF
  in space: R Elevator Machine Room
FL5 Roof (G.SSW1.E4)                      0.000          0.00        0.048        774.99      0.048           774.99  ROOF
  in space: FL5 Classroom A
R Roof (G.NW2.E7)                         0.000          0.00        0.048        178.10      0.048           178.10  ROOF
  in space: R Elevators
FL5 Roof (G.NW6.E15)                      0.000          0.00        0.048        679.47      0.048           679.47  ROOF
  in space: FL5 Classroom C
FL5 Roof (G.NE12.E28)                     0.000          0.00        0.048        430.18      0.048           430.18  ROOF
  in space: FL5 Corridor
R Roof (G.SSE3.E10)                       0.000          0.00        0.048         65.54      0.048            65.54  ROOF
  in space: R Corridor
Exterior Wall 141                         0.000          0.00        0.048        298.98      0.048           298.98  ROOF
  in space: FL5 Corridor
FL5 Roof (G.N2.E9)                        0.000          0.00        0.048        949.20      0.048           949.20  ROOF
  in space: FL5 Classroom B
FL5 Roof (G.SE13.E30)                     0.000          0.00        0.048       1795.27      0.048          1795.27  ROOF
  in space: FL5 Classroom D
R Roof (G.W4.E14)                         0.000          0.00        0.048        298.70      0.048           298.70  ROOF
  in space: R Stairs A
C Flr (B.NNE1.U1)                         0.000          0.00        0.010        414.75      0.010           414.75  UNDERGRND
  in space: C Gas Meter Room
C NW Wall (B.NNE1.U2)                     0.000          0.00        0.058        142.20      0.058           142.20  UNDERGRND
  in space: C Gas Meter Room
C NE Wall (B.NNE1.U3)                     0.000          0.00        0.058        420.00      0.058           420.00  UNDERGRND
  in space: C Gas Meter Room
C Flr (B.W2.U4)                           0.000          0.00        0.010        281.18      0.010           281.18  UNDERGRND
  in space: C Mech Equipment Room
C SW Wall (B.W2.U5)                       0.000          0.00        0.058        104.40      0.058           104.40  UNDERGRND
  in space: C Mech Equipment Room
C NW Wall (B.W2.U6)                       0.000          0.00        0.058        127.80      0.058           127.80  UNDERGRND
  in space: C Mech Equipment Room
C Flr (B.C3.U7)                           0.000          0.00        0.010        130.72      0.010           130.72  UNDERGRND
  in space: C Stairs B
C Flr (B.NW4.U8)                          0.000          0.00        0.010        333.40      0.010           333.40  UNDERGRND
  in space: C Electrical Room
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C NW Wall (B.NW4.U9)                      0.000          0.00        0.058        200.40      0.058           200.40  UNDERGRND
  in space: C Electrical Room
C Flr (B.NW5.U10)                         0.000          0.00        0.010        336.67      0.010           336.67  UNDERGRND
  in space: C Water Service/Sewage Ejector
C NW Wall (B.NW5.U11)                     0.000          0.00        0.058        238.80      0.058           238.80  UNDERGRND
  in space: C Water Service/Sewage Ejector
C Flr (B.C6.U12)                          0.000          0.00        0.010        186.71      0.010           186.71  UNDERGRND
  in space: C Elevators
C Flr (B.W7.U13)                          0.000          0.00        0.010        316.82      0.010           316.82  UNDERGRND
  in space: C Stairs A
C SW Wall (B.W7.U14)                      0.000          0.00        0.058        117.60      0.058           117.60  UNDERGRND
  in space: C Stairs A
C NW Wall (B.W7.U15)                      0.000          0.00        0.058        138.00      0.058           138.00  UNDERGRND
  in space: C Stairs A
C Flr (B.SW8.U16)                         0.000          0.00        0.010        347.15      0.010           347.15  UNDERGRND
  in space: C Sprinkler Booster Pump
C SE Wall (B.SW8.U17)                     0.000          0.00        0.058        157.20      0.058           157.20  UNDERGRND
  in space: C Sprinkler Booster Pump


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE          AREA       U-VALUE          AREA       U-VALUE          AREA    AZIMUTH
                                   (BTU/HR-SQFT-F)     (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)     (SQFT)


C NW Wall (B.SW8.U18)                     0.000          0.00        0.058        157.20      0.058           157.20  UNDERGRND
  in space: C Sprinkler Booster Pump
C SW Wall (B.SW8.U19)                     0.000          0.00        0.058        318.00      0.058           318.00  UNDERGRND
  in space: C Sprinkler Booster Pump
C Flr (B.SE9.U20)                         0.000          0.00        0.010        758.28      0.010           758.28  UNDERGRND
  in space: C Corridor
C NE Wall (B.SE9.U21)                     0.000          0.00        0.058        120.00      0.058           120.00  UNDERGRND
  in space: C Corridor
C SE Wall (B.SE9.U22)                     0.000          0.00        0.058        847.20      0.058           847.20  UNDERGRND
  in space: C Corridor



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                        AVERAGE             AVERAGE         AVERAGE U-VALUE        WINDOW         WALL           WINDOW+WALL
                    U-VALUE/WINDOWS      U-VALUE/WALLS       WALLS+WINDOWS          AREA          AREA              AREA
                    (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)        (SQFT)        (SQFT)            (SQFT)
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NORTH-EAST               0.551               0.064               0.082             225.00        6113.15          6338.15

SOUTH-EAST               0.551               0.064               0.226            2959.50        5947.05          8906.55

SOUTH                    0.000               0.064               0.064               0.00         448.14           448.14

SOUTH-WEST               0.551               0.064               0.121             682.50        5207.59          5890.09

NORTH-WEST               0.551               0.064               0.197            2420.00        6481.35          8901.35

FLOOR                    0.000               0.055               0.055               0.00        7094.64          7094.64

ROOF                     0.000               0.048               0.048               0.00        9281.85          9281.85

ALL WALLS                0.551               0.064               0.165            6287.00       24197.28         30484.29

    WALLS+ROOFS          0.551               0.060               0.138            6287.00       33479.14         39766.14

    UNDERGRND            0.000               0.034               0.034               0.00        6194.48          6194.48

BUILDING                 0.551               0.056               0.114            6287.00       46768.24         53055.24


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF WINDOWS 123

(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME    CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES         AREA         U-VALUE
NAME                            MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

Window 1                               1.0        90.00    7.50  12.00       2.50     2.50      0.00   0.00   0.384   0.000
Window 2                               1.0        90.00    7.50  12.00      17.30     2.50      0.00   0.00   0.384   0.000
Window 121                             1.0        45.00    7.50   6.00       1.00     2.50      0.00   0.00   0.384   0.000
Window 5                               1.0        30.00    7.50   4.00      11.00     2.50      0.00   0.00   0.384   0.000
Window 3                               1.0        60.00    7.50   8.00       0.00     2.50      0.00   0.00   0.384   0.000
Window 7                               1.0        50.00    8.00   6.25       0.00     0.00      0.00   0.00   0.384   0.000
Window 75                              1.0        90.00    7.50  12.00       2.50     2.50      0.00   0.00   0.384   0.000
Window 77                              1.0        52.50    7.50   7.00       3.75     2.50      0.00   0.00   0.384   0.000
Window 78                              1.0        52.50    7.50   7.00      17.75     2.50      0.00   0.00   0.384   0.000
Window 79                              1.0        52.50    7.50   7.00      32.75     2.50      0.00   0.00   0.384   0.000
Window 80                              1.0        52.50    7.50   7.00      46.75     2.50      0.00   0.00   0.384   0.000
Window 81                              1.0        67.50    7.50   9.00      58.75     2.50      0.00   0.00   0.384   0.000
Window 76                              1.0        52.50    7.50   7.00       1.00     2.50      0.00   0.00   0.384   0.000
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Window 82                              1.0        21.00    7.00   3.00      14.00     0.00    0.00    0.00    0.384   0.000
Window 126                             1.0        21.00    7.00   3.00       1.00     0.00    0.00    0.00    0.384   0.000
Window 90                              1.0        90.00    7.50  12.00       2.00     2.50    0.00    0.00    0.384   0.000
Window 91                              1.0        90.00    7.50  12.00      17.00     2.50    0.00    0.00    0.384   0.000
Window 131                             1.0        90.00    7.50  12.00       2.75     2.50    0.00    0.00    0.384   0.000
Window 132                             1.0        90.00    7.50  12.00      16.75     2.50    0.00    0.00    0.384   0.000
Window 74                              1.0        30.00    7.50   4.00       2.50     2.50    0.00    0.00    0.384   0.000
Window 84                              1.0        90.00    7.50  12.00       3.75     2.50    0.00    0.00    0.384   0.000
Window 85                              1.0        90.00    7.50  12.00      17.75     2.50    0.00    0.00    0.384   0.000
Window 8                               1.0        30.00    7.50   4.00       2.50     2.50    0.00    0.00    0.384   0.000
Window 9                               1.0        60.00    7.50   8.00      10.50     2.50    0.00    0.00    0.384   0.000
Window 10                              1.0        60.00    7.50   8.00      21.35     2.50    0.00    0.00    0.384   0.000
Window 44                              1.0        18.00    3.00   6.00       3.00    10.00    0.00    0.00    0.384   0.000
Window 11                              1.0        37.50    7.50   5.00       2.55     2.50    0.00    0.00    0.384   0.000
Window 12                              1.0        52.50    7.50   7.00       0.00     2.50    0.00    0.00    0.384   0.000
Window 13                              1.0        90.00    7.50  12.00      11.00     2.50    0.00    0.00    0.384   0.000
Window 51                              1.0        18.00    3.00   6.00       3.00     0.00    0.00    0.00    0.384   0.000
Window 58                              1.0        18.00    3.00   6.00       3.00    10.00    0.00    0.00    0.384   0.000
Window 14                              1.0        60.00    7.50   8.00       0.00     2.50    0.00    0.00    0.384   0.000
Window 15                              1.0        60.00    7.50   8.00      12.50     2.50    0.00    0.00    0.384   0.000
Window 16                              1.0        30.00    7.50   4.00      24.50     2.50    0.00    0.00    0.384   0.000
Window 62                              1.0        60.00    7.50   8.00       0.00     2.50    0.00    0.00    0.384   0.000
Window 66                              1.0        30.00    7.50   4.00      30.00     2.50    0.00    0.00    0.384   0.000
Window 122                             1.0        45.00    7.50   6.00       1.00     2.50    0.00    0.00    0.384   0.000
Window 70                              1.0        30.00    7.50   4.00       2.00     2.50    0.00    0.00    0.384   0.000
Window 127                             1.0        90.00    7.50  12.00       2.75     2.50    0.00    0.00    0.384   0.000
Window 128                             1.0        90.00    7.50  12.00      16.75     2.50    0.00    0.00    0.384   0.000
Window 98                              1.0        90.00    7.50  12.00       2.00     2.50    0.00    0.00    0.384   0.000
Window 99                              1.0        90.00    7.50  12.00      17.00     2.50    0.00    0.00    0.384   0.000
Window 94                              1.0        90.00    7.50  12.00       2.75     2.50    0.00    0.00    0.384   0.000
Window 95                              1.0        90.00    7.50  12.00      16.75     2.50    0.00    0.00    0.384   0.000
Window 73                              1.0        30.00    7.50   4.00       2.50     2.50    0.00    0.00    0.384   0.000
Window 92                              1.0        90.00    7.50  12.00       3.75     2.50    0.00    0.00    0.384   0.000
Window 93                              1.0        90.00    7.50  12.00      17.75     2.50    0.00    0.00    0.384   0.000
Window 17                              1.0        60.00    7.50   8.00       2.50     2.50    0.00    0.00    0.384   0.000
Window 18                              1.0        60.00    7.50   8.00      14.50     2.50    0.00    0.00    0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME   CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES      AREA          U-VALUE
NAME                            MULTIPLIER       (SQFT )   (FT)   (FT)     X (FT)   Y (FT)     (SQFT )     (BTU/HR-SQFT-F)

Window 19                              1.0        30.00    7.50   4.00      24.50     2.50    0.00    0.00    0.384   0.000
Window 45                              1.0        18.00    3.00   6.00       3.00    10.00    0.00    0.00    0.384   0.000
Window 49                              1.0        18.00    3.00   6.00       3.00     0.00    0.00    0.00    0.384   0.000
Window 27                              1.0        30.00    7.50   4.00       2.50     2.50    0.00    0.00    0.384   0.000
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Window 28                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 52                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 57                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 29                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 30                              1.0        30.00    7.50   4.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 31                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 61                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 65                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 123                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 69                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 26                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 129                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 130                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 109                             1.0        60.00    7.50   8.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 110                             1.0        60.00    7.50   8.00      14.00     2.50     0.00    0.00   0.384   0.000
Window 103                             1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 104                             1.0        60.00    7.50   8.00       6.00     2.50     0.00    0.00   0.384   0.000
Window 105                             1.0        60.00    7.50   8.00      19.00     2.50     0.00    0.00   0.384   0.000
Window 135                             1.0        60.00    7.50   8.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 72                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 100                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 101                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 102                             1.0        30.00    7.50   4.00      26.30     2.50     0.00    0.00   0.384   0.000
Window 20                              1.0        60.00    7.50   8.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 21                              1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000
Window 22                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 46                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 50                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 38                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 39                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 40                              1.0        30.00    7.50   4.00      18.50     2.50     0.00    0.00   0.384   0.000
Window 41                              1.0        30.00    7.50   4.00      26.50     2.50     0.00    0.00   0.384   0.000
Window 53                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 56                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 32                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 33                              1.0        60.00    7.50   8.00       8.50     2.50     0.00    0.00   0.384   0.000
Window 34                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 60                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 64                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 124                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 68                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 133                             1.0        60.00    7.50   8.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 134                             1.0        60.00    7.50   8.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 71                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 111                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 112                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 23                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 24                              1.0        60.00    7.50   8.00      10.50     2.50     0.00    0.00   0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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(Note: u-values include outside air film)

                                                                LOCATION OF ORIGIN
                                                GLASS   GLASS   GLASS       IN SURFACE     FRAME    CURB    FRAME   CURB
WINDOW                                           AREA  HEIGHT   WIDTH      COORDINATES        AREA            U-VALUE
NAME                                MULTIPLIER  (SQFT )   (FT)    (FT)     X (FT)   Y (FT)      (SQFT )     (BTU/HR-SQFT-F)

Window 25                                  1.0    60.00    7.50    8.00     21.35     2.50     0.00    0.00   0.384   0.000
Window 47                                  1.0    18.00    3.00    6.00      3.00    10.00     0.00    0.00   0.384   0.000
Window 48                                  1.0    18.00    3.00    6.00      3.00     0.00     0.00    0.00   0.384   0.000
Window 42                                  1.0    90.00    7.50   12.00      2.50     2.50     0.00    0.00   0.384   0.000
Window 43                                  1.0    90.00    7.50   12.00     18.50     2.50     0.00    0.00   0.384   0.000
Window 54                                  1.0    18.00    3.00    6.00      3.00     0.00     0.00    0.00   0.384   0.000
Window 55                                  1.0    18.00    3.00    6.00      3.00    10.00     0.00    0.00   0.384   0.000
Window 35                                  1.0    60.00    7.50    8.00      0.00     2.50     0.00    0.00   0.384   0.000
Window 36                                  1.0    60.00    7.50    8.00     12.50     2.50     0.00    0.00   0.384   0.000
Window 37                                  1.0    30.00    7.50    4.00     24.50     2.50     0.00    0.00   0.384   0.000
Window 59                                  1.0    60.00    7.50    8.00      0.00     2.50     0.00    0.00   0.384   0.000
Window 63                                  1.0    30.00    7.50    4.00     30.00     2.50     0.00    0.00   0.384   0.000
Window 125                                 1.0    45.00    7.50    6.00      1.00     2.50     0.00    0.00   0.384   0.000
Window 67                                  1.0    30.00    7.50    4.00      2.00     2.50     0.00    0.00   0.384   0.000
Window 113                                 1.0    60.00    7.50    8.00      4.50     2.50     0.00    0.00   0.384   0.000
Window 114                                 1.0    60.00    7.50    8.00     14.50     2.50     0.00    0.00   0.384   0.000
Window 115                                 1.0    60.00    7.50    8.00     26.50     2.50     0.00    0.00   0.384   0.000
Window 116                                 1.0    60.00    7.50    8.00     36.50     2.50     0.00    0.00   0.384   0.000
Window 117                                 1.0    60.00    7.50    8.00      0.00     2.50     0.00    0.00   0.384   0.000
Window 118                                 1.0    60.00    7.50    8.00     10.00     2.50     0.00    0.00   0.384   0.000
Window 119                                 1.0    60.00    7.50    8.00     24.00     2.50     0.00    0.00   0.384   0.000
Window 120                                 1.0    60.00    7.50    8.00     36.00     2.50     0.00    0.00   0.384   0.000


                                                GLASS     NUMBER         CENTER-OF-      GLASS     GLASS    SURFACE TO
WINDOW                                SETBACK  SHADING        OF     GLASS U-VALUE     VISIBLE     SOLAR    ROUGH OPEN
NAME                                     (FT)    COEFF     PANES   (BTU/HR-SQFT-F)       TRANS     TRANS    AREA RATIO

Window 1                                 0.00     0.46         1             0.551       0.440     0.878      1.000
Window 2                                 0.00     0.46         1             0.551       0.440     0.878      1.000
Window 121                               0.00     0.46         1             0.551       0.440     0.878      1.000
Window 5                                 0.00     0.46         1             0.551       0.440     0.878      1.000
Window 3                                 0.00     0.46         1             0.551       0.440     0.878      1.000
Window 7                                 0.00     0.46         1             0.551       0.440     0.878      1.000
Window 75                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 77                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 78                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 79                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 80                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 81                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 76                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 82                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 126                               0.00     0.46         1             0.551       0.440     0.878      1.000
Window 90                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 91                                0.00     0.46         1             0.551       0.440     0.878      1.000
Window 131                               0.00     0.46         1             0.551       0.440     0.878      1.000
Window 132                               0.00     0.46         1             0.551       0.440     0.878      1.000
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Window 74                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 84                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 85                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 8                              0.00        0.46          1               0.551       0.440     0.878     1.000
Window 9                              0.00        0.46          1               0.551       0.440     0.878     1.000



PS 33X Jerome Ave 3                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                                 GLASS     NUMBER         CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF      GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES    (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 10                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 44                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 11                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 12                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 13                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 51                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 58                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 14                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 15                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 16                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 62                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 66                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 122                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 70                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 127                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 128                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 98                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 99                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 94                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 95                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 73                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 92                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 93                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 17                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 18                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 19                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 45                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 49                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 27                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 28                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 52                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 57                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 29                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 30                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 31                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 61                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 65                             0.00        0.46          1               0.551       0.440     0.878     1.000
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Window 123                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 69                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 26                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 129                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 130                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 109                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 110                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 103                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 104                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 105                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 135                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 72                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 100                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 101                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 102                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 20                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 21                             0.00        0.46          1               0.551       0.440     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 22                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 46                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 50                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 38                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 39                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 40                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 41                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 53                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 56                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 32                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 33                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 34                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 60                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 64                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 124                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 68                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 133                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 134                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 71                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 111                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 112                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 23                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 24                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 25                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 47                             0.00        0.46          1               0.551       0.440     0.878     1.000
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Window 48                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 42                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 43                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 54                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 55                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 35                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 36                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 37                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 59                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 63                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 125                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 67                             0.00        0.46          1               0.551       0.440     0.878     1.000
Window 113                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 114                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 115                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 116                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 117                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 118                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 119                            0.00        0.46          1               0.551       0.440     0.878     1.000
Window 120                            0.00        0.46          1               0.551       0.440     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:06:37  BDL RUN  1

REPORT- LV-I Details of Constructions                                                       WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF CONSTRUCTIONS  10          DELAYED   8     QUICK   2


                                  U-VALUE                  SURFACE               NUMBER OF
    CONSTRUCTION                                    SURFACE  ROUGHNESS    SURFACE     RESPONSE
    NAME                  (BTU/HR-SQFT-F)   ABSORPTANCE      INDEX    TYPE         FACTORS

C EWall Construction                0.066          0.70          3    QUICK              0
C Ceilg Construction                0.141          0.70          3    DELAYED            4
C IWall Construction                0.141          0.70          3    DELAYED            4
C IFlr Construction                 0.813          0.70          3    DELAYED            5
C IFlSP Construction                0.813          0.70          3    DELAYED            5
FL1 GFlr Construction               0.056          0.70          3    DELAYED           23
FL1 GFlSP Construction              0.056          0.70          3    DELAYED           23
FL5 Roof Construction               0.049          0.60          1    QUICK              0
C UFCons (B.NNE1.U2)                0.010          0.70          3    DELAYED           52
C UWCons (B.NNE1.U2)                0.058          0.70          3    DELAYED           40
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ASHRAE 90.1 SECTION 11 ENERGY MODEL FOR LL86 COMPLIANCE (BASELINE):

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PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- BEPS Building Energy Performance                                                    WEATHER FILE- NEW YORK LAGUARDI NY
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                         TASK     MISC    SPACE   SPACE      HEAT    PUMPS     VENT    REFRIG  HT PUMP   DOMEST    EXT
               LIGHTS   LIGHTS   EQUIP   HEATING  COOLING   REJECT   & AUX     FANS   DISPLAY  SUPPLEM  HOT WTR   USAGE    TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    MBTU        318.1      0.0    264.2      2.1    257.2      0.0     27.6    241.4      0.0      0.0      0.0     36.3    1147.0

FM1  NATURAL-GAS
    MBTU          0.0      0.0     44.9    646.7      0.0      0.0      0.0      0.0      0.0      0.0     53.0      0.0     744.6
              =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  ========

    MBTU        318.1      0.0    309.1    648.8    257.2      0.0     27.6    241.4      0.0      0.0     53.0     36.3    1891.6


                   TOTAL SITE ENERGY      1891.57 MBTU     38.7 KBTU/SQFT-YR GROSS-AREA     38.7 KBTU/SQFT-YR NET-AREA
                   TOTAL SOURCE ENERGY    4185.50 MBTU     85.6 KBTU/SQFT-YR GROSS-AREA     85.6 KBTU/SQFT-YR NET-AREA

                   PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  3.76
                   PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
                   HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =     0
                   HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =   234

                   NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
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PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- BEPU Building Utility Performance                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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                      TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT   REFRIG  HT PUMP   DOMEST      EXT
               LIGHTS   LIGHTS    EQUIP  HEATING  COOLING   REJECT   & AUX      FANS  DISPLAY  SUPPLEM  HOT WTR    USAGE     TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    KWH        93216.       0.   77411.     623.   75346.       0.    8081.   70739.       0.       0.       0.   10644.   336059.

FM1  NATURAL-GAS
    THERM          0.       0.     449.    6467.       0.       0.       0.       0.       0.       0.     530.       0.     7446.



           TOTAL ELECTRICITY    336059. KWH         6.873 KWH     /SQFT-YR GROSS-AREA    6.873 KWH     /SQFT-YR NET-AREA
           TOTAL NATURAL-GAS      7446. THERM       0.152 THERM   /SQFT-YR GROSS-AREA    0.152 THERM   /SQFT-YR NET-AREA


           PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  3.76
           PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
           HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =     0
           HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =   234

           NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- ES-D Energy Cost Summary                                                            WEATHER FILE- NEW YORK LAGUARDI NY
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                                                                           METERED             TOTAL      VIRTUAL
                                                                            ENERGY            CHARGE         RATE  RATE USED
UTILITY-RATE                       RESOURCE           METERS              UNITS/YR               ($)     ($/UNIT)  ALL YEAR?
--------------------------------   ----------------   -----------   -------------------   ----------   ----------  ---------

ConEd SmGen SC-2 Non-TOU Elec      ELECTRICITY        EM1                336059. KWH          70764.       0.2106     YES

ConEd Gen SC-2 Heating Gas         NATURAL-GAS        FM1                  7446. THERM         8569.       1.1508     YES

                                                                                          ==========
                                                                                              79334.


                                                             ENERGY COST/GROSS BLDG AREA:      1.62
                                                               ENERGY COST/NET BLDG AREA:      1.62
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PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                              WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF SPACES  112          EXTERIOR   76     INTERIOR   36


                                                       LIGHTS          EQUIP
                             SPACE*FLOOR SPACE        (WATT /        (WATT / INFILTRATION              AREA       VOLUME
SPACE                         MULTIPLIER  TYPE   AZIM  SQFT ) PEOPLE  SQFT )       METHOD   ACH     (SQFT )      (CUFT )



Spaces on floor: C Below-Grade Flr

C Gas Meter Room                     1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00       414.8       4977.0
C Mech Equipment Room                1.0   INT  -90.0    0.42    0.0    0.00   NO-INFILT.  0.00       281.2       3374.1
C Stairs B                           1.0   INT    0.0    0.63    0.0    0.00   NO-INFILT.  0.00       130.7       1568.6
C Electrical Room                    1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00       333.4       4000.8
C Water Service/Sewage Ejector       1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00       336.7       4040.0
C Elevators                          1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       186.7       2240.5
C Stairs A                           1.0   INT  -90.0    0.63    0.0    0.00   NO-INFILT.  0.00       316.8       3801.9
C Sprinkler Booster Pump             1.0   INT  180.0    0.42    0.0    0.00   NO-INFILT.  0.00       347.2       4165.8
C Corridor                           1.0   INT   90.0    0.59    0.0    0.00   NO-INFILT.  0.00       758.3       9099.3

Spaces on floor: FL1 Ground Flr

FL1 Exercise Room                    1.0   EXT    0.0    0.72   74.4    0.25   AIR-CHANGE  0.31      1283.6      16686.3
FL1 Stairs B                         1.0   EXT  -90.0    0.63    0.0    0.00   AIR-CHANGE  0.31       432.5       5622.8
FL1 Toilet/Shower/Lockers            1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       188.3       2448.4
FL1 Parents/Community                1.0   EXT    0.0    1.11    2.2    0.50   AIR-CHANGE  0.31       217.7       2830.7
FL1 Toilet A                         1.0   EXT    0.0    0.88    0.0    0.00   AIR-CHANGE  0.31        70.1        911.2
FL1 Exam Room                        1.0   EXT    0.0    1.12    4.0    0.00   AIR-CHANGE  0.31        91.2       1185.1
FL1 Stairs A                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       362.8       4716.3
FL1 Nurse's Office                   1.0   INT    0.0    1.00    1.7    1.25   NO-INFILT.  0.00       166.9       2169.4
FL1 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       193.1       2510.6
FL1 Bike Storage                     1.0   EXT   90.0    0.63    0.0    0.00   AIR-CHANGE  0.31        97.6       1268.8
FL1 Vestibule A                      1.0   EXT  -90.0    0.59    0.0    0.00   AIR-CHANGE  0.31       118.4       1539.0
FL1 Supervisory Office               1.0   EXT    0.0    1.00    2.0    1.25   AIR-CHANGE  0.31       203.7       2648.3
FL1 Vestibule B                      1.0   EXT  -90.0    0.59    0.0    0.00   AIR-CHANGE  0.31        65.4        850.1
FL1 Boys                             1.0   EXT    1.1    0.88    0.0    0.00   AIR-CHANGE  0.31       153.2       1992.2
FL1 Cafeteria                        1.0   EXT  180.0    0.65  110.1    0.00   AIR-CHANGE  0.31      1981.6      25760.2
FL1 Girls                            1.0   EXT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       125.4       1630.5
FL1 Students                         1.0   EXT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        64.2        834.1
FL1 Electrical                       1.0   EXT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00        66.7        867.5
FL1 Servery                          1.0   EXT    0.0    0.65   15.8    0.00   NO-INFILT.  0.00       284.8       3702.1
FL1 Janitor's Closet                 1.0   INT    0.0    1.24    0.0    0.00   NO-INFILT.  0.00        48.7        633.4
FL1 Refuse Recycling                 1.0   EXT  180.0    0.63    0.0    0.00   AIR-CHANGE  0.31       145.0       1885.3
FL1 Can Wash                         1.0   EXT   90.0    1.21    0.5    3.00   AIR-CHANGE  0.31        94.3       1226.5
FL1 Dietition's Office               1.0   EXT   90.0    1.00    0.8    1.25   AIR-CHANGE  0.31        75.7        983.7
FL1 Locker Rooms                     1.0   EXT   90.0    0.88    0.0    0.00   AIR-CHANGE  0.31       164.7       2140.6
FL1 Toilet B                         1.0   EXT    0.0    0.88    0.0    0.00   AIR-CHANGE  0.31        74.2        965.1
FL1 Pot Wash                         1.0   EXT    0.0    1.21    0.8    3.00   NO-INFILT.  0.00       168.4       2189.4
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FL1 Prep/Warming                     1.0   EXT    0.0    1.21    2.7    3.00   NO-INFILT.  0.00       541.2       7036.1
FL1 Corridor                         1.0   EXT  -90.0    0.59    0.0    0.00   NO-INFILT.  0.00      1183.0      15378.8
FL1 Storage                          1.0   EXT  180.0    0.63    0.0    0.00   AIR-CHANGE  0.31       124.9       1623.4
FL1 Receiving                        1.0   EXT  180.0    0.63    0.0    0.00   AIR-CHANGE  0.31        78.6       1022.1

Spaces on floor: FL2 Ground Flr

FL2 Classroom A                      1.0   EXT   90.0    1.12   43.3    0.25   AIR-CHANGE  0.31       994.9      12933.2


PS 33X Jerome Ave 3                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-B Summary of Spaces                                              WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL2 Classroom B                      1.0   EXT   90.0    1.12   42.7    0.25   AIR-CHANGE  0.31       983.0      12778.4
FL2 Classroom C                      1.0   EXT    0.0    1.12   44.0    0.25   AIR-CHANGE  0.31      1013.0      13168.9
FL2 Toilets A                        1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       133.6       1736.3
FL2 Toilets B                        1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       125.3       1629.3
FL2 Classroom D                      1.0   EXT   90.0    1.12   41.3    0.25   AIR-CHANGE  0.31       949.2      12339.5
FL2 Stairs B                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       349.1       4538.8
FL2 Toilets C                        1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       119.1       1548.9
FL2 Staff                            1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        84.1       1093.0
FL2 Comp / AV                        1.0   INT    0.0    0.42    0.0    7.50   NO-INFILT.  0.00        86.6       1126.2
FL2 Toilet D                         1.0   EXT    0.0    0.88    0.0    0.00   AIR-CHANGE  0.31        61.2        795.0
FL2 Reading / Speech Resource        1.0   EXT    0.0    0.95    8.1    0.50   AIR-CHANGE  0.31       469.0       6097.4
FL2 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5       2554.0
FL2 Stairs A                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       322.3       4190.4
FL2 Classroom E                      1.0   EXT    0.0    1.12   41.1    0.25   AIR-CHANGE  0.31       946.1      12299.9
FL2 Toilet E                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        62.6        814.1
FL2 Elec                             1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        803.3
FL2 Corridor                         1.0   EXT   90.0    0.59    0.0    0.00   AIR-CHANGE  0.31      1089.6      14165.3
FL2 Classroom F                      1.0   EXT   90.0    1.12   43.7    0.25   AIR-CHANGE  0.31      1005.6      13073.0

Spaces on floor: FL3 Ground Flr

FL3 Classroom A                      1.0   EXT   90.0    1.12   43.3    0.25   AIR-CHANGE  0.31       994.9      12933.2
FL3 Classroom B                      1.0   EXT   90.0    1.12   42.7    0.25   AIR-CHANGE  0.31       983.0      12778.4
FL3 Classroom C                      1.0   EXT    0.0    1.12   44.0    0.25   AIR-CHANGE  0.31      1013.0      13168.9
FL3 Toilets A                        1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       133.6       1736.3
FL3 Toilets B                        1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       125.3       1629.3
FL3 Classroom D                      1.0   EXT   90.0    1.12   41.3    0.25   AIR-CHANGE  0.31       949.2      12339.5
FL3 Stairs B                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       349.1       4538.8
FL3 Toilet C                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       119.1       1548.9
FL3 Toilet D                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        84.1       1093.0
FL3 MDF                              1.0   EXT    0.0    0.42    0.0    7.50   AIR-CHANGE  0.31       358.7       4662.7
FL3 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   AIR-CHANGE  0.31       196.5       2554.0
FL3 Stairs A                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       322.3       4190.4
FL3 Classroom E                      1.0   EXT    0.0    1.12   41.1    0.25   AIR-CHANGE  0.31       946.1      12299.9
FL3 Toilet E                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        62.6        814.1
FL3 Elec                             1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        803.3
FL3 Corridor                         1.0   EXT   90.0    0.59    0.0    0.00   AIR-CHANGE  0.31      1093.1      14209.7
FL3 Comp / AV                        1.0   INT    0.0    0.42    0.0    7.50   NO-INFILT.  0.00        59.2        769.6
FL3 Supervisory                      1.0   EXT    0.0    1.00    2.0    1.25   AIR-CHANGE  0.31       195.8       2544.8
FL3 Classroom F                      1.0   EXT   90.0    1.12   43.7    0.25   AIR-CHANGE  0.31      1005.6      13073.0
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Spaces on floor: FL4 Ground Flr

FL4 Classroom A                      1.0   EXT   90.0    1.12   38.2    0.25   AIR-CHANGE  0.31       877.5      11407.1
FL4 Classroom B                      1.0   EXT   90.0    1.12   64.4    0.25   AIR-CHANGE  0.31      1480.3      19244.5
FL4 Classroom C                      1.0   EXT    0.0    1.12   46.8    0.25   AIR-CHANGE  0.31      1077.2      14003.1
FL4 Classroom D                      1.0   EXT   90.0    1.12   41.3    0.25   AIR-CHANGE  0.31       949.2      12339.5
FL4 Stairs B                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       349.1       4538.8
FL4 Toilet C                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       119.1       1548.9
FL4 Comp / AV                        1.0   INT    0.0    0.42    0.0    7.50   NO-INFILT.  0.00        67.2        873.1
FL4 Staff Lunch / Conf               1.0   EXT  -90.0    0.65   34.2    0.00   AIR-CHANGE  0.31       615.8       8005.2
FL4 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5       2554.0
FL4 Stairs A                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.31       322.3       4190.4
FL4 Classroom E                      1.0   EXT    0.0    1.12   39.2    0.25   AIR-CHANGE  0.31       901.1      11713.8
FL4 Toilet D                         1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       107.7       1400.3
FL4 Elec                             1.0   INT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        803.3
FL4 Corridor                         1.0   EXT   90.0    0.59    0.0    0.00   AIR-CHANGE  0.31      1032.4      13421.4


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                              WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL4 Staff                            1.0   INT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        76.1        989.5
FL4 Classroom F                      1.0   EXT   90.0    1.12   35.5    0.25   AIR-CHANGE  0.31       817.3      10624.6

Spaces on floor: FL5 Ground Flr

FL5 Classroom A                      1.0   EXT    0.0    1.12   33.7    0.25   AIR-CHANGE  0.27       775.0      11624.8
FL5 Classroom B                      1.0   EXT   90.0    1.12   41.3    0.25   AIR-CHANGE  0.27       949.2      14237.9
FL5 Stairs B                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.27       349.1       5237.1
FL5 Toilet A                         1.0   EXT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       119.1       1787.2
FL5 Toilet B                         1.0   EXT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00        79.6       1194.0
FL5 Classroom C                      1.0   EXT  -90.0    1.12   29.5    0.25   AIR-CHANGE  0.27       679.5      10192.0
FL5 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5       2946.9
FL5 Stairs A                         1.0   EXT    0.0    0.63    0.0    0.00   AIR-CHANGE  0.27       322.3       4835.0
FL5 Library                          1.0   EXT    0.0    0.95   15.5    0.50   AIR-CHANGE  0.27       901.1      13515.9
FL5 Toilet C                         1.0   EXT    0.0    0.88    0.0    0.00   NO-INFILT.  0.00       107.7       1615.7
FL5 Elec                             1.0   EXT    0.0    0.42    0.0    0.00   NO-INFILT.  0.00        61.8        926.9
FL5 Corridor                         1.0   EXT   90.0    0.59    0.0    0.00   AIR-CHANGE  0.27      1032.4      15486.3
FL5 Classroom D                      1.0   EXT  180.0    1.12   78.1    0.25   AIR-CHANGE  0.27      1795.3      26929.1
FL5 Boiler Room                      1.0   EXT   90.0    0.42    0.0    0.00   AIR-CHANGE  0.27      1339.7      20096.0
FL5 Closets                          1.0   EXT    0.0    0.63    0.0    0.00   NO-INFILT.  0.00       347.1       5206.7

Spaces on floor: R Ground Flr

R Elevator Machine Room              1.0   EXT  180.0    0.42    0.0    0.00   AIR-CHANGE  0.34       403.0       4836.5
R Elevators                          1.0   EXT    0.0    0.00    0.0    0.00   AIR-CHANGE  0.34       178.1       2137.1
R Corridor                           1.0   EXT   90.0    0.59    0.0    0.00   AIR-CHANGE  0.34        65.5        786.5
R Stairs A                           1.0   EXT   90.0    0.63    0.0    0.00   AIR-CHANGE  0.34       298.7       3584.4
                                                              ------                                ---------   ----------
BUILDING TOTALS                                               1234.9                                  49128.7     652732.6
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PS 33X Jerome Ave 3                                                         DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                              WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF EXTERIOR SURFACES 182
(U-VALUE INCLUDES OUTSIDE FILM; WINDOW INCLUDES FRAME AND CURB, IF DEFINED)


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE        AREA       U-VALUE         AREA      U-VALUE        AREA   AZIMUTH
                                   (BTU/HR-SQFT-F)   (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)    (SQFT)


FL1 NE Wall (G.NNE1.E2)                   0.441       45.00        0.104        62.90      0.245        107.90  NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNE1.E4)                   0.000        0.00        0.104       473.20      0.104        473.20  NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNW10.E11)                 0.000        0.00        0.104        42.90      0.104         42.90  NORTH-EAST
  in space: FL1 Bike Storage
FL1 NE Wall (G.E22.E24)                   0.000        0.00        0.104       120.25      0.104        120.25  NORTH-EAST
  in space: FL1 Can Wash
FL1 NE Wall (G.NE23.E26)                  0.000        0.00        0.104        68.90      0.104         68.90  NORTH-EAST
  in space: FL1 Dietition's Office
FL1 NE Wall (G.NE24.E27)                  0.000        0.00        0.104       180.05      0.104        180.05  NORTH-EAST
  in space: FL1 Locker Rooms
FL1 NE Wall (G.NNE25.E29)                 0.000        0.00        0.104        95.55      0.104         95.55  NORTH-EAST
  in space: FL1 Toilet B
FL2 NE Wall (G.E1.E1)                     0.000        0.00        0.104       462.15      0.104        462.15  NORTH-EAST
  in space: FL2 Classroom A
FL2 NE Wall (G.N6.E8)                     0.000        0.00        0.104       473.20      0.104        473.20  NORTH-EAST
  in space: FL2 Classroom D
FL2 NE Wall (G.W15.E19)                   0.000        0.00        0.104       113.75      0.104        113.75  NORTH-EAST
  in space: FL2 Classroom E
FL2 NE Wall (G.C18.E20)                   0.441       45.00        0.104        65.50      0.242        110.50  NORTH-EAST
  in space: FL2 Corridor
FL3 NE Wall (G.E1.E1)                     0.000        0.00        0.104       462.15      0.104        462.15  NORTH-EAST
  in space: FL3 Classroom A
FL3 NE Wall (G.N6.E8)                     0.000        0.00        0.104       473.20      0.104        473.20  NORTH-EAST
  in space: FL3 Classroom D
FL3 NE Wall (G.W13.E18)                   0.000        0.00        0.104       113.75      0.104        113.75  NORTH-EAST
  in space: FL3 Classroom E
FL3 NE Wall (G.C16.E19)                   0.441       45.00        0.104        65.50      0.242        110.50  NORTH-EAST
  in space: FL3 Corridor
FL4 NE Wall (G.E1.E1)                     0.000        0.00        0.104       462.15      0.104        462.15  NORTH-EAST
  in space: FL4 Classroom A
FL4 NE Wall (G.N6.E8)                     0.000        0.00        0.104       473.20      0.104        473.20  NORTH-EAST
  in space: FL4 Classroom D
FL4 NE Wall (G.W13.E18)                   0.000        0.00        0.104       113.75      0.104        113.75  NORTH-EAST
  in space: FL4 Classroom E
FL4 NE Wall (G.NE16.E19)                  0.441       45.00        0.104        65.50      0.242        110.50  NORTH-EAST
  in space: FL4 Corridor
FL5 NE Wall (G.N2.E5)                     0.000        0.00        0.104       546.00      0.104        546.00  NORTH-EAST
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  in space: FL5 Classroom B
FL5 NE Wall (G.W9.E22)                    0.000          0.00        0.104        131.25      0.104           131.25  NORTH-EAST
  in space: FL5 Library
FL5 NE Wall (G.NE12.E26)                  0.441         45.00        0.104         82.50      0.223           127.50  NORTH-EAST
  in space: FL5 Corridor
FL5 NE Wall (G.E14.E31)                   0.000          0.00        0.104        533.25      0.104           533.25  NORTH-EAST
  in space: FL5 Boiler Room
R NE Wall (G.E1.E2)                       0.000          0.00        0.104        235.20      0.104           235.20  NORTH-EAST
  in space: R Elevator Machine Room



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
R NE Wall (G.W4.E11)                      0.000          0.00        0.104        197.40      0.104           197.40  NORTH-EAST
  in space: R Stairs A
Exterior Wall 145                         0.441        180.00        0.104        212.60      0.259           392.60  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 149                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 150                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL2 Classroom F
FL1 SE Wall (G.SE21.E23)                  0.441         21.00        0.104        219.50      0.134           240.50  SOUTH-EAST
  in space: FL1 Refuse Recycling
FL3 SE Wall (G.SE2.E4)                    0.441        180.00        0.104        200.25      0.264           380.25  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 152                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 153                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 154                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL3 Classroom B
FL3 SE Wall (G.S3.E7)                     0.441        180.00        0.104        213.90      0.258           393.90  SOUTH-EAST
  in space: FL3 Classroom C
Exterior Wall 143                         0.000          0.00        0.104        175.50      0.104           175.50  SOUTH-EAST
  in space: FL1 Storage
FL3 SE Wall (G.N6.E11)                    0.000          0.00        0.104         40.95      0.104            40.95  SOUTH-EAST
  in space: FL3 Classroom D
FL3 SE Wall (G.W13.E17)                   0.000          0.00        0.104         33.15      0.104            33.15  SOUTH-EAST
  in space: FL3 Classroom E
Exterior Wall 144                         0.441         21.00        0.104         89.50      0.168           110.50  SOUTH-EAST
  in space: FL1 Receiving
FL1 SE Wall (G.NNE1.E3)                   0.000          0.00        0.104         40.95      0.104            40.95  SOUTH-EAST
  in space: FL1 Exercise Room
Exterior Wall 151                         0.441        180.00        0.104        212.60      0.259           392.60  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 155                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 156                         0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL3 Classroom F
FL2 SE Wall (G.SE2.E4)                    0.000          0.00        0.104          0.65      0.104             0.65  SOUTH-EAST
  in space: FL2 Classroom B
FL4 SE Wall (G.SE2.E4)                    0.441        210.00        0.104        330.15      0.235           540.15  SOUTH-EAST
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  in space: FL4 Classroom B
Exterior Wall 158                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 159                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 160                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL4 Classroom B
FL4 SE Wall (G.S3.E7)                     0.441       150.00        0.104      243.90      0.233          393.90  SOUTH-EAST
  in space: FL4 Classroom C
Exterior Wall 146                         0.441       180.00        0.104      200.25      0.264          380.25  SOUTH-EAST
  in space: FL2 Classroom B
FL4 SE Wall (G.N6.E11)                    0.000         0.00        0.104       40.95      0.104           40.95  SOUTH-EAST
  in space: FL4 Classroom D
FL4 SE Wall (G.W13.E17)                   0.000         0.00        0.104       33.15      0.104           33.15  SOUTH-EAST
  in space: FL4 Classroom E
Exterior Wall 147                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL2 Classroom B
Exterior Wall 148                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL2 Classroom B



PS 33X Jerome Ave 3                                                            DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                 WEATHER FILE- NEW YORK LAGUARDI NY
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------
Exterior Wall 157                         0.441       120.00        0.104      177.70      0.240          297.70  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 161                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 162                         0.000         0.00        0.104        0.65      0.104            0.65  SOUTH-EAST
  in space: FL4 Classroom F
FL5 SE Wall (G.SSW1.E3)                   0.441       120.00        0.104      207.00      0.228          327.00  SOUTH-EAST
  in space: FL5 Classroom A
FL2 SE Wall (G.S3.E7)                     0.441       180.00        0.104      213.90      0.258          393.90  SOUTH-EAST
  in space: FL2 Classroom C
FL5 SE Wall (G.N2.E8)                     0.000         0.00        0.104       47.25      0.104           47.25  SOUTH-EAST
  in space: FL5 Classroom B
FL5 SE Wall (G.W9.E21)                    0.000         0.00        0.104       38.25      0.104           38.25  SOUTH-EAST
  in space: FL5 Library
FL1 SE Wall (G.E22.E25)                   0.000         0.00        0.104      132.60      0.104          132.60  SOUTH-EAST
  in space: FL1 Can Wash
FL2 SE Wall (G.N6.E11)                    0.000         0.00        0.104       40.95      0.104           40.95  SOUTH-EAST
  in space: FL2 Classroom D
FL5 SE Wall (G.SE13.E29)                  0.441       240.00        0.104      517.50      0.211          757.50  SOUTH-EAST
  in space: FL5 Classroom D
FL2 SE Wall (G.W15.E18)                   0.000         0.00        0.104       33.15      0.104           33.15  SOUTH-EAST
  in space: FL2 Classroom E
FL5 SE Wall (G.E14.E33)                   0.441       240.00        0.104      471.75      0.218          711.75  SOUTH-EAST
  in space: FL5 Boiler Room
R SE Wall (G.E1.E1)                       0.000         0.00        0.104      355.80      0.104          355.80  SOUTH-EAST
  in space: R Elevator Machine Room
FL1 SE Wall (G.WSW12.E17)                 0.000         0.00        0.104       33.15      0.104           33.15  SOUTH-EAST
  in space: FL1 Supervisory Office
R SE Wall (G.SSE3.E9)                     0.000         0.00        0.104      140.40      0.104          140.40  SOUTH-EAST
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  in space: R Corridor
FL1 SE Wall (G.SSE15.E21)                 0.441        277.50        0.104        626.00      0.208           903.50  SOUTH-EAST
  in space: FL1 Cafeteria
FL2 SE Wall (G.E1.E3)                     0.441        180.00        0.104        206.75      0.261           386.75  SOUTH-EAST
  in space: FL2 Classroom A
FL3 SE Wall (G.E1.E3)                     0.441        180.00        0.104        206.75      0.261           386.75  SOUTH-EAST
  in space: FL3 Classroom A
FL4 SE Wall (G.E1.E3)                     0.441        120.00        0.104        201.10      0.230           321.10  SOUTH-EAST
  in space: FL4 Classroom A
R SW Wall (G.W4.E13)                      0.000          0.00        0.104        309.01      0.104           309.01  SOUTH
  in space: R Stairs A
FL1 SW Wall (G.WSW14.E20)                 0.000          0.00        0.104        139.13      0.104           139.13  SOUTH
  in space: FL1 Boys
FL4 SW Wall (G.NE16.E20)                  0.441         30.00        0.104         74.00      0.202           104.00  SOUTH-WEST
  in space: FL4 Corridor
FL1 SW Wall (G.C28.E30)                   0.000          0.00        0.104         12.35      0.104            12.35  SOUTH-WEST
  in space: FL1 Corridor
FL1 SW Wall (G.SW13.E18)                  0.000          0.00        0.104        104.00      0.104           104.00  SOUTH-WEST
  in space: FL1 Vestibule B
FL1 SW Wall (G.W11.E13)                   0.000          0.00        0.104        150.15      0.104           150.15  SOUTH-WEST
  in space: FL1 Vestibule A
FL5 SW Wall (G.SSW1.E2)                   0.441         30.00        0.104        503.25      0.123           533.25  SOUTH-WEST
  in space: FL5 Classroom A
FL3 SW Wall (G.S3.E6)                     0.441         30.00        0.104        432.15      0.126           462.15  SOUTH-WEST
  in space: FL3 Classroom C
FL2 SW Wall (G.C18.E21)                   0.441         30.00        0.104         74.00      0.202           104.00  SOUTH-WEST
  in space: FL2 Corridor
FL5 SW Wall (G.N2.E7)                     0.000          0.00        0.104        131.25      0.104           131.25  SOUTH-WEST
  in space: FL5 Classroom B


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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FL2 SW Wall (G.S3.E6)                     0.441         30.00        0.104        432.15      0.126           462.15  SOUTH-WEST
  in space: FL2 Classroom C
FL5 SW Wall (G.W9.E20)                    0.441         90.00        0.104        463.50      0.159           553.50  SOUTH-WEST
  in space: FL5 Library
FL3 SW Wall (G.N6.E10)                    0.000          0.00        0.104        113.75      0.104           113.75  SOUTH-WEST
  in space: FL3 Classroom D
FL1 SW Wall (G.WSW12.E16)                 0.441         90.00        0.104        156.35      0.227           246.35  SOUTH-WEST
  in space: FL1 Supervisory Office
FL4 SW Wall (G.S3.E6)                     0.441         30.00        0.104        432.15      0.126           462.15  SOUTH-WEST
  in space: FL4 Classroom C
FL5 SW Wall (G.NE12.E27)                  0.441         30.00        0.104         90.00      0.189           120.00  SOUTH-WEST
  in space: FL5 Corridor
FL3 SW Wall (G.W13.E16)                   0.441         60.00        0.104        419.70      0.147           479.70  SOUTH-WEST
  in space: FL3 Classroom E
FL1 SW Wall (G.SSE15.E22)                 0.441         52.50        0.104        271.20      0.159           323.70  SOUTH-WEST
  in space: FL1 Cafeteria
FL4 SW Wall (G.N6.E10)                    0.000          0.00        0.104        113.75      0.104           113.75  SOUTH-WEST
  in space: FL4 Classroom D
FL2 SW Wall (G.N6.E10)                    0.000          0.00        0.104        113.75      0.104           113.75  SOUTH-WEST
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  in space: FL2 Classroom D
FL4 SW Wall (G.W13.E16)                   0.441         60.00        0.104        419.70      0.147           479.70  SOUTH-WEST
  in space: FL4 Classroom E
R SW Wall (G.E1.E4)                       0.000          0.00        0.104         55.80      0.104            55.80  SOUTH-WEST
  in space: R Elevator Machine Room
FL1 SW Wall (G.W2.E5)                     0.000          0.00        0.104        113.10      0.104           113.10  SOUTH-WEST
  in space: FL1 Stairs B
FL3 SW Wall (G.C16.E20)                   0.441         30.00        0.104         74.00      0.202           104.00  SOUTH-WEST
  in space: FL3 Corridor
FL2 SW Wall (G.W15.E17)                   0.441         90.00        0.104        389.70      0.168           479.70  SOUTH-WEST
  in space: FL2 Classroom E
R SW Wall (G.SSE3.E8)                     0.000          0.00        0.104         67.84      0.104            67.84  SOUTH-WEST
  in space: R Corridor
FL3 NW Wall (G.N6.E9)                     0.441        150.00        0.104        231.55      0.237           381.55  NORTH-WEST
  in space: FL3 Classroom D
FL4 NW Wall (G.NW7.E12)                   0.441         36.00        0.104        128.45      0.178           164.45  NORTH-WEST
  in space: FL4 Stairs B
FL4 NW Wall (G.NW10.E13)                  0.441        120.00        0.104        355.80      0.189           475.80  NORTH-WEST
  in space: FL4 Staff Lunch / Conf
FL4 NW Wall (G.NW12.E14)                  0.441         36.00        0.104        116.10      0.184           152.10  NORTH-WEST
  in space: FL4 Stairs A
FL4 NW Wall (G.W13.E15)                   0.441        150.00        0.104        232.85      0.236           382.85  NORTH-WEST
  in space: FL4 Classroom E
FL2 NW Wall (G.W15.E16)                   0.441        150.00        0.104        232.85      0.236           382.85  NORTH-WEST
  in space: FL2 Classroom E
FL2 NW Wall (G.E1.E2)                     0.000          0.00        0.104         40.95      0.104            40.95  NORTH-WEST
  in space: FL2 Classroom A
FL3 NW Wall (G.NW7.E12)                   0.441         36.00        0.104        128.45      0.178           164.45  NORTH-WEST
  in space: FL3 Stairs B
FL3 NW Wall (G.NW10.E13)                  0.441         60.00        0.104        201.95      0.182           261.95  NORTH-WEST
  in space: FL3 MDF
FL3 NW Wall (G.NW12.E14)                  0.441         36.00        0.104        116.10      0.184           152.10  NORTH-WEST
  in space: FL3 Stairs A
FL3 NW Wall (G.W13.E15)                   0.441        150.00        0.104        232.85      0.236           382.85  NORTH-WEST
  in space: FL3 Classroom E
FL1 NW Wall (G.W11.E14)                   0.441         50.00        0.104         83.25      0.231           133.25  NORTH-WEST
  in space: FL1 Vestibule A
FL1 NW Wall (G.WSW12.E15)                 0.000          0.00        0.104        139.75      0.104           139.75  NORTH-WEST
  in space: FL1 Supervisory Office


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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FL5 NW Wall (G.SSW1.E1)                   0.000          0.00        0.104         38.25      0.104            38.25  NORTH-WEST
  in space: FL5 Classroom A
FL1 NW Wall (G.NW4.E7)                    0.441         30.00        0.104        195.55      0.149           225.55  NORTH-WEST
  in space: FL1 Parents/Community
FL1 NW Wall (G.NW5.E8)                    0.000          0.00        0.104        105.95      0.104           105.95  NORTH-WEST
  in space: FL1 Toilet A
FL1 NW Wall (G.NNE25.E28)                 0.000          0.00        0.104         40.95      0.104            40.95  NORTH-WEST
  in space: FL1 Toilet B
FL5 NW Wall (G.N2.E6)                     0.441        150.00        0.104        290.25      0.219           440.25  NORTH-WEST
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  in space: FL5 Classroom B
FL3 NW Wall (G.NW18.E21)                  0.441         90.00        0.104        123.85      0.246           213.85  NORTH-WEST
  in space: FL3 Supervisory
FL2 NW Wall (G.S3.E5)                     0.000          0.00        0.104         33.15      0.104            33.15  NORTH-WEST
  in space: FL2 Classroom C
FL5 NW Wall (G.NW3.E10)                   0.441         36.00        0.104        153.75      0.168           189.75  NORTH-WEST
  in space: FL5 Stairs B
FL5 NW Wall (G.NW6.E14)                   0.441        180.00        0.104        369.00      0.215           549.00  NORTH-WEST
  in space: FL5 Classroom C
FL5 NW Wall (G.NW8.E17)                   0.441         36.00        0.104        139.50      0.173           175.50  NORTH-WEST
  in space: FL5 Stairs A
FL5 NW Wall (G.W9.E19)                    0.441        150.00        0.104        291.75      0.219           441.75  NORTH-WEST
  in space: FL5 Library
FL1 NW Wall (G.NW6.E9)                    0.441         60.00        0.104         77.80      0.251           137.80  NORTH-WEST
  in space: FL1 Exam Room
FL1 NW Wall (G.NW7.E10)                   0.000          0.00        0.104        169.65      0.104           169.65  NORTH-WEST
  in space: FL1 Stairs A
FL3 NW Wall (G.E1.E2)                     0.000          0.00        0.104         40.95      0.104            40.95  NORTH-WEST
  in space: FL3 Classroom A
FL4 NW Wall (G.E1.E2)                     0.000          0.00        0.104         40.95      0.104            40.95  NORTH-WEST
  in space: FL4 Classroom A
FL1 NW Wall (G.NNE1.E1)                   0.441        180.00        0.104        200.90      0.264           380.90  NORTH-WEST
  in space: FL1 Exercise Room
FL2 NW Wall (G.N6.E9)                     0.441        150.00        0.104        231.55      0.237           381.55  NORTH-WEST
  in space: FL2 Classroom D
FL1 NW Wall (G.NNW10.E12)                 0.000          0.00        0.104        109.85      0.104           109.85  NORTH-WEST
  in space: FL1 Bike Storage
FL5 NW Wall (G.E14.E32)                   0.000          0.00        0.104         47.25      0.104            47.25  NORTH-WEST
  in space: FL5 Boiler Room
FL1 NW Wall (G.W2.E6)                     0.000          0.00        0.104        154.05      0.104           154.05  NORTH-WEST
  in space: FL1 Stairs B
FL2 NW Wall (G.NW7.E12)                   0.441         18.00        0.104        146.45      0.141           164.45  NORTH-WEST
  in space: FL2 Stairs B
FL4 NW Wall (G.S3.E5)                     0.000          0.00        0.104         33.15      0.104            33.15  NORTH-WEST
  in space: FL4 Classroom C
R NW Wall (G.E1.E3)                       0.000          0.00        0.104        126.00      0.104           126.00  NORTH-WEST
  in space: R Elevator Machine Room
FL3 NW Wall (G.S3.E5)                     0.000          0.00        0.104         33.15      0.104            33.15  NORTH-WEST
  in space: FL3 Classroom C
R NW Wall (G.NW2.E6)                      0.000          0.00        0.104        229.80      0.104           229.80  NORTH-WEST
  in space: R Elevators
FL2 NW Wall (G.NW11.E13)                  0.441         37.50        0.104         60.65      0.233            98.15  NORTH-WEST
  in space: FL2 Toilet D
FL2 NW Wall (G.NW12.E14)                  0.441        142.50        0.104        235.15      0.231           377.65  NORTH-WEST
  in space: FL2 Reading / Speech Resource
FL4 NW Wall (G.N6.E9)                     0.441        150.00        0.104        231.55      0.237           381.55  NORTH-WEST
  in space: FL4 Classroom D
R NW Wall (G.W4.E12)                      0.000          0.00        0.104        140.40      0.104           140.40  NORTH-WEST
  in space: R Stairs A
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FL2 NW Wall (G.NW14.E15)                  0.441         36.00        0.104        116.10      0.184           152.10  NORTH-WEST
  in space: FL2 Stairs A
FL1 NW Wall (G.WSW14.E19)                 0.000          0.00        0.104         33.15      0.104            33.15  NORTH-WEST
  in space: FL1 Boys
Exterior Wall 175                         0.000          0.00        0.055         94.35      0.055            94.35  FLOOR
  in space: FL1 Can Wash
Exterior Wall 168                         0.000          0.00        0.055        153.25      0.055           153.25  FLOOR
  in space: FL1 Boys
Exterior Wall 176                         0.000          0.00        0.055         75.67      0.055            75.67  FLOOR
  in space: FL1 Dietition's Office
Exterior Wall 166                         0.000          0.00        0.055        203.71      0.055           203.71  FLOOR
  in space: FL1 Supervisory Office
Exterior Wall 177                         0.000          0.00        0.055        164.66      0.055           164.66  FLOOR
  in space: FL1 Locker Rooms
Exterior Wall 163                         0.000          0.00        0.055       1283.56      0.055          1283.56  FLOOR
  in space: FL1 Exercise Room
Exterior Wall 169                         0.000          0.00        0.055       1981.56      0.055          1981.56  FLOOR
  in space: FL1 Cafeteria
Exterior Wall 178                         0.000          0.00        0.055         74.24      0.055            74.24  FLOOR
  in space: FL1 Toilet B
Exterior Wall 179                         0.000          0.00        0.055        168.42      0.055           168.42  FLOOR
  in space: FL1 Pot Wash
Exterior Wall 180                         0.000          0.00        0.055        541.24      0.055           541.24  FLOOR
  in space: FL1 Prep/Warming
Exterior Wall 170                         0.000          0.00        0.055        125.43      0.055           125.43  FLOOR
  in space: FL1 Girls
Exterior Wall 181                         0.000          0.00        0.055       1182.98      0.055          1182.98  FLOOR
  in space: FL1 Corridor
Exterior Wall 171                         0.000          0.00        0.055         64.16      0.055            64.16  FLOOR
  in space: FL1 Students
Exterior Wall 182                         0.000          0.00        0.055        124.88      0.055           124.88  FLOOR
  in space: FL1 Storage
Exterior Wall 172                         0.000          0.00        0.055         66.73      0.055            66.73  FLOOR
  in space: FL1 Electrical
Exterior Wall 183                         0.000          0.00        0.055         78.62      0.055            78.62  FLOOR
  in space: FL1 Receiving
Exterior Wall 173                         0.000          0.00        0.055        284.78      0.055           284.78  FLOOR
  in space: FL1 Servery
Exterior Wall 167                         0.000          0.00        0.055         65.40      0.055            65.40  FLOOR
  in space: FL1 Vestibule B
Exterior Wall 174                         0.000          0.00        0.055        145.02      0.055           145.02  FLOOR
  in space: FL1 Refuse Recycling
Exterior Wall 164                         0.000          0.00        0.055         97.60      0.055            97.60  FLOOR
  in space: FL1 Bike Storage
Exterior Wall 165                         0.000          0.00        0.055        118.39      0.055           118.39  FLOOR
  in space: FL1 Vestibule A
Exterior Wall 142                         0.000          0.00        0.032        103.10      0.032           103.10  ROOF
  in space: FL1 Stairs B
FL5 Roof (G.NW3.E11)                      0.000          0.00        0.032        349.14      0.032           349.14  ROOF
  in space: FL5 Stairs B
FL5 Roof (G.C4.E12)                       0.000          0.00        0.032        119.15      0.032           119.15  ROOF
  in space: FL5 Toilet A
FL5 Roof (G.E14.E34)                      0.000          0.00        0.032       1339.73      0.032          1339.73  ROOF
  in space: FL5 Boiler Room
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FL5 Roof (G.C15.E35)                      0.000          0.00        0.032        347.11      0.032           347.11  ROOF
  in space: FL5 Closets
FL5 Roof (G.C5.E13)                       0.000          0.00        0.032         79.60      0.032            79.60  ROOF
  in space: FL5 Toilet B



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL5 Roof (G.W9.E23)                       0.000          0.00        0.032        901.06      0.032           901.06  ROOF
  in space: FL5 Library
FL5 Roof (G.C10.E24)                      0.000          0.00        0.032        107.72      0.032           107.72  ROOF
  in space: FL5 Toilet C
FL5 Roof (G.C11.E25)                      0.000          0.00        0.032         61.79      0.032            61.79  ROOF
  in space: FL5 Elec
R Roof (G.E1.E5)                          0.000          0.00        0.032        403.05      0.032           403.05  ROOF
  in space: R Elevator Machine Room
FL5 Roof (G.SSW1.E4)                      0.000          0.00        0.032        774.99      0.032           774.99  ROOF
  in space: FL5 Classroom A
R Roof (G.NW2.E7)                         0.000          0.00        0.032        178.10      0.032           178.10  ROOF
  in space: R Elevators
FL5 Roof (G.NW6.E15)                      0.000          0.00        0.032        679.47      0.032           679.47  ROOF
  in space: FL5 Classroom C
FL5 Roof (G.NE12.E28)                     0.000          0.00        0.032        430.18      0.032           430.18  ROOF
  in space: FL5 Corridor
R Roof (G.SSE3.E10)                       0.000          0.00        0.032         65.54      0.032            65.54  ROOF
  in space: R Corridor
Exterior Wall 141                         0.000          0.00        0.032        298.98      0.032           298.98  ROOF
  in space: FL5 Corridor
FL5 Roof (G.N2.E9)                        0.000          0.00        0.032        949.20      0.032           949.20  ROOF
  in space: FL5 Classroom B
FL5 Roof (G.SE13.E30)                     0.000          0.00        0.032       1795.27      0.032          1795.27  ROOF
  in space: FL5 Classroom D
R Roof (G.W4.E14)                         0.000          0.00        0.032        298.70      0.032           298.70  ROOF
  in space: R Stairs A
C Flr (B.NNE1.U1)                         0.000          0.00        0.010        414.75      0.010           414.75  UNDERGRND
  in space: C Gas Meter Room
C NW Wall (B.NNE1.U2)                     0.000          0.00        0.077        142.20      0.077           142.20  UNDERGRND
  in space: C Gas Meter Room
C NE Wall (B.NNE1.U3)                     0.000          0.00        0.077        420.00      0.077           420.00  UNDERGRND
  in space: C Gas Meter Room
C Flr (B.W2.U4)                           0.000          0.00        0.010        281.18      0.010           281.18  UNDERGRND
  in space: C Mech Equipment Room
C SW Wall (B.W2.U5)                       0.000          0.00        0.077        104.40      0.077           104.40  UNDERGRND
  in space: C Mech Equipment Room
C NW Wall (B.W2.U6)                       0.000          0.00        0.077        127.80      0.077           127.80  UNDERGRND
  in space: C Mech Equipment Room
C Flr (B.C3.U7)                           0.000          0.00        0.010        130.72      0.010           130.72  UNDERGRND
  in space: C Stairs B
C Flr (B.NW4.U8)                          0.000          0.00        0.010        333.40      0.010           333.40  UNDERGRND
  in space: C Electrical Room
C NW Wall (B.NW4.U9)                      0.000          0.00        0.077        200.40      0.077           200.40  UNDERGRND
  in space: C Electrical Room
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C Flr (B.NW5.U10)                         0.000          0.00        0.010        336.67      0.010           336.67  UNDERGRND
  in space: C Water Service/Sewage Ejector
C NW Wall (B.NW5.U11)                     0.000          0.00        0.077        238.80      0.077           238.80  UNDERGRND
  in space: C Water Service/Sewage Ejector
C Flr (B.C6.U12)                          0.000          0.00        0.010        186.71      0.010           186.71  UNDERGRND
  in space: C Elevators
C Flr (B.W7.U13)                          0.000          0.00        0.010        316.82      0.010           316.82  UNDERGRND
  in space: C Stairs A
C SW Wall (B.W7.U14)                      0.000          0.00        0.077        117.60      0.077           117.60  UNDERGRND
  in space: C Stairs A
C NW Wall (B.W7.U15)                      0.000          0.00        0.077        138.00      0.077           138.00  UNDERGRND
  in space: C Stairs A
C Flr (B.SW8.U16)                         0.000          0.00        0.010        347.15      0.010           347.15  UNDERGRND
  in space: C Sprinkler Booster Pump
C SE Wall (B.SW8.U17)                     0.000          0.00        0.077        157.20      0.077           157.20  UNDERGRND
  in space: C Sprinkler Booster Pump


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE          AREA       U-VALUE          AREA       U-VALUE        AREA    AZIMUTH
                                   (BTU/HR-SQFT-F)     (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)     (SQFT)


C NW Wall (B.SW8.U18)                     0.000          0.00        0.077        157.20      0.077           157.20  UNDERGRND
  in space: C Sprinkler Booster Pump
C SW Wall (B.SW8.U19)                     0.000          0.00        0.077        318.00      0.077           318.00  UNDERGRND
  in space: C Sprinkler Booster Pump
C Flr (B.SE9.U20)                         0.000          0.00        0.010        758.28      0.010           758.28  UNDERGRND
  in space: C Corridor
C NE Wall (B.SE9.U21)                     0.000          0.00        0.077        120.00      0.077           120.00  UNDERGRND
  in space: C Corridor
C SE Wall (B.SE9.U22)                     0.000          0.00        0.077        847.20      0.077           847.20  UNDERGRND
  in space: C Corridor


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                        AVERAGE             AVERAGE         AVERAGE U-VALUE         WINDOW         WALL           WINDOW+WALL
                    U-VALUE/WINDOWS      U-VALUE/WALLS       WALLS+WINDOWS          AREA           AREA             AREA
                    (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)         (SQFT)         (SQFT)           (SQFT)
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NORTH-EAST               0.441               0.104               0.116             225.00         6113.15          6338.15

SOUTH-EAST               0.441               0.104               0.216            2959.50         5947.05          8906.55

SOUTH                    0.000               0.104               0.104               0.00          448.14           448.14

SOUTH-WEST               0.441               0.104               0.143             682.50         5207.59          5890.09

NORTH-WEST               0.441               0.104               0.196            2420.00         6481.35          8901.35

FLOOR                    0.000               0.055               0.055               0.00         7094.64          7094.64

ROOF                     0.000               0.032               0.032               0.00         9281.85          9281.85

ALL WALLS                0.441               0.104               0.174            6287.00        24197.28         30484.29

    WALLS+ROOFS          0.441               0.084               0.141            6287.00        33479.14         39766.14

    UNDERGRND            0.000               0.043               0.043               0.00         6194.48          6194.48

BUILDING                 0.441               0.074               0.118            6287.00        46768.24         53055.24


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF WINDOWS 123

(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME   CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES         AREA         U-VALUE
NAME                            MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

Window 1                               1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 2                               1.0        90.00    7.50  12.00      17.30     2.50     0.00    0.00   0.384   0.000
Window 121                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 5                               1.0        30.00    7.50   4.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 3                               1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 7                               1.0        50.00    8.00   6.25       0.00     0.00     0.00    0.00   0.384   0.000
Window 75                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 77                              1.0        52.50    7.50   7.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 78                              1.0        52.50    7.50   7.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 79                              1.0        52.50    7.50   7.00      32.75     2.50     0.00    0.00   0.384   0.000
Window 80                              1.0        52.50    7.50   7.00      46.75     2.50     0.00    0.00   0.384   0.000
Window 81                              1.0        67.50    7.50   9.00      58.75     2.50     0.00    0.00   0.384   0.000
Window 76                              1.0        52.50    7.50   7.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 82                              1.0        21.00    7.00   3.00      14.00     0.00     0.00    0.00   0.384   0.000
Window 126                             1.0        21.00    7.00   3.00       1.00     0.00     0.00    0.00   0.384   0.000
Window 90                              1.0        90.00    7.50  12.00       2.00     2.50     0.00    0.00   0.384   0.000
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Window 91                              1.0        90.00    7.50  12.00      17.00     2.50     0.00    0.00   0.384   0.000
Window 131                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 132                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 74                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 84                              1.0        90.00    7.50  12.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 85                              1.0        90.00    7.50  12.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 8                               1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 9                               1.0        60.00    7.50   8.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 10                              1.0        60.00    7.50   8.00      21.35     2.50     0.00    0.00   0.384   0.000
Window 44                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 11                              1.0        37.50    7.50   5.00       2.55     2.50     0.00    0.00   0.384   0.000
Window 12                              1.0        52.50    7.50   7.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 13                              1.0        90.00    7.50  12.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 51                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 58                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 14                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 15                              1.0        60.00    7.50   8.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 16                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 62                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 66                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 122                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 70                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 127                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 128                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 98                              1.0        90.00    7.50  12.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 99                              1.0        90.00    7.50  12.00      17.00     2.50     0.00    0.00   0.384   0.000
Window 94                              1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 95                              1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 73                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 92                              1.0        90.00    7.50  12.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 93                              1.0        90.00    7.50  12.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 17                              1.0        60.00    7.50   8.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 18                              1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME    CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES         AREA         U-VALUE
NAME                                MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

Window 19                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 45                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 49                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 27                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 28                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 52                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 57                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
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Window 29                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 30                              1.0        30.00    7.50   4.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 31                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 61                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 65                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 123                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 69                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 26                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 129                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 130                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 109                             1.0        60.00    7.50   8.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 110                             1.0        60.00    7.50   8.00      14.00     2.50     0.00    0.00   0.384   0.000
Window 103                             1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 104                             1.0        60.00    7.50   8.00       6.00     2.50     0.00    0.00   0.384   0.000
Window 105                             1.0        60.00    7.50   8.00      19.00     2.50     0.00    0.00   0.384   0.000
Window 135                             1.0        60.00    7.50   8.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 72                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 100                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 101                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 102                             1.0        30.00    7.50   4.00      26.30     2.50     0.00    0.00   0.384   0.000
Window 20                              1.0        60.00    7.50   8.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 21                              1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000
Window 22                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 46                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 50                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 38                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 39                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 40                              1.0        30.00    7.50   4.00      18.50     2.50     0.00    0.00   0.384   0.000
Window 41                              1.0        30.00    7.50   4.00      26.50     2.50     0.00    0.00   0.384   0.000
Window 53                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 56                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 32                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 33                              1.0        60.00    7.50   8.00       8.50     2.50     0.00    0.00   0.384   0.000
Window 34                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 60                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 64                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 124                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 68                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 133                             1.0        60.00    7.50   8.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 134                             1.0        60.00    7.50   8.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 71                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 111                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 112                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 23                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 24                              1.0        60.00    7.50   8.00      10.50     2.50     0.00    0.00   0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------

(Note: u-values include outside air film)
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WINDOW NAME	MULTIPLIER	GLASS AREA (SQFT)	GLASS HEIGHT (FT)	GLASS WIDTH (FT)	LOCATION OF ORIGIN IN SURFACE COORDINATES X (FT)	LOCATION OF ORIGIN IN SURFACE COORDINATES Y (FT)	FRAME AREA (SQFT)	CURB AREA (SQFT)	FRAME U-VALUE (BTU/HR-SQFT-F)	CURB U-VALUE (BTU/HR-SQFT-F)
Window 25	1.0	60.00	7.50	8.00	21.35	2.50	0.00	0.00	0.384	0.000
Window 47	1.0	18.00	3.00	6.00	3.00	10.00	0.00	0.00	0.384	0.000
Window 48	1.0	18.00	3.00	6.00	3.00	0.00	0.00	0.00	0.384	0.000
Window 42	1.0	90.00	7.50	12.00	2.50	2.50	0.00	0.00	0.384	0.000
Window 43	1.0	90.00	7.50	12.00	18.50	2.50	0.00	0.00	0.384	0.000
Window 54	1.0	18.00	3.00	6.00	3.00	0.00	0.00	0.00	0.384	0.000
Window 55	1.0	18.00	3.00	6.00	3.00	10.00	0.00	0.00	0.384	0.000
Window 35	1.0	60.00	7.50	8.00	0.00	2.50	0.00	0.00	0.384	0.000
Window 36	1.0	60.00	7.50	8.00	12.50	2.50	0.00	0.00	0.384	0.000
Window 37	1.0	30.00	7.50	4.00	24.50	2.50	0.00	0.00	0.384	0.000
Window 59	1.0	60.00	7.50	8.00	0.00	2.50	0.00	0.00	0.384	0.000
Window 63	1.0	30.00	7.50	4.00	30.00	2.50	0.00	0.00	0.384	0.000
Window 125	1.0	45.00	7.50	6.00	1.00	2.50	0.00	0.00	0.384	0.000
Window 67	1.0	30.00	7.50	4.00	2.00	2.50	0.00	0.00	0.384	0.000
Window 113	1.0	60.00	7.50	8.00	4.50	2.50	0.00	0.00	0.384	0.000
Window 114	1.0	60.00	7.50	8.00	14.50	2.50	0.00	0.00	0.384	0.000
Window 115	1.0	60.00	7.50	8.00	26.50	2.50	0.00	0.00	0.384	0.000
Window 116	1.0	60.00	7.50	8.00	36.50	2.50	0.00	0.00	0.384	0.000
Window 117	1.0	60.00	7.50	8.00	0.00	2.50	0.00	0.00	0.384	0.000
Window 118	1.0	60.00	7.50	8.00	10.00	2.50	0.00	0.00	0.384	0.000
Window 119	1.0	60.00	7.50	8.00	24.00	2.50	0.00	0.00	0.384	0.000
Window 120	1.0	60.00	7.50	8.00	36.00	2.50	0.00	0.00	0.384	0.000

WINDOW NAME	SETBACK (FT)	GLASS SHADING COEFF	NUMBER OF PANES	CENTER-OF-GLASS U-VALUE (BTU/HR-SQFT-F)	GLASS VISIBLE TRANS	GLASS SOLAR TRANS	SURFACE TO ROUGH OPEN AREA RATIO
Window 1	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 2	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 121	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 5	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 3	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 7	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 75	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 77	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 78	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 79	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 80	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 81	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 76	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 82	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 126	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 90	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 91	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 131	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 132	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 74	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 84	0.00	0.46	1	0.441	0.440	0.878	1.000
Window 85	0.00	0.46	1	0.441	0.440	0.878	1.000

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Window 8                              0.00        0.46          1               0.441       0.440     0.878     1.000
Window 9                              0.00        0.46          1               0.441       0.440     0.878     1.000



PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 10                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 44                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 11                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 12                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 13                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 51                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 58                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 14                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 15                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 16                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 62                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 66                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 122                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 70                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 127                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 128                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 98                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 99                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 94                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 95                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 73                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 92                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 93                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 17                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 18                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 19                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 45                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 49                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 27                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 28                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 52                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 57                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 29                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 30                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 31                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 61                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 65                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 123                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 69                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 26                             0.00        0.46          1               0.441       0.440     0.878     1.000
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Window 129                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 130                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 109                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 110                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 103                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 104                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 105                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 135                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 72                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 100                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 101                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 102                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 20                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 21                             0.00        0.46          1               0.441       0.440     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 22                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 46                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 50                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 38                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 39                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 40                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 41                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 53                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 56                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 32                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 33                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 34                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 60                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 64                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 124                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 68                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 133                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 134                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 71                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 111                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 112                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 23                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 24                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 25                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 47                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 48                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 42                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 43                             0.00        0.46          1               0.441       0.440     0.878     1.000
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Window 54                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 55                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 35                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 36                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 37                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 59                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 63                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 125                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 67                             0.00        0.46          1               0.441       0.440     0.878     1.000
Window 113                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 114                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 115                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 116                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 117                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 118                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 119                            0.00        0.46          1               0.441       0.440     0.878     1.000
Window 120                            0.00        0.46          1               0.441       0.440     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48y    7/24/2018    17:17:21  BDL RUN  1

REPORT- LV-I Details of Constructions                                                       WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF CONSTRUCTIONS  10          DELAYED   8     QUICK   2

                                  U-VALUE                  SURFACE               NUMBER OF
    CONSTRUCTION                                SURFACE  ROUGHNESS    SURFACE     RESPONSE
    NAME                  (BTU/HR-SQFT-F)   ABSORPTANCE      INDEX    TYPE         FACTORS

C EWall Construction                0.109          0.70          3    QUICK              0
C Ceilg Construction                0.141          0.70          3    DELAYED            4
C IWall Construction                0.141          0.70          3    DELAYED            4
C IFlr Construction                 0.813          0.70          3    DELAYED            5
C IFlSP Construction                0.813          0.70          3    DELAYED            5
FL1 GFlr Construction               0.056          0.70          3    DELAYED           23
FL1 GFlSP Construction              0.056          0.70          3    DELAYED           23
FL5 Roof Construction               0.032          0.60          1    QUICK              0
C UFCons (B.NNE1.U2)                0.010          0.70          3    DELAYED           52
C UWCons (B.NNE1.U2)                0.077          0.70          3    DELAYED           40
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PROPOSED DESIGN:

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PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- BEPS Building Energy Performance                                                    WEATHER FILE- NEW YORK LAGUARDI NY
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                         TASK     MISC    SPACE   SPACE      HEAT    PUMPS     VENT    REFRIG  HT PUMP   DOMEST   EXT
               LIGHTS   LIGHTS   EQUIP   HEATING  COOLING   REJECT   & AUX    FANS    DISPLAY  SUPPLEM  HOT WTR   USAGE    TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    MBTU        150.9      0.0    264.2     15.7    284.9      0.0     46.5    195.6      0.0      0.0      0.0     10.7     968.6

FM1  NATURAL-GAS
    MBTU          0.0      0.0     44.9    473.9      0.0      0.0      0.0      0.0      0.0      0.0     44.8      0.0     563.6
              =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  ========

    MBTU        150.9      0.0    309.1    489.7    284.9      0.0     46.5    195.6      0.0      0.0     44.8     10.7    1532.2


                   TOTAL SITE ENERGY      1532.21 MBTU     31.3 KBTU/SQFT-YR GROSS-AREA     31.3 KBTU/SQFT-YR NET-AREA
                   TOTAL SOURCE ENERGY    3469.46 MBTU     71.0 KBTU/SQFT-YR GROSS-AREA     71.0 KBTU/SQFT-YR NET-AREA

                   PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  0.02
                   PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
                   HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =     0
                   HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =     1

                   NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
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PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- BEPU Building Utility Performance                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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                         TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT    REFRIG  HT PUMP  DOMEST    EXT
               LIGHTS   LIGHTS   EQUIP   HEATING  COOLING   REJECT   & AUX     FANS   DISPLAY  SUPPLEM  HOT WTR   USAGE    TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------

EM1  ELECTRICITY
    KWH         44216.       0.   77411.    4612.   83475.       0.   13633.   57323.       0.       0.       0.    3136.   283806.

FM1  NATURAL-GAS
    THERM           0.       0.     449.    4739.       0.       0.       0.       0.       0.       0.     448.       0.     5636.



           TOTAL ELECTRICITY    283806. KWH         5.805 KWH     /SQFT-YR GROSS-AREA    5.805 KWH     /SQFT-YR NET-AREA
           TOTAL NATURAL-GAS      5636. THERM       0.115 THERM   /SQFT-YR GROSS-AREA    0.115 THERM   /SQFT-YR NET-AREA


           PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  0.02
           PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.00
           HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =     0
           HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =     1

           NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
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PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- ES-D Energy Cost Summary                                                            WEATHER FILE- NEW YORK LAGUARDI NY
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                                                                           METERED             TOTAL      VIRTUAL
                                                                            ENERGY            CHARGE         RATE  RATE USED
UTILITY-RATE                       RESOURCE           METERS              UNITS/YR               ($)     ($/UNIT)  ALL YEAR?
--------------------------------   ----------------   -----------   -------------------   ----------   ----------   ---------

ConEd SmGen SC-2 Non-TOU Elec      ELECTRICITY        EM1              283806. KWH            58464.       0.2060      YES

ConEd Gen SC-2 Heating Gas         NATURAL-GAS        FM1                5636. THERM           6547.       1.1617      YES

                                                                                          ==========
                                                                                              65012.


                                                             ENERGY COST/GROSS BLDG AREA:      1.33
                                                               ENERGY COST/NET BLDG AREA:      1.33
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PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                              WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF SPACES  112          EXTERIOR   77     INTERIOR   35


                                                       LIGHTS          EQUIP
                             SPACE*FLOOR SPACE        (WATT /         (WATT / INFILTRATION              AREA       VOLUME
SPACE                         MULTIPLIER  TYPE   AZIM  SQFT ) PEOPLE  SQFT )       METHOD   ACH     (SQFT )      (CUFT )



Spaces on floor: C Below-Grade Flr

C Gas Meter Room                     1.0   INT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00       414.8       4977.0
C Mech Equipment Room                1.0   INT  -90.0    0.49    0.0    0.00   NO-INFILT.  0.00       281.2       3374.1
C Stairs B                           1.0   INT    0.0    0.23    0.0    0.00   NO-INFILT.  0.00       130.7       1568.6
C Electrical Room                    1.0   INT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00       333.4       4000.8
C Water Service/Sewage Ejector       1.0   INT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00       336.7       4040.0
C Elevators                          1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       186.7       2240.5
C Stairs A                           1.0   INT  -90.0    0.23    0.0    0.00   NO-INFILT.  0.00       316.8       3801.9
C Sprinkler Booster Pump             1.0   INT  180.0    0.49    0.0    0.00   NO-INFILT.  0.00       347.2       4165.8
C Corridor                           1.0   INT   90.0    0.49    0.0    0.00   NO-INFILT.  0.00       758.3       9099.3

Spaces on floor: FL1 Ground Flr

FL1 Exercise Room                    1.0   EXT    0.0    0.31   74.4    0.25   AIR-CHANGE  0.31      1283.6      16686.3
FL1 Stairs B                         1.0   EXT  -90.0    0.23    0.0    0.00   AIR-CHANGE  0.31       432.5       5622.8
FL1 Toilet/Shower/Lockers            1.0   INT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       188.3       2448.4
FL1 Parents/Community                1.0   EXT    0.0    1.14    2.2    0.50   AIR-CHANGE  0.31       217.7       2830.7
FL1 Toilet A                         1.0   EXT    0.0    0.57    0.0    0.00   AIR-CHANGE  0.31        70.1        911.2
FL1 Exam Room                        1.0   EXT    0.0    0.90    4.0    0.00   AIR-CHANGE  0.31        91.2       1185.1
FL1 Stairs A                         1.0   EXT    0.0    0.23    0.0    0.00   AIR-CHANGE  0.31       362.8       4716.3
FL1 Nurse's Office                   1.0   INT    0.0    0.90    1.7    1.25   NO-INFILT.  0.00       166.9       2169.4
FL1 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       193.1       2510.6
FL1 Bike Storage                     1.0   EXT   90.0    0.99    0.0    0.00   AIR-CHANGE  0.31        97.6       1268.8
FL1 Vestibule A                      1.0   EXT  -90.0    0.49    0.0    0.00   AIR-CHANGE  0.31       118.4       1539.0
FL1 Supervisory Office               1.0   EXT    0.0    0.90    2.0    1.25   AIR-CHANGE  0.31       203.7       2648.3
FL1 Vestibule B                      1.0   EXT  -90.0    0.49    0.0    0.00   AIR-CHANGE  0.31        65.4        850.1
FL1 Boys                             1.0   EXT    1.1    0.57    0.0    0.00   AIR-CHANGE  0.31       153.2       1992.2
FL1 Cafeteria                        1.0   EXT  180.0    0.51  110.1    0.00   AIR-CHANGE  0.31      1981.6      25760.2
FL1 Girls                            1.0   EXT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       125.4       1630.5
FL1 Students                         1.0   EXT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00        64.2        834.1
FL1 Electrical                       1.0   EXT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00        66.7        867.5
FL1 Servery                          1.0   EXT    0.0    0.51   15.8    0.00   NO-INFILT.  0.00       284.8       3702.1
FL1 Janitor's Closet                 1.0   EXT    0.0    0.70    0.0    0.00   NO-INFILT.  0.00        48.7        633.4
FL1 Refuse Recycling                 1.0   EXT  180.0    0.99    0.0    0.00   AIR-CHANGE  0.31       145.0       1885.3
FL1 Can Wash                         1.0   EXT   90.0    0.78    0.5    3.00   AIR-CHANGE  0.31        94.3       1226.5
FL1 Dietition's Office               1.0   EXT   90.0    0.90    0.8    1.25   AIR-CHANGE  0.31        75.7        983.7
FL1 Locker Rooms                     1.0   EXT   90.0    0.57    0.0    0.00   AIR-CHANGE  0.31       164.7       2140.6
FL1 Toilet B                         1.0   EXT    0.0    0.57    0.0    0.00   AIR-CHANGE  0.31        74.2        965.1
FL1 Pot Wash                         1.0   EXT    0.0    0.78    0.8    3.00   NO-INFILT.  0.00       168.4       2189.4
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FL1 Prep/Warming                     1.0   EXT     0.0    0.78    2.7    3.00   NO-INFILT.  0.00        541.2       7036.1
FL1 Corridor                         1.0   EXT   -90.0    0.49    0.0    0.00   NO-INFILT.  0.00       1183.0      15378.8
FL1 Storage                          1.0   EXT   180.0    0.99    0.0    0.00   AIR-CHANGE  0.31        124.9       1623.4
FL1 Receiving                        1.0   EXT   180.0    0.99    0.0    0.00   AIR-CHANGE  0.31         78.6       1022.1

Spaces on floor: FL2 Ground Flr

FL2 Classroom A                      1.0   EXT    90.0    0.59   43.3    0.25   AIR-CHANGE  0.31        994.9      12933.2


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                              WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL2 Classroom B                      1.0   EXT    90.0    0.59   42.7    0.25   AIR-CHANGE  0.31        983.0      12778.4
FL2 Classroom C                      1.0   EXT     0.0    0.59   44.0    0.25   AIR-CHANGE  0.31       1013.0      13168.9
FL2 Toilets A                        1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        133.6       1736.3
FL2 Toilets B                        1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        125.3       1629.3
FL2 Classroom D                      1.0   EXT    90.0    0.59   41.3    0.25   AIR-CHANGE  0.31        949.2      12339.5
FL2 Stairs B                         1.0   EXT     0.0    0.23    0.0    0.00   AIR-CHANGE  0.31        349.1       4538.8
FL2 Toilets C                        1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        119.1       1548.9
FL2 Staff                            1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00         84.1       1093.0
FL2 Comp / AV                        1.0   INT     0.0    0.49    0.0    7.50   NO-INFILT.  0.00         86.6       1126.2
FL2 Toilet D                         1.0   EXT     0.0    0.57    0.0    0.00   AIR-CHANGE  0.31         61.2        795.0
FL2 Reading / Speech Resource        1.0   EXT     0.0    0.54    8.1    0.50   AIR-CHANGE  0.31        469.0       6097.4
FL2 Elevators                        1.0   INT     0.0    0.00    0.0    0.00   NO-INFILT.  0.00        196.5       2554.0
FL2 Stairs A                         1.0   EXT     0.0    0.23    0.0    0.00   AIR-CHANGE  0.31        322.3       4190.4
FL2 Classroom E                      1.0   EXT     0.0    0.59   41.1    0.25   AIR-CHANGE  0.31        946.1      12299.9
FL2 Toilet E                         1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00         62.6        814.1
FL2 Elec                             1.0   INT     0.0    0.49    0.0    0.00   NO-INFILT.  0.00         61.8        803.3
FL2 Corridor                         1.0   EXT    90.0    0.49    0.0    0.00   AIR-CHANGE  0.31       1089.6      14165.3
FL2 Classroom F                      1.0   EXT    90.0    0.59   43.7    0.25   AIR-CHANGE  0.31       1005.6      13073.0

Spaces on floor: FL3 Ground Flr

FL3 Classroom A                      1.0   EXT    90.0    0.59   43.3    0.25   AIR-CHANGE  0.31        994.9      12933.2
FL3 Classroom B                      1.0   EXT    90.0    0.59   42.7    0.25   AIR-CHANGE  0.31        983.0      12778.4
FL3 Classroom C                      1.0   EXT     0.0    0.59   44.0    0.25   AIR-CHANGE  0.31       1013.0      13168.9
FL3 Toilets A                        1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        133.6       1736.3
FL3 Toilets B                        1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        125.3       1629.3
FL3 Classroom D                      1.0   EXT    90.0    0.59   41.3    0.25   AIR-CHANGE  0.31        949.2      12339.5
FL3 Stairs B                         1.0   EXT     0.0    0.23    0.0    0.00   AIR-CHANGE  0.31        349.1       4538.8
FL3 Toilet C                         1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00        119.1       1548.9
FL3 Toilet D                         1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00         84.1       1093.0
FL3 MDF                              1.0   EXT     0.0    0.49    0.0    7.50   AIR-CHANGE  0.31        358.7       4662.7
FL3 Elevators                        1.0   INT     0.0    0.00    0.0    0.00   AIR-CHANGE  0.31        196.5       2554.0
FL3 Stairs A                         1.0   EXT     0.0    0.23    0.0    0.00   AIR-CHANGE  0.31        322.3       4190.4
FL3 Classroom E                      1.0   EXT     0.0    0.59   41.1    0.25   AIR-CHANGE  0.31        946.1      12299.9
FL3 Toilet E                         1.0   INT     0.0    0.57    0.0    0.00   NO-INFILT.  0.00         62.6        814.1
FL3 Elec                             1.0   INT     0.0    0.49    0.0    0.00   NO-INFILT.  0.00         61.8        803.3
FL3 Corridor                         1.0   EXT    90.0    0.49    0.0    0.00   AIR-CHANGE  0.31       1093.1      14209.7
FL3 Comp / AV                        1.0   INT     0.0    0.49    0.0    7.50   NO-INFILT.  0.00         59.2        769.6
FL3 Supervisory                      1.0   EXT     0.0    0.90    2.0    1.25   AIR-CHANGE  0.31        195.8       2544.8
FL3 Classroom F                      1.0   EXT    90.0    0.59   43.7    0.25   AIR-CHANGE  0.31       1005.6      13073.0
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Spaces on floor: FL4 Ground Flr

FL4 Classroom A                      1.0   EXT   90.0    0.59   38.2    0.25   AIR-CHANGE  0.31       877.5     11407.1
FL4 Classroom B                      1.0   EXT   90.0    0.59   64.4    0.25   AIR-CHANGE  0.31      1480.3     19244.5
FL4 Classroom C                      1.0   EXT    0.0    0.59   46.8    0.25   AIR-CHANGE  0.31      1077.2     14003.1
FL4 Classroom D                      1.0   EXT   90.0    0.59   41.3    0.25   AIR-CHANGE  0.31       949.2     12339.5
FL4 Stairs B                         1.0   EXT    0.0    0.23    0.0    0.00   AIR-CHANGE  0.31       349.1      4538.8
FL4 Toilet C                         1.0   INT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       119.1      1548.9
FL4 Comp / AV                        1.0   INT    0.0    0.49    0.0    7.50   NO-INFILT.  0.00        67.2       873.1
FL4 Staff Lunch / Conf               1.0   EXT  -90.0    0.51   34.2    0.00   AIR-CHANGE  0.31       615.8      8005.2
FL4 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5      2554.0
FL4 Stairs A                         1.0   EXT    0.0    0.23    0.0    0.00   AIR-CHANGE  0.31       322.3      4190.4
FL4 Classroom E                      1.0   EXT    0.0    0.59   39.2    0.25   AIR-CHANGE  0.31       901.1     11713.8
FL4 Toilet D                         1.0   INT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       107.7      1400.3
FL4 Elec                             1.0   INT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00        61.8       803.3
FL4 Corridor                         1.0   EXT   90.0    0.49    0.0    0.00   AIR-CHANGE  0.31      1032.4     13421.4


PS 33X Jerome Ave 3                                                             DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-B Summary of Spaces                                                              WEATHER FILE- NEW YORK LAGUARDI NY
-------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL4 Staff                            1.0   INT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00        76.1       989.5
FL4 Classroom F                      1.0   EXT   90.0    0.59   35.5    0.25   AIR-CHANGE  0.31       817.3     10624.6

Spaces on floor: FL5 Ground Flr

FL5 Classroom A                      1.0   EXT    0.0    0.59   33.7    0.25   AIR-CHANGE  0.27       775.0     11624.8
FL5 Classroom B                      1.0   EXT   90.0    0.59   41.3    0.25   AIR-CHANGE  0.27       949.2     14237.9
FL5 Stairs B                         1.0   EXT    0.0    0.23    0.0    0.00   AIR-CHANGE  0.27       349.1      5237.1
FL5 Toilet A                         1.0   EXT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       119.1      1787.2
FL5 Toilet B                         1.0   EXT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00        79.6      1194.0
FL5 Classroom C                      1.0   EXT  -90.0    0.59   29.5    0.25   AIR-CHANGE  0.27       679.5     10192.0
FL5 Elevators                        1.0   INT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00       196.5      2946.9
FL5 Stairs A                         1.0   EXT    0.0    0.23    0.0    0.00   AIR-CHANGE  0.27       322.3      4835.0
FL5 Library                          1.0   EXT    0.0    0.54   15.5    0.50   AIR-CHANGE  0.27       901.1     13515.9
FL5 Toilet C                         1.0   EXT    0.0    0.57    0.0    0.00   NO-INFILT.  0.00       107.7      1615.7
FL5 Elec                             1.0   EXT    0.0    0.49    0.0    0.00   NO-INFILT.  0.00        61.8       926.9
FL5 Corridor                         1.0   EXT   90.0    0.49    0.0    0.00   AIR-CHANGE  0.27      1032.4     15486.3
FL5 Classroom D                      1.0   EXT  180.0    0.59   78.1    0.25   AIR-CHANGE  0.27      1795.3     26929.1
FL5 Boiler Room                      1.0   EXT   90.0    0.49    0.0    0.00   AIR-CHANGE  0.27      1339.7     20096.0
FL5 Closets                          1.0   EXT    0.0    0.99    0.0    0.00   NO-INFILT.  0.00       347.1      5206.7

Spaces on floor: R Ground Flr

R Elevator Machine Room              1.0   EXT  180.0    0.49    0.0    0.00   AIR-CHANGE  0.34       403.0      4836.5
R Elevators                          1.0   EXT    0.0    0.00    0.0    0.00   AIR-CHANGE  0.34       178.1      2137.1
R Corridor                           1.0   EXT   90.0    0.49    0.0    0.00   AIR-CHANGE  0.34        65.5       786.5
R Stairs A                           1.0   EXT   90.0    0.23    0.0    0.00   AIR-CHANGE  0.34       298.7      3584.4
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BUILDING TOTALS                                               1234.9                                49128.7    652732.6
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PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF EXTERIOR SURFACES 183
(U-VALUE INCLUDES OUTSIDE FILM; WINDOW INCLUDES FRAME AND CURB, IF DEFINED)


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE          AREA       U-VALUE          AREA       U-VALUE        AREA    AZIMUTH
                                   (BTU/HR-SQFT-F)     (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)     (SQFT)


FL1 NE Wall (G.NNE1.E2)                   0.450         45.00        0.060         62.90      0.223           107.90  NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNE1.E4)                   0.000          0.00        0.060        473.20      0.060           473.20  NORTH-EAST
  in space: FL1 Exercise Room
FL1 NE Wall (G.NNW10.E11)                 0.000          0.00        0.060         42.90      0.060            42.90  NORTH-EAST
  in space: FL1 Bike Storage
FL1 NE Wall (G.E22.E24)                   0.000          0.00        0.060        120.25      0.060           120.25  NORTH-EAST
  in space: FL1 Can Wash
FL1 NE Wall (G.NE23.E26)                  0.000          0.00        0.060         68.90      0.060            68.90  NORTH-EAST
  in space: FL1 Dietition's Office
FL1 NE Wall (G.NE24.E27)                  0.000          0.00        0.060        180.05      0.060           180.05  NORTH-EAST
  in space: FL1 Locker Rooms
FL1 NE Wall (G.NNE25.E29)                 0.000          0.00        0.060         95.55      0.060            95.55  NORTH-EAST
  in space: FL1 Toilet B
FL2 NE Wall (G.E1.E1)                     0.000          0.00        0.060        462.15      0.060           462.15  NORTH-EAST
  in space: FL2 Classroom A
FL2 NE Wall (G.N6.E8)                     0.000          0.00        0.060        473.20      0.060           473.20  NORTH-EAST
  in space: FL2 Classroom D
FL2 NE Wall (G.W15.E19)                   0.000          0.00        0.060        113.75      0.060           113.75  NORTH-EAST
  in space: FL2 Classroom E
FL2 NE Wall (G.C18.E20)                   0.450         45.00        0.060         65.50      0.219           110.50  NORTH-EAST
  in space: FL2 Corridor
FL3 NE Wall (G.E1.E1)                     0.000          0.00        0.060        462.15      0.060           462.15  NORTH-EAST
  in space: FL3 Classroom A
FL3 NE Wall (G.N6.E8)                     0.000          0.00        0.060        473.20      0.060           473.20  NORTH-EAST
  in space: FL3 Classroom D
FL3 NE Wall (G.W13.E18)                   0.000          0.00        0.060        113.75      0.060           113.75  NORTH-EAST
  in space: FL3 Classroom E
FL3 NE Wall (G.C16.E19)                   0.450         45.00        0.060         65.50      0.219           110.50  NORTH-EAST
  in space: FL3 Corridor
FL4 NE Wall (G.E1.E1)                     0.000          0.00        0.060        462.15      0.060           462.15  NORTH-EAST
  in space: FL4 Classroom A
FL4 NE Wall (G.N6.E8)                     0.000          0.00        0.060        473.20      0.060           473.20  NORTH-EAST
  in space: FL4 Classroom D
FL4 NE Wall (G.W13.E18)                   0.000          0.00        0.060        113.75      0.060           113.75  NORTH-EAST
  in space: FL4 Classroom E
FL4 NE Wall (G.NE16.E19)                  0.450         45.00        0.060         65.50      0.219           110.50  NORTH-EAST
  in space: FL4 Corridor
FL5 NE Wall (G.N2.E5)                     0.000          0.00        0.060        546.00      0.060           546.00  NORTH-EAST
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  in space: FL5 Classroom B
FL5 NE Wall (G.W9.E22)                    0.000          0.00        0.060        131.25      0.060           131.25  NORTH-EAST
  in space: FL5 Library
FL5 NE Wall (G.NE12.E26)                  0.450         45.00        0.060         82.50      0.198           127.50  NORTH-EAST
  in space: FL5 Corridor
FL5 NE Wall (G.E14.E31)                   0.000          0.00        0.060        533.25      0.060           533.25  NORTH-EAST
  in space: FL5 Boiler Room
R NE Wall (G.E1.E2)                       0.000          0.00        0.060        235.20      0.060           235.20  NORTH-EAST
  in space: R Elevator Machine Room



PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
R NE Wall (G.W4.E11)                      0.000          0.00        0.060        197.40      0.060           197.40  NORTH-EAST
  in space: R Stairs A
Exterior Wall 145                         0.450        180.00        0.060        212.60      0.239           392.60  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 149                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL2 Classroom F
Exterior Wall 150                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL2 Classroom F
FL1 SE Wall (G.SE21.E23)                  0.450         21.00        0.060        219.50      0.095           240.50  SOUTH-EAST
  in space: FL1 Refuse Recycling
FL3 SE Wall (G.SE2.E4)                    0.450        180.00        0.060        200.25      0.245           380.25  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 152                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 153                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL3 Classroom B
Exterior Wall 154                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL3 Classroom B
FL3 SE Wall (G.S3.E7)                     0.450        180.00        0.060        213.90      0.239           393.90  SOUTH-EAST
  in space: FL3 Classroom C
Exterior Wall 143                         0.000          0.00        0.060        175.50      0.060           175.50  SOUTH-EAST
  in space: FL1 Storage
FL3 SE Wall (G.N6.E11)                    0.000          0.00        0.060         40.95      0.060            40.95  SOUTH-EAST
  in space: FL3 Classroom D
FL3 SE Wall (G.W13.E17)                   0.000          0.00        0.060         33.15      0.060            33.15  SOUTH-EAST
  in space: FL3 Classroom E
Exterior Wall 144                         0.450         21.00        0.060         89.50      0.135           110.50  SOUTH-EAST
  in space: FL1 Receiving
FL1 SE Wall (G.NNE1.E3)                   0.000          0.00        0.060         40.95      0.060            40.95  SOUTH-EAST
  in space: FL1 Exercise Room
Exterior Wall 151                         0.450        180.00        0.060        212.60      0.239           392.60  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 155                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL3 Classroom F
Exterior Wall 156                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL3 Classroom F
FL2 SE Wall (G.SE2.E4)                    0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL2 Classroom B
FL4 SE Wall (G.SE2.E4)                    0.450        210.00        0.060        330.15      0.212           540.15  SOUTH-EAST
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  in space: FL4 Classroom B
Exterior Wall 158                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 159                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL4 Classroom B
Exterior Wall 160                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL4 Classroom B
FL4 SE Wall (G.S3.E7)                     0.450        150.00        0.060        243.90      0.209           393.90  SOUTH-EAST
  in space: FL4 Classroom C
Exterior Wall 146                         0.450        180.00        0.060        200.25      0.245           380.25  SOUTH-EAST
  in space: FL2 Classroom B
FL4 SE Wall (G.N6.E11)                    0.000          0.00        0.060         40.95      0.060            40.95  SOUTH-EAST
  in space: FL4 Classroom D
FL4 SE Wall (G.W13.E17)                   0.000          0.00        0.060         33.15      0.060            33.15  SOUTH-EAST
  in space: FL4 Classroom E
Exterior Wall 147                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL2 Classroom B
Exterior Wall 148                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL2 Classroom B


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
Exterior Wall 157                         0.450        120.00        0.060        177.70      0.218           297.70  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 161                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL4 Classroom F
Exterior Wall 162                         0.000          0.00        0.060          0.65      0.060             0.65  SOUTH-EAST
  in space: FL4 Classroom F
FL5 SE Wall (G.SSW1.E3)                   0.450        120.00        0.060        207.00      0.203           327.00  SOUTH-EAST
  in space: FL5 Classroom A
FL2 SE Wall (G.S3.E7)                     0.450        180.00        0.060        213.90      0.239           393.90  SOUTH-EAST
  in space: FL2 Classroom C
FL5 SE Wall (G.N2.E8)                     0.000          0.00        0.060         47.25      0.060            47.25  SOUTH-EAST
  in space: FL5 Classroom B
FL5 SE Wall (G.W9.E21)                    0.000          0.00        0.060         38.25      0.060            38.25  SOUTH-EAST
  in space: FL5 Library
FL1 SE Wall (G.E22.E25)                   0.000          0.00        0.060        132.60      0.060           132.60  SOUTH-EAST
  in space: FL1 Can Wash
FL2 SE Wall (G.N6.E11)                    0.000          0.00        0.060         40.95      0.060            40.95  SOUTH-EAST
  in space: FL2 Classroom D
FL5 SE Wall (G.SE13.E29)                  0.450        240.00        0.060        517.50      0.184           757.50  SOUTH-EAST
  in space: FL5 Classroom D
FL2 SE Wall (G.W15.E18)                   0.000          0.00        0.060         33.15      0.060            33.15  SOUTH-EAST
  in space: FL2 Classroom E
FL5 SE Wall (G.E14.E33)                   0.450        240.00        0.060        471.75      0.192           711.75  SOUTH-EAST
  in space: FL5 Boiler Room
R SE Wall (G.E1.E1)                       0.000          0.00        0.060        355.80      0.060           355.80  SOUTH-EAST
  in space: R Elevator Machine Room
FL1 SE Wall (G.WSW12.E17)                 0.000          0.00        0.060         33.15      0.060            33.15  SOUTH-EAST
  in space: FL1 Supervisory Office
R SE Wall (G.SSE3.E9)                     0.000          0.00        0.060        140.40      0.060           140.40  SOUTH-EAST
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  in space: R Corridor
FL1 SE Wall (G.SSE15.E21)                 0.510        277.50        0.060        626.00      0.199           903.50  SOUTH-EAST
  in space: FL1 Cafeteria
FL2 SE Wall (G.E1.E3)                     0.450        180.00        0.060        206.75      0.242           386.75  SOUTH-EAST
  in space: FL2 Classroom A
FL3 SE Wall (G.E1.E3)                     0.450        180.00        0.060        206.75      0.242           386.75  SOUTH-EAST
  in space: FL3 Classroom A
FL4 SE Wall (G.E1.E3)                     0.450        120.00        0.060        201.10      0.206           321.10  SOUTH-EAST
  in space: FL4 Classroom A
R SW Wall (G.W4.E13)                      0.000          0.00        0.060        309.01      0.060           309.01  SOUTH
  in space: R Stairs A
FL1 SW Wall (G.WSW14.E20)                 0.000          0.00        0.060        139.13      0.060           139.13  SOUTH
  in space: FL1 Boys
FL4 SW Wall (G.NE16.E20)                  0.450         30.00        0.060         74.00      0.173           104.00  SOUTH-WEST
  in space: FL4 Corridor
FL1 SW Wall (G.C28.E30)                   0.000          0.00        0.060         12.35      0.060            12.35  SOUTH-WEST
  in space: FL1 Corridor
FL1 SW Wall (G.SW13.E18)                  0.000          0.00        0.060        104.00      0.060           104.00  SOUTH-WEST
  in space: FL1 Vestibule B
FL1 SW Wall (G.W11.E13)                   0.000          0.00        0.060        150.15      0.060           150.15  SOUTH-WEST
  in space: FL1 Vestibule A
FL5 SW Wall (G.SSW1.E2)                   0.450         30.00        0.060        503.25      0.082           533.25  SOUTH-WEST
  in space: FL5 Classroom A
FL3 SW Wall (G.S3.E6)                     0.450         30.00        0.060        432.15      0.086           462.15  SOUTH-WEST
  in space: FL3 Classroom C
FL2 SW Wall (G.C18.E21)                   0.450         30.00        0.060         74.00      0.173           104.00  SOUTH-WEST
  in space: FL2 Corridor
FL5 SW Wall (G.N2.E7)                     0.000          0.00        0.060        131.25      0.060           131.25  SOUTH-WEST
  in space: FL5 Classroom B


PS 33X Jerome Ave 3                                                             DOE-2.2-48r    8/17/2018   11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                  WEATHER FILE- NEW YORK LAGUARDI NY
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FL2 SW Wall (G.S3.E6)                     0.450         30.00        0.060        432.15      0.086           462.15  SOUTH-WEST
  in space: FL2 Classroom C
FL5 SW Wall (G.W9.E20)                    0.450         90.00        0.060        463.50      0.124           553.50  SOUTH-WEST
  in space: FL5 Library
FL3 SW Wall (G.N6.E10)                    0.000          0.00        0.060        113.75      0.060           113.75  SOUTH-WEST
  in space: FL3 Classroom D
FL1 SW Wall (G.WSW12.E16)                 0.450         90.00        0.060        156.35      0.203           246.35  SOUTH-WEST
  in space: FL1 Supervisory Office
FL4 SW Wall (G.S3.E6)                     0.450         30.00        0.060        432.15      0.086           462.15  SOUTH-WEST
  in space: FL4 Classroom C
FL5 SW Wall (G.NE12.E27)                  0.450         30.00        0.060         90.00      0.158           120.00  SOUTH-WEST
  in space: FL5 Corridor
FL3 SW Wall (G.W13.E16)                   0.450         60.00        0.060        419.70      0.109           479.70  SOUTH-WEST
  in space: FL3 Classroom E
FL1 SW Wall (G.SSE15.E22)                 0.510         52.50        0.060        271.20      0.133           323.70  SOUTH-WEST
  in space: FL1 Cafeteria
FL4 SW Wall (G.N6.E10)                    0.000          0.00        0.060        113.75      0.060           113.75  SOUTH-WEST
  in space: FL4 Classroom D
FL2 SW Wall (G.N6.E10)                    0.000          0.00        0.060        113.75      0.060           113.75  SOUTH-WEST
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  in space: FL2 Classroom D
FL4 SW Wall (G.W13.E16)                   0.450         60.00        0.060        419.70      0.109           479.70  SOUTH-WEST
  in space: FL4 Classroom E
R SW Wall (G.E1.E4)                       0.000          0.00        0.060         55.80      0.060            55.80  SOUTH-WEST
  in space: R Elevator Machine Room
FL1 SW Wall (G.W2.E5)                     0.000          0.00        0.060        113.10      0.060           113.10  SOUTH-WEST
  in space: FL1 Stairs B
FL3 SW Wall (G.C16.E20)                   0.450         30.00        0.060         74.00      0.173           104.00  SOUTH-WEST
  in space: FL3 Corridor
FL2 SW Wall (G.W15.E17)                   0.450         90.00        0.060        389.70      0.134           479.70  SOUTH-WEST
  in space: FL2 Classroom E
R SW Wall (G.SSE3.E8)                     0.000          0.00        0.060         67.84      0.060            67.84  SOUTH-WEST
  in space: R Corridor
FL3 NW Wall (G.N6.E9)                     0.450        150.00        0.060        231.55      0.214           381.55  NORTH-WEST
  in space: FL3 Classroom D
FL4 NW Wall (G.NW7.E12)                   0.450         36.00        0.060        128.45      0.146           164.45  NORTH-WEST
  in space: FL4 Stairs B
FL4 NW Wall (G.NW10.E13)                  0.450        120.00        0.060        355.80      0.159           475.80  NORTH-WEST
  in space: FL4 Staff Lunch / Conf
FL4 NW Wall (G.NW12.E14)                  0.450         36.00        0.060        116.10      0.153           152.10  NORTH-WEST
  in space: FL4 Stairs A
FL4 NW Wall (G.W13.E15)                   0.450        150.00        0.060        232.85      0.213           382.85  NORTH-WEST
  in space: FL4 Classroom E
FL2 NW Wall (G.W15.E16)                   0.450        150.00        0.060        232.85      0.213           382.85  NORTH-WEST
  in space: FL2 Classroom E
FL2 NW Wall (G.E1.E2)                     0.000          0.00        0.060         40.95      0.060            40.95  NORTH-WEST
  in space: FL2 Classroom A
FL3 NW Wall (G.NW7.E12)                   0.450         36.00        0.060        128.45      0.146           164.45  NORTH-WEST
  in space: FL3 Stairs B
FL3 NW Wall (G.NW10.E13)                  0.450         60.00        0.060        201.95      0.150           261.95  NORTH-WEST
  in space: FL3 MDF
FL3 NW Wall (G.NW12.E14)                  0.450         36.00        0.060        116.10      0.153           152.10  NORTH-WEST
  in space: FL3 Stairs A
FL3 NW Wall (G.W13.E15)                   0.450        150.00        0.060        232.85      0.213           382.85  NORTH-WEST
  in space: FL3 Classroom E
FL1 NW Wall (G.W11.E14)                   0.450         50.00        0.060         83.25      0.207           133.25  NORTH-WEST
  in space: FL1 Vestibule A
FL1 NW Wall (G.WSW12.E15)                 0.000          0.00        0.060        139.75      0.060           139.75  NORTH-WEST
  in space: FL1 Supervisory Office


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                   WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
FL5 NW Wall (G.SSW1.E1)                   0.000          0.00        0.060         38.25      0.060            38.25  NORTH-WEST
  in space: FL5 Classroom A
FL1 NW Wall (G.NW4.E7)                    0.450         30.00        0.060        195.55      0.112           225.55  NORTH-WEST
  in space: FL1 Parents/Community
FL1 NW Wall (G.NW5.E8)                    0.000          0.00        0.060        105.95      0.060           105.95  NORTH-WEST
  in space: FL1 Toilet A
FL1 NW Wall (G.NNE25.E28)                 0.000          0.00        0.060         40.95      0.060            40.95  NORTH-WEST
  in space: FL1 Toilet B
FL5 NW Wall (G.N2.E6)                     0.450        150.00        0.060        290.25      0.193           440.25  NORTH-WEST
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  in space: FL5 Classroom B
FL3 NW Wall (G.NW18.E21)                  0.450         90.00        0.060        123.85      0.224           213.85  NORTH-WEST
  in space: FL3 Supervisory
FL2 NW Wall (G.S3.E5)                     0.000          0.00        0.060         33.15      0.060            33.15  NORTH-WEST
  in space: FL2 Classroom C
FL5 NW Wall (G.NW3.E10)                   0.450         36.00        0.060        153.75      0.134           189.75  NORTH-WEST
  in space: FL5 Stairs B
FL5 NW Wall (G.NW6.E14)                   0.450        180.00        0.060        369.00      0.188           549.00  NORTH-WEST
  in space: FL5 Classroom C
FL5 NW Wall (G.NW8.E17)                   0.450         36.00        0.060        139.50      0.140           175.50  NORTH-WEST
  in space: FL5 Stairs A
FL5 NW Wall (G.W9.E19)                    0.450        150.00        0.060        291.75      0.193           441.75  NORTH-WEST
  in space: FL5 Library
FL1 NW Wall (G.NW6.E9)                    0.450         60.00        0.060         77.80      0.230           137.80  NORTH-WEST
  in space: FL1 Exam Room
FL1 NW Wall (G.NW7.E10)                   0.000          0.00        0.060        169.65      0.060           169.65  NORTH-WEST
  in space: FL1 Stairs A
FL3 NW Wall (G.E1.E2)                     0.000          0.00        0.060         40.95      0.060            40.95  NORTH-WEST
  in space: FL3 Classroom A
FL4 NW Wall (G.E1.E2)                     0.000          0.00        0.060         40.95      0.060            40.95  NORTH-WEST
  in space: FL4 Classroom A
FL1 NW Wall (G.NNE1.E1)                   0.450        180.00        0.060        200.90      0.245           380.90  NORTH-WEST
  in space: FL1 Exercise Room
FL2 NW Wall (G.N6.E9)                     0.450        150.00        0.060        231.55      0.214           381.55  NORTH-WEST
  in space: FL2 Classroom D
FL1 NW Wall (G.NNW10.E12)                 0.000          0.00        0.060        109.85      0.060           109.85  NORTH-WEST
  in space: FL1 Bike Storage
FL5 NW Wall (G.E14.E32)                   0.000          0.00        0.060         47.25      0.060            47.25  NORTH-WEST
  in space: FL5 Boiler Room
FL1 NW Wall (G.W2.E6)                     0.000          0.00        0.060        154.05      0.060           154.05  NORTH-WEST
  in space: FL1 Stairs B
FL2 NW Wall (G.NW7.E12)                   0.450         18.00        0.060        146.45      0.103           164.45  NORTH-WEST
  in space: FL2 Stairs B
FL4 NW Wall (G.S3.E5)                     0.000          0.00        0.060         33.15      0.060            33.15  NORTH-WEST
  in space: FL4 Classroom C
R NW Wall (G.E1.E3)                       0.000          0.00        0.060        126.00      0.060           126.00  NORTH-WEST
  in space: R Elevator Machine Room
FL3 NW Wall (G.S3.E5)                     0.000          0.00        0.060         33.15      0.060            33.15  NORTH-WEST
  in space: FL3 Classroom C
R NW Wall (G.NW2.E6)                      0.000          0.00        0.060        229.80      0.060           229.80  NORTH-WEST
  in space: R Elevators
FL2 NW Wall (G.NW11.E13)                  0.450         37.50        0.060         60.65      0.209            98.15  NORTH-WEST
  in space: FL2 Toilet D
FL2 NW Wall (G.NW12.E14)                  0.450        142.50        0.060        235.15      0.208           377.65  NORTH-WEST
  in space: FL2 Reading / Speech Resource
FL4 NW Wall (G.N6.E9)                     0.450        150.00        0.060        231.55      0.214           381.55  NORTH-WEST
  in space: FL4 Classroom D
R NW Wall (G.W4.E12)                      0.000          0.00        0.060        140.40      0.060           140.40  NORTH-WEST
  in space: R Stairs A
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FL2 NW Wall (G.NW14.E15)                  0.450         36.00        0.060        116.10      0.153           152.10  NORTH-WEST
  in space: FL2 Stairs A
FL1 NW Wall (G.WSW14.E19)                 0.000          0.00        0.060         33.15      0.060            33.15  NORTH-WEST
  in space: FL1 Boys
Exterior Wall 173                         0.000          0.00        0.055        284.78      0.055           284.78  FLOOR
  in space: FL1 Servery
Exterior Wall 174                         0.000          0.00        0.055         48.72      0.055            48.72  FLOOR
  in space: FL1 Janitor's Closet
Exterior Wall 167                         0.000          0.00        0.055         65.40      0.055            65.40  FLOOR
  in space: FL1 Vestibule B
Exterior Wall 175                         0.000          0.00        0.055        145.02      0.055           145.02  FLOOR
  in space: FL1 Refuse Recycling
Exterior Wall 164                         0.000          0.00        0.055         97.60      0.055            97.60  FLOOR
  in space: FL1 Bike Storage
Exterior Wall 165                         0.000          0.00        0.055        118.39      0.055           118.39  FLOOR
  in space: FL1 Vestibule A
Exterior Wall 176                         0.000          0.00        0.055         94.35      0.055            94.35  FLOOR
  in space: FL1 Can Wash
Exterior Wall 168                         0.000          0.00        0.055        153.25      0.055           153.25  FLOOR
  in space: FL1 Boys
Exterior Wall 177                         0.000          0.00        0.055         75.67      0.055            75.67  FLOOR
  in space: FL1 Dietition's Office
Exterior Wall 166                         0.000          0.00        0.055        203.71      0.055           203.71  FLOOR
  in space: FL1 Supervisory Office
Exterior Wall 178                         0.000          0.00        0.055        164.66      0.055           164.66  FLOOR
  in space: FL1 Locker Rooms
Exterior Wall 163                         0.000          0.00        0.055       1283.56      0.055          1283.56  FLOOR
  in space: FL1 Exercise Room
Exterior Wall 169                         0.000          0.00        0.055       1981.56      0.055          1981.56  FLOOR
  in space: FL1 Cafeteria
Exterior Wall 179                         0.000          0.00        0.055         74.24      0.055            74.24  FLOOR
  in space: FL1 Toilet B
Exterior Wall 180                         0.000          0.00        0.055        168.42      0.055           168.42  FLOOR
  in space: FL1 Pot Wash
Exterior Wall 181                         0.000          0.00        0.055        541.24      0.055           541.24  FLOOR
  in space: FL1 Prep/Warming
Exterior Wall 170                         0.000          0.00        0.055        125.43      0.055           125.43  FLOOR
  in space: FL1 Girls
Exterior Wall 182                         0.000          0.00        0.055       1182.98      0.055          1182.98  FLOOR
  in space: FL1 Corridor
Exterior Wall 171                         0.000          0.00        0.055         64.16      0.055            64.16  FLOOR
  in space: FL1 Students
Exterior Wall 183                         0.000          0.00        0.055        124.88      0.055           124.88  FLOOR
  in space: FL1 Storage
Exterior Wall 172                         0.000          0.00        0.055         66.73      0.055            66.73  FLOOR
  in space: FL1 Electrical
Exterior Wall 184                         0.000          0.00        0.055         78.62      0.055            78.62  FLOOR
  in space: FL1 Receiving
Exterior Wall 142                         0.000          0.00        0.032        103.10      0.032           103.10  ROOF
  in space: FL1 Stairs B
FL5 Roof (G.NW3.E11)                      0.000          0.00        0.032        349.14      0.032           349.14  ROOF
  in space: FL5 Stairs B
FL5 Roof (G.C4.E12)                       0.000          0.00        0.032        119.15      0.032           119.15  ROOF
  in space: FL5 Toilet A
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FL5 Roof (G.E14.E34)                      0.000          0.00        0.032       1339.73      0.032         1339.73  ROOF
  in space: FL5 Boiler Room
FL5 Roof (G.C15.E35)                      0.000          0.00        0.032        347.11      0.032          347.11  ROOF
  in space: FL5 Closets



PS 33X Jerome Ave 3                                                             DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                                  WEATHER FILE- NEW YORK LAGUARDI NY
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FL5 Roof (G.C5.E13)                       0.000          0.00        0.032         79.60      0.032           79.60  ROOF
  in space: FL5 Toilet B
FL5 Roof (G.W9.E23)                       0.000          0.00        0.032        901.06      0.032          901.06  ROOF
  in space: FL5 Library
FL5 Roof (G.C10.E24)                      0.000          0.00        0.032        107.72      0.032          107.72  ROOF
  in space: FL5 Toilet C
FL5 Roof (G.C11.E25)                      0.000          0.00        0.032         61.79      0.032           61.79  ROOF
  in space: FL5 Elec
R Roof (G.E1.E5)                          0.000          0.00        0.032        403.05      0.032          403.05  ROOF
  in space: R Elevator Machine Room
FL5 Roof (G.SSW1.E4)                      0.000          0.00        0.032        774.99      0.032          774.99  ROOF
  in space: FL5 Classroom A
R Roof (G.NW2.E7)                         0.000          0.00        0.032        178.10      0.032          178.10  ROOF
  in space: R Elevators
FL5 Roof (G.NW6.E15)                      0.000          0.00        0.032        679.47      0.032          679.47  ROOF
  in space: FL5 Classroom C
FL5 Roof (G.NE12.E28)                     0.000          0.00        0.032        430.18      0.032          430.18  ROOF
  in space: FL5 Corridor
R Roof (G.SSE3.E10)                       0.000          0.00        0.032         65.54      0.032           65.54  ROOF
  in space: R Corridor
Exterior Wall 141                         0.000          0.00        0.032        298.98      0.032          298.98  ROOF
  in space: FL5 Corridor
FL5 Roof (G.N2.E9)                        0.000          0.00        0.032        949.20      0.032          949.20  ROOF
  in space: FL5 Classroom B
FL5 Roof (G.SE13.E30)                     0.000          0.00        0.032       1795.27      0.032         1795.27  ROOF
  in space: FL5 Classroom D
R Roof (G.W4.E14)                         0.000          0.00        0.032        298.70      0.032          298.70  ROOF
  in space: R Stairs A
C Flr (B.NNE1.U1)                         0.000          0.00        0.010        414.75      0.010          414.75  UNDERGRND
  in space: C Gas Meter Room
C NW Wall (B.NNE1.U2)                     0.000          0.00        0.060        142.20      0.060          142.20  UNDERGRND
  in space: C Gas Meter Room
C NE Wall (B.NNE1.U3)                     0.000          0.00        0.060        420.00      0.060          420.00  UNDERGRND
  in space: C Gas Meter Room
C Flr (B.W2.U4)                           0.000          0.00        0.010        281.18      0.010          281.18  UNDERGRND
  in space: C Mech Equipment Room
C SW Wall (B.W2.U5)                       0.000          0.00        0.060        104.40      0.060          104.40  UNDERGRND
  in space: C Mech Equipment Room
C NW Wall (B.W2.U6)                       0.000          0.00        0.060        127.80      0.060          127.80  UNDERGRND
  in space: C Mech Equipment Room
C Flr (B.C3.U7)                           0.000          0.00        0.010        130.72      0.010          130.72  UNDERGRND
  in space: C Stairs B
C Flr (B.NW4.U8)                          0.000          0.00        0.010        333.40      0.010          333.40  UNDERGRND
  in space: C Electrical Room
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C NW Wall (B.NW4.U9)                    0.000          0.00         0.060        200.40      0.060            200.40  UNDERGRND
  in space: C Electrical Room
C Flr (B.NW5.U10)                       0.000          0.00         0.010        336.67      0.010            336.67  UNDERGRND
  in space: C Water Service/Sewage Ejector
C NW Wall (B.NW5.U11)                   0.000          0.00         0.060        238.80      0.060            238.80  UNDERGRND
  in space: C Water Service/Sewage Ejector
C Flr (B.C6.U12)                        0.000          0.00         0.010        186.71      0.010            186.71  UNDERGRND
  in space: C Elevators
C Flr (B.W7.U13)                        0.000          0.00         0.010        316.82      0.010            316.82  UNDERGRND
  in space: C Stairs A
C SW Wall (B.W7.U14)                    0.000          0.00         0.060        117.60      0.060            117.60  UNDERGRND
  in space: C Stairs A
C NW Wall (B.W7.U15)                    0.000          0.00         0.060        138.00      0.060            138.00  UNDERGRND
  in space: C Stairs A
C Flr (B.SW8.U16)                       0.000          0.00         0.010        347.15      0.010            347.15  UNDERGRND
  in space: C Sprinkler Booster Pump


PS 33X Jerome Ave 3                                                        DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                             WEATHER FILE- NEW YORK LAGUARDI NY
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                   - - - W I N D O W S - - -    - - - - W A L L - - - -   -W A L L + W I N D O W S-
SURFACE                                U-VALUE          AREA       U-VALUE         AREA      U-VALUE           AREA    AZIMUTH
                                   (BTU/HR-SQFT-F)     (SQFT)  (BTU/HR-SQFT-F)    (SQFT)  (BTU/HR-SQFT-F)     (SQFT)


C SE Wall (B.SW8.U17)                   0.000          0.00         0.060        157.20      0.060            157.20  UNDERGRND
  in space: C Sprinkler Booster Pump
C NW Wall (B.SW8.U18)                   0.000          0.00         0.060        157.20      0.060            157.20  UNDERGRND
  in space: C Sprinkler Booster Pump
C SW Wall (B.SW8.U19)                   0.000          0.00         0.060        318.00      0.060            318.00  UNDERGRND
  in space: C Sprinkler Booster Pump
C Flr (B.SE9.U20)                       0.000          0.00         0.010        758.28      0.010            758.28  UNDERGRND
  in space: C Corridor
C NE Wall (B.SE9.U21)                   0.000          0.00         0.060        120.00      0.060            120.00  UNDERGRND
  in space: C Corridor
C SE Wall (B.SE9.U22)                   0.000          0.00         0.060        847.20      0.060            847.20  UNDERGRND
  in space: C Corridor


PS 33X Jerome Ave 3                                                        DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-D Details of Exterior Surfaces                                             WEATHER FILE- NEW YORK LAGUARDI NY
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                           AVERAGE             AVERAGE         AVERAGE U-VALUE        WINDOW         WALL          WINDOW+WALL
                    U-VALUE/WINDOWS     U-VALUE/WALLS       WALLS+WINDOWS         AREA           AREA             AREA
                    (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)     (BTU/HR-SQFT-F)       (SQFT)         (SQFT)           (SQFT)
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NORTH-EAST               0.450               0.060               0.074             225.00        6113.15          6338.15

SOUTH-EAST               0.456               0.060               0.192            2959.50        5947.05          8906.55

SOUTH                    0.000               0.060               0.060               0.00         448.14           448.14

SOUTH-WEST               0.455               0.060               0.106             682.50        5207.59          5890.09

NORTH-WEST               0.450               0.060               0.166            2420.00        6481.35          8901.35

FLOOR                    0.000               0.055               0.055               0.00        7143.36          7143.36

ROOF                     0.000               0.032               0.032               0.00        9281.85          9281.85

ALL WALLS                0.453               0.060               0.141            6287.00       24197.28         30484.29

    WALLS+ROOFS          0.453               0.052               0.116            6287.00       33479.14         39766.14

    UNDERGRND            0.000               0.035               0.035               0.00        6194.48          6194.48

BUILDING                 0.453               0.051               0.098            6287.00       46816.96         53103.97


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF WINDOWS 123

(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME    CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES         AREA        U-VALUE
NAME                            MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

Window 1                               1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 2                               1.0        90.00    7.50  12.00      17.30     2.50     0.00    0.00   0.384   0.000
Window 121                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 5                               1.0        30.00    7.50   4.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 3                               1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 7                               1.0        50.00    8.00   6.25       0.00     0.00     0.00    0.00   0.384   0.000
Window 75                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 77                              1.0        52.50    7.50   7.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 78                              1.0        52.50    7.50   7.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 79                              1.0        52.50    7.50   7.00      32.75     2.50     0.00    0.00   0.384   0.000
Window 80                              1.0        52.50    7.50   7.00      46.75     2.50     0.00    0.00   0.384   0.000
Window 81                              1.0        67.50    7.50   9.00      58.75     2.50     0.00    0.00   0.384   0.000
Window 76                              1.0        52.50    7.50   7.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 82                              1.0        21.00    7.00   3.00      14.00     0.00     0.00    0.00   0.384   0.000
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Window 126                             1.0        21.00    7.00   3.00       1.00     0.00     0.00    0.00   0.384   0.000
Window 90                              1.0        90.00    7.50  12.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 91                              1.0        90.00    7.50  12.00      17.00     2.50     0.00    0.00   0.384   0.000
Window 131                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 132                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 74                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 84                              1.0        90.00    7.50  12.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 85                              1.0        90.00    7.50  12.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 8                               1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 9                               1.0        60.00    7.50   8.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 10                              1.0        60.00    7.50   8.00      21.35     2.50     0.00    0.00   0.384   0.000
Window 44                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 11                              1.0        37.50    7.50   5.00       2.55     2.50     0.00    0.00   0.384   0.000
Window 12                              1.0        52.50    7.50   7.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 13                              1.0        90.00    7.50  12.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 51                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 58                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 14                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 15                              1.0        60.00    7.50   8.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 16                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 62                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 66                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 122                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 70                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 127                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 128                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 98                              1.0        90.00    7.50  12.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 99                              1.0        90.00    7.50  12.00      17.00     2.50     0.00    0.00   0.384   0.000
Window 94                              1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 95                              1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 73                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 92                              1.0        90.00    7.50  12.00       3.75     2.50     0.00    0.00   0.384   0.000
Window 93                              1.0        90.00    7.50  12.00      17.75     2.50     0.00    0.00   0.384   0.000
Window 17                              1.0        60.00    7.50   8.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 18                              1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------

(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB   FRAME    CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES       AREA          U-VALUE
NAME                            MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)      (SQFT )    (BTU/HR-SQFT-F)

Window 19                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 45                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 49                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 27                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 28                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
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Window 52                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 57                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 29                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 30                              1.0        30.00    7.50   4.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 31                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 61                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 65                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 123                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 69                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 26                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 129                             1.0        90.00    7.50  12.00       2.75     2.50     0.00    0.00   0.384   0.000
Window 130                             1.0        90.00    7.50  12.00      16.75     2.50     0.00    0.00   0.384   0.000
Window 109                             1.0        60.00    7.50   8.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 110                             1.0        60.00    7.50   8.00      14.00     2.50     0.00    0.00   0.384   0.000
Window 103                             1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 104                             1.0        60.00    7.50   8.00       6.00     2.50     0.00    0.00   0.384   0.000
Window 105                             1.0        60.00    7.50   8.00      19.00     2.50     0.00    0.00   0.384   0.000
Window 135                             1.0        60.00    7.50   8.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 72                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 100                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 101                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 102                             1.0        30.00    7.50   4.00      26.30     2.50     0.00    0.00   0.384   0.000
Window 20                              1.0        60.00    7.50   8.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 21                              1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000
Window 22                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 46                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 50                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 38                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 39                              1.0        30.00    7.50   4.00      10.50     2.50     0.00    0.00   0.384   0.000
Window 40                              1.0        30.00    7.50   4.00      18.50     2.50     0.00    0.00   0.384   0.000
Window 41                              1.0        30.00    7.50   4.00      26.50     2.50     0.00    0.00   0.384   0.000
Window 53                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 56                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 32                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 33                              1.0        60.00    7.50   8.00       8.50     2.50     0.00    0.00   0.384   0.000
Window 34                              1.0        60.00    7.50   8.00      20.50     2.50     0.00    0.00   0.384   0.000
Window 60                              1.0        30.00    7.50   4.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 64                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 124                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 68                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 133                             1.0        60.00    7.50   8.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 134                             1.0        60.00    7.50   8.00      11.00     2.50     0.00    0.00   0.384   0.000
Window 71                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 111                             1.0        60.00    7.50   8.00       3.80     2.50     0.00    0.00   0.384   0.000
Window 112                             1.0        60.00    7.50   8.00      13.80     2.50     0.00    0.00   0.384   0.000
Window 23                              1.0        30.00    7.50   4.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 24                              1.0        60.00    7.50   8.00      10.50     2.50     0.00    0.00   0.384   0.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS          IN SURFACE    FRAME    CURB FRAME     CURB
WINDOW                                             AREA  HEIGHT  WIDTH         COORDINATES         AREA         U-VALUE
NAME                            MULTIPLIER      (SQFT )    (FT)   (FT)     X (FT)   Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

Window 25                              1.0        60.00    7.50   8.00      21.35     2.50     0.00    0.00   0.384   0.000
Window 47                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 48                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 42                              1.0        90.00    7.50  12.00       2.50     2.50     0.00    0.00   0.384   0.000
Window 43                              1.0        90.00    7.50  12.00      18.50     2.50     0.00    0.00   0.384   0.000
Window 54                              1.0        18.00    3.00   6.00       3.00     0.00     0.00    0.00   0.384   0.000
Window 55                              1.0        18.00    3.00   6.00       3.00    10.00     0.00    0.00   0.384   0.000
Window 35                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 36                              1.0        60.00    7.50   8.00      12.50     2.50     0.00    0.00   0.384   0.000
Window 37                              1.0        30.00    7.50   4.00      24.50     2.50     0.00    0.00   0.384   0.000
Window 59                              1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 63                              1.0        30.00    7.50   4.00      30.00     2.50     0.00    0.00   0.384   0.000
Window 125                             1.0        45.00    7.50   6.00       1.00     2.50     0.00    0.00   0.384   0.000
Window 67                              1.0        30.00    7.50   4.00       2.00     2.50     0.00    0.00   0.384   0.000
Window 113                             1.0        60.00    7.50   8.00       4.50     2.50     0.00    0.00   0.384   0.000
Window 114                             1.0        60.00    7.50   8.00      14.50     2.50     0.00    0.00   0.384   0.000
Window 115                             1.0        60.00    7.50   8.00      26.50     2.50     0.00    0.00   0.384   0.000
Window 116                             1.0        60.00    7.50   8.00      36.50     2.50     0.00    0.00   0.384   0.000
Window 117                             1.0        60.00    7.50   8.00       0.00     2.50     0.00    0.00   0.384   0.000
Window 118                             1.0        60.00    7.50   8.00      10.00     2.50     0.00    0.00   0.384   0.000
Window 119                             1.0        60.00    7.50   8.00      24.00     2.50     0.00    0.00   0.384   0.000
Window 120                             1.0        60.00    7.50   8.00      36.00     2.50     0.00    0.00   0.384   0.000


                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 1                              0.00        0.39          1               0.450       0.680     0.878     1.000
Window 2                              0.00        0.39          1               0.450       0.680     0.878     1.000
Window 121                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 5                              0.00        0.39          1               0.450       0.680     0.878     1.000
Window 3                              0.00        0.39          1               0.450       0.680     0.878     1.000
Window 7                              0.00        0.39          1               0.450       0.680     0.878     1.000
Window 75                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 77                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 78                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 79                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 80                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 81                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 76                             0.00        0.39          1               0.510       0.680     0.878     1.000
Window 82                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 126                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 90                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 91                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 131                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 132                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 74                             0.00        0.39          1               0.450       0.680     0.878     1.000
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Window 84                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 85                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 8                              0.00      0.39          1               0.450       0.680     0.878     1.000
Window 9                              0.00      0.39          1               0.450       0.680     0.878     1.000



PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
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                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 10                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 44                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 11                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 12                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 13                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 51                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 58                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 14                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 15                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 16                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 62                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 66                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 122                            0.00      0.39          1               0.450       0.680     0.878     1.000
Window 70                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 127                            0.00      0.39          1               0.450       0.680     0.878     1.000
Window 128                            0.00      0.39          1               0.450       0.680     0.878     1.000
Window 98                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 99                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 94                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 95                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 73                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 92                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 93                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 17                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 18                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 19                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 45                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 49                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 27                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 28                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 52                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 57                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 29                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 30                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 31                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 61                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 65                             0.00      0.39          1               0.450       0.680     0.878     1.000
Window 123                            0.00      0.39          1               0.450       0.680     0.878     1.000
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Window 69                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 26                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 129                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 130                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 109                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 110                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 103                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 104                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 105                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 135                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 72                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 100                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 101                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 102                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 20                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 21                             0.00        0.39          1               0.450       0.680     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-H Details of Windows                                                             WEATHER FILE- NEW YORK LAGUARDI NY
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------


                                                 GLASS     NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                             SETBACK     SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                  (FT)       COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

Window 22                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 46                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 50                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 38                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 39                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 40                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 41                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 53                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 56                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 32                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 33                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 34                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 60                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 64                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 124                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 68                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 133                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 134                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 71                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 111                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 112                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 23                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 24                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 25                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 47                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 48                             0.00        0.39          1               0.450       0.680     0.878     1.000
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Window 42                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 43                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 54                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 55                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 35                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 36                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 37                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 59                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 63                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 125                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 67                             0.00        0.39          1               0.450       0.680     0.878     1.000
Window 113                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 114                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 115                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 116                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 117                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 118                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 119                            0.00        0.39          1               0.450       0.680     0.878     1.000
Window 120                            0.00        0.39          1               0.450       0.680     0.878     1.000


PS 33X Jerome Ave 3                                                              DOE-2.2-48r    8/17/2018    11:11:54  BDL RUN  1

REPORT- LV-I Details of Constructions                                                       WEATHER FILE- NEW YORK LAGUARDI NY
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NUMBER OF CONSTRUCTIONS  10          DELAYED   8     QUICK   2


                                  U-VALUE                  SURFACE               NUMBER OF
    CONSTRUCTION                                SURFACE  ROUGHNESS    SURFACE     RESPONSE
    NAME                  (BTU/HR-SQFT-F)   ABSORPTANCE      INDEX    TYPE         FACTORS

C EWall Construction                0.062          0.70          3    QUICK              0
C Ceilg Construction                0.141          0.70          3    DELAYED            4
C IWall Construction                0.141          0.70          3    DELAYED            4
C IFlr Construction                 0.813          0.70          3    DELAYED            5
C IFlSP Construction                0.813          0.70          3    DELAYED            5
FL1 GFlr Construction               0.056          0.70          3    DELAYED           23
FL1 GFlSP Construction              0.056          0.70          3    DELAYED           23
FL5 Roof Construction               0.032          0.60          1    QUICK              0
C UFCons (B.NNE1.U2)                0.010          0.70          3    DELAYED           52
C UWCons (B.NNE1.U2)                0.060          0.70          3    DELAYED           27
```

PS-347X SCHOOL

COOLING AND HEATING LOAD CALCULATIONS

60% DESIGN SUBMISSION

Prepared By: DVL consulting Engineer, Inc
375 Main Street
Hackensack, NJ 07601

DVL#756 **4/26/2018**

DESIGN PARAMETERS

INDOOR AMBIENT DESIGN PARAMETERS FOR ASSEMBLY SPACES:

Summer: 78°F (DB) / 50% RH

Winter: 72°F (DB)

INDOOR AMBIENT DESIGN PARAMETERS FOR CLASSROOMS AND OFFICES:

Summer: 78°F (DB) / 50% RH

Winter: 72°F (DB)

OUTDOOR DESIGN PARAMETERS FOR AIR HANDLERS (AHU):

Summer: 89°F (DB) / 73°F (WB)

Winter: 11°F (DB)

THERMAL TRANSMITTANCE U-FACTORS:

U-FACTOR (WINDOW)	0.42
U-FACTOR (WALL)	0.056
U-FACTOR (ROOF)	0.031

SOLAR HEAT GAIN COEFFICIENT:

SHGC	0.38

2400 Jerome Avenue Bronx, NY 10468
Heating Calculation for the Size of Boilers

DVL#: **756.00** **Date:** **3/14/2018**

New Building:

1. Instantaneous Block Heating Load and Conductive Heat Load

A. Conductive Heat Load:

(Total Glass Area) X (Glass "U") X 61
5,422 X 0.42 X 61 = 138,912 BTU/HR

(Total Exterioor Wall Area) X (Wall "U") X 61
22,408 X 0.056 X 61 = 76,546 BTU/HR

(Total Roof Area) X (Roof "U") X 61
9,674 X 0.031 X 61 = 18,294 BTU/HR

(Ventilation Air, cfm) X 1.085 x 61 °F
13,620 X 1.085 X 61 = 901,440 BTU/HR

B. Total Block Heating Load 1,135,191 BTU/HR

C. Total Building Heating Load 1,135,191 BTU/HR

2. Heating Safety Fac 25%

3. Total Heating Load 1,135,191 BTU/HR X 1.25 = 1,418,988 BTU/HR

4. As per SCA HVAC Design Standard No. 6.2.13 - Two (2) Boilers, each sized for 75% of building total heating load shall be provided for the school.

One (1) Boiler Minimum
Net Capacity: 1,418,988 X 0.75 = 1,064,241 BTU/HR

LWT = 155 °F
EWT = 125°F

Heating Calculation for the Size of Boilers

Notes: 1. The "U" values considered in this calculations are: Glass 0.42, Wall 0.056, Roof 0.031.

2. The boiler sizing is in compliance with SCA standards
Section: 6.2.13 Sizing of Equipment.

PS 347X-Bronx Standalone Annex

Load Calculations for the Chiller

DVL#: 756 **Date: 3/13/2018**

SYSTEM	TOTAL COOLING LOAD	
AHU-1 (O.A = 5500 CFM)	389 MBH*	32 TONS*
AHU-2 (O.A = 5800 CFM)	433 MBH*	36 TONS*
AHU-3 (O.A = 2000 CFM)	218 MBH*	18 TONS*
Total	1040 MBH	87 TONS

Cooling Safety Factor (considering reduction of cooling capacity after several years of service): add 10%

Total Cooling Load: 87 x1.10 95 TONS

Actual Capacity = 133.9 TONS (Based on Air Stack Modular Air Cooled Chiller)

***BASED ON PERFORMANCE DATA SHEET OF SELECTED EQUIPMENT.**

****BASED ON COOLING LOAD CALCULATIONS.**

System Checksums

By DVL

AHU-1

VAV w/Baseboard Heating

COOLING COIL PEAK / CLG SPACE PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 89 / 73 / 97

CLG SPACE PEAK: Mo/Hr: 8 / 10
OADB: 79

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads						
Skylite Solar	0	0	0	0	0	0
Skylite Cond	0	0	0	0	0	0
Roof Cond	0	0	0	0	0	0
Glass Solar	61,434	0	61,434	12	101,951	40
Glass Cond	14,083	0	14,083	3	3,398	1
Wall Cond	7,479	3,929	11,409	2	4,872	2
Partition	0		0	0	0	0
Exposed Floor	0		0	0	0	0
Infiltration	0		0	0	0	0
Sub Total ==>	82,996	3,929	86,925	17	110,221	43
Internal Loads						
Lights	42,349	10,587	52,936	10	42,349	17
People	131,950		131,950	25	79,170	31
Misc	16,200	0	16,200	3	16,200	6
Sub Total ==>	190,499	10,587	201,086	39	137,719	54
Ceiling Load	4,182	-4,182	0	0	3,574	1
Ventilation Load	0	0	210,689	41	0	0
Dehumid. Ov Sizing			0	0		
Ov/Undr Sizing	2,348		2,348	0	4,385	2
Exhaust Heat		-11,535	-11,535	-2		
Sup. Fan Heat			16,175	3		
Ret. Fan Heat		12,940	12,940	2		
Duct Heat Pkup		0	0	0		
Reheat at Design			0	0		
Grand Total ==>	280,025	11,740	518,629	100.00	255,899	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 11

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass Cond	-65,056	-65,056	12.78
Wall Cond	-10,691	-16,445	3.23
Partition	0	0	0.00
Exposed Floor	0	0	0.00
Infiltration	-3	-3	0.00
Sub Total ==>	-75,749	-81,504	16.01
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,926	0	0.00
Ventilation Load	0	-367,587	72.23
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		2,361	-0.46
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-62,213	12.22
Additional Reheat		0	0.00
Grand Total ==>	-77,675	-508,943	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	72.0
Plenum	75.9	71.6
Return	76.9	71.6
Ret/OA	82.7	34.2
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Vent	5,406	5,406
Infil	0	0
Supply	12,295	8,766
MinStop/Rh	8,766	8,766
Return	12,295	8,766
Exhaust	5,406	5,406
Rm Exh	0	0
Auxiliary	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	44.0	0.0
cfm/ft²	0.79	0.57
cfm/ton	284.48	
ft²/ton	358.87	
Btu/hr·ft²	33.44	-32.81
No. People	377	

COOLING COIL SELECTION

	Total Capacity		Sens Cap.	Coil Airflow	Enter DB/WB/HR			Leave DB/WB/HR		
	ton	MBh	MBh	cfm	°F	°F	gr/lb	°F	°F	gr/lb
Main Clg	43.2	518.6	337.1	10,918.3	82.7	68.1	79.9	55.0	52.9	56.5
Aux Clg	0.0	0.0	0.0	0	0	0	0	0	0	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	43.2	518.6								

AREAS

	Gross Total	Glass ft²	(%)
Floor	15,510		
Part	0		
ExFlr	0		
Roof	0	0	0
Wall	7,347	2,522	34

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-243.8	0.0	0.0	0.0
Aux Htg	0.0	0	0	0
Preheat	-265.1	5,406	11	55
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-508.9			

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-1 Classroom.trc

PEAK COOLING LOADS

MAIN SYSTEM

By DVL

					SPACE								COIL							
System	Zone	Room		Floor Area ft²	Peak Time Mo/Hr	OA Condition DB °F	OA Condition WB °F	Room Dry Bulb °F	Supply Dry Bulb °F	Space Air Flow cfm	Space Sensible Load Btu/h	Space Latent Load Btu/h	Peak Time Mo/Hr	OA Condition DB °F	OA Condition WB °F	Supply Dry Bulb °F	Coil Airflow cfm	Coil Sensible Load Btu/h	Coil Latent Load Btu/h
		508 Grade 2 E	Peak	773	7/9	79	67	75.0	56.3	824	17,160	3,640	7 /10	81	68	56.3	797	20,796	7,280
		506 Grade 2 E	Peak	756	7/9	79	67	75.0	56.3	822	17,110	3,640	7 /10	81	68	56.3	795	20,727	7,269
		504 Grade 2 SE	Peak	804	9/11	78	63	75.0	56.3	902	18,777	3,920	7 /12	86	70	56.3	823	23,358	9,745
		503 Library SW	Peak	864	9/16	84	66	75.0	56.3	1,162	24,176	3,220	7 /17	88	72	56.3	1,124	32,332	12,895
		408 Grade 1 E	Peak	792	7/9	79	67	75.0	56.3	827	17,216	3,640	7 /10	81	68	56.3	800	20,873	7,292
		406 Grade 1 E	Peak	761	7/9	79	67	75.0	56.3	823	17,125	3,640	7 /10	81	68	56.3	795	20,748	7,272
		404 Grade 1 SE	Peak	804	9/11	78	63	75.0	56.3	862	17,937	3,360	7 /12	86	70	56.3	783	22,261	8,925
		403 Grade 1 SW	Peak	838	9/16	84	66	75.0	56.3	1,043	21,698	3,220	7 /17	88	72	56.3	1,005	28,997	11,903
		3 Floor Corridor	Peak	997	11/13	62	49	75.0	56.3	412	8,573	980	7 /14	89	72	56.3	329	10,225	3,943
		306 Kindergarten E	Peak	917	7/9	79	67	75.0	56.3	918	19,108	3,220	7 /9	79	67	56.3	918	24,214	7,110
		304 Kindergarten SE	Peak	954	8/9	77	64	75.0	56.3	987	20,548	3,360	7 /9	79	67	56.3	982	24,851	7,543
		303 Project Room	Peak	930	9/16	84	66	75.0	56.3	979	20,374	3,220	7 /17	88	72	56.3	941	27,259	11,373
		2 FLoor Corridor	Peak	997	11/13	62	49	75.0	56.3	412	8,573	980	7 /14	89	72	56.3	329	10,225	3,943
		206 Pre-K E	Peak	917	7/9	79	67	75.0	56.3	918	19,108	3,220	7 /9	79	67	56.3	918	24,214	7,110
		204 Pre-K SE	Peak	954	8/9	77	64	75.0	56.3	987	20,548	3,360	7 /9	79	67	56.3	982	24,851	7,543
		203 Kindergarten SW	Peak	930	9/16	84	66	75.0	56.3	979	20,374	3,220	7 /17	88	72	56.3	941	27,259	11,373
		1 Floor Corridor	Peak	1,102	9/18	81	66	75.0	56.3	230	4,791	980	7 /15	89	73	56.3	230	6,999	2,982
		103C Exam Room W	Peak	117	7/18	86	72	75.0	56.3	227	4,717	280	7 /18	86	72	56.3	227	6,346	2,212
		103A Nurse Office	Peak	89	7/18	86	72	75.0	56.3	90	1,871	280	7 /16	89	73	56.3	88	2,577	1,079
		105 Parent Community W	Peak	214	6/18	83	66	75.0	56.3	207	4,303	1,400	7 /15	89	73	56.3	203	5,943	3,197
AHU-1			**Peak**	**15,510**		**79**	**64**	**75.0**	**56.3**	**14,610**	**304,086**	**52,780**		**89**	**73**	**56.3**	**14,008**	**454,321**	**141,989**
AHU-1			**Block**	**15,510**	**8/10**	**79**	**64**	**75.0**	**56.3**	**12,295**	**255,899**	**52,780**	**7 /16**	**89**	**73**	**56.3**	**10,918**	**337,623**	**182,605**

PEAK HEATING LOADS

MAIN SYSTEM

By DVL

	OA Condition	
	DB	WB
Peak Time	°F	°F
Htg Design	11	7

					SPACE				COIL		
System	Zone	Room	Block or Peak	Floor Area ft²	Room Dry Bulb °F	Supply Dry Bulb °F	Space Air Flow cfm	Space Sensible Load Btu/h	Supply Dry Bulb °F	Coil Air Flow cfm	Coil Sensible Load Btu/h
		508 Grade 2 E	Peak	773	72.0	72.0	0	-3,028	72.0	0	-12,403
		506 Grade 2 E	Peak	756	72.0	72.0	0	-3,026	72.0	0	-12,373
		504 Grade 2 SE	Peak	804	72.0	72.0	0	-5,273	72.0	0	-15,531
		503 Library SW	Peak	864	72.0	72.0	0	-6,510	72.0	0	-19,717
		408 Grade 1 E	Peak	792	72.0	72.0	0	-3,030	72.0	0	-12,436
		406 Grade 1 E	Peak	761	72.0	72.0	0	-3,026	72.0	0	-12,382
		404 Grade 1 SE	Peak	804	72.0	72.0	0	-5,273	72.0	0	-15,072
		403 Grade 1 SW	Peak	838	72.0	72.0	0	-6,507	72.0	0	-18,360
		3 Floor Corridor	Peak	997	72.0	72.0	0	-1,708	72.0	0	-6,392
		306 Kindergarten E	Peak	917	72.0	72.0	0	-4,341	72.0	0	-14,780
		304 Kindergarten SE	Peak	954	72.0	72.0	0	-6,455	72.0	0	-17,681
		303 Project Room	Peak	930	72.0	72.0	0	-6,518	72.0	0	-17,648
		2 FLoor Corridor	Peak	997	72.0	72.0	0	-1,708	72.0	0	-6,392
		206 Pre-K E	Peak	917	72.0	72.0	0	-4,341	72.0	0	-14,780
		204 Pre-K SE	Peak	954	72.0	72.0	0	-6,455	72.0	0	-17,681
		203 Kindergarten SW	Peak	930	72.0	72.0	0	-6,518	72.0	0	-17,648
		1 Floor Corridor	Peak	1,102	72.0	72.0	0	-137	72.0	0	-2,754
		103C Exam Room W	Peak	117	72.0	72.0	0	-1,488	72.0	0	-4,066
		103A Nurse Office	Peak	89	72.0	72.0	0	-166	72.0	0	-1,189
		105 Parent Community W	Peak	214	72.0	72.0	0	-2,166	72.0	0	-4,517
AHU-1			**Peak**	**15,510**	**72.0**	**72.0**	**0**	**-77,675**	**72.0**	**0**	**-243,798**
AHU-1			**Block**	**15,510**	**72.0**	**72.0**	**0**	**-77,672**	**72.0**	**0**	**-243,795**

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-1 Classroom.trc

TRACE® 700 v6.0 calculated at 02:30 PM on 04/26/2018
Alternative - 1 Peak Htg Loads Main System Report Page 1 of 1

System Checksums

By DVL

AHU-2

VAV w/Baseboard Heating

COOLING COIL PEAK / CLG SPACE PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 89 / 73 / 97

CLG SPACE PEAK: Mo/Hr: 7 / 17
OADB: 88

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads						
Skylite Solar	0	0	0	0	0	0
Skylite Cond	0	0	0	0	0	0
Roof Cond	0	0	0	0	0	0
Glass Solar	86,499	0	86,499	16	91,955	32
Glass Cond	9,168	0	9,168	2	8,499	3
Wall Cond	6,963	3,175	10,138	2	7,403	3
Partition	0		0	0	0	0
Exposed Floor	0		0	0	0	0
Infiltration	0		0	0	0	0
Sub Total ==>	102,630	3,175	105,805	19	107,857	38
Internal Loads						
Lights	79,597	19,899	99,496	18	79,597	28
People	131,600		131,600	24	78,960	28
Misc	13,200	0	13,200	2	13,200	5
Sub Total ==>	224,397	19,899	244,296	44	171,757	60
Ceiling Load	6,087	-6,087	0	0	6,061	2
Ventilation Load	0	0	191,451	34	0	0
Dehumid. Ov Sizing			0	0		
Ov/Undr Sizing	223		223	0	883	0
Exhaust Heat		-15,266	-15,266	-3		
Sup. Fan Heat			17,214	3		
Ret. Fan Heat		13,771	13,771	2		
Duct Heat Pkup		0	0	0		
Reheat at Design			0	0		
Grand Total ==>	333,337	15,492	557,494	100.00	286,557	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 11

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass Cond	-54,325	-54,325	10.64
Wall Cond	-12,763	-18,709	3.66
Partition	0	0	0.00
Exposed Floor	0	0	0.00
Infiltration	-2	-2	0.00
Sub Total ==>	-67,091	-73,037	14.30
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-1,961	0	0.00
Ventilation Load	0	-391,082	76.59
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		2,723	-0.53
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-49,246	9.64
Additional Reheat		0	0.00
Grand Total ==>	-69,052	-510,642	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	72.0
Plenum	79.3	71.6
Return	80.4	71.6
Ret/OA	84.4	30.2
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Vent	5,751	5,751
Infil	0	0
Supply	11,862	8,417
MinStop/Rh	8,417	8,417
Return	11,862	8,417
Exhaust	5,751	5,751
Rm Exh	0	0
Auxiliary	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	48.5	0.0
cfm/ft²	0.81	0.58
cfm/ton	255.33	
ft²/ton	313.75	
Btu/hr·ft²	38.25	-35.03
No. People	376	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	46.5	557.5	381.3	11,619.5	84.4	69.0	81.6	55.0	53.9	60.3
Aux Clg	0.0	0.0	0.0	0	0	0	0	0	0	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	46.5	557.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	14,576		
Part	0		
ExFlr	0		
Roof	0	0	0
Wall	7,595	2,106	28

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-228.6	0.0	0.0	0.0
Aux Htg	0.0	0	0	0
Preheat	-282.1	5,751	11	55
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-510.6			

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-2 Classroom.trc

TRACE® 700 v6.0 calculated at 03:06 PM on 04/26/2018
Alternative - 1 System Checksums Report Page 1 of 1

PEAK COOLING LOADS

MAIN SYSTEM

By DVL

					SPACE								COIL						
System	**Zone**	**Room**		**Floor Area ft²**	**Peak Time Mo/Hr**	**OA Condition DB °F**	**OA Condition WB °F**	**Room Dry Bulb °F**	**Supply Dry Bulb °F**	**Space Air Flow cfm**	**Space Sensible Load Btu/h**	**Space Latent Load Btu/h**	**Peak Time Mo/Hr**	**OA Condition DB °F**	**OA Condition WB °F**	**Supply Dry Bulb °F**	**Coil Airflow cfm**	**Coil Sensible Load Btu/h**	**Coil Latent Load Btu/h**
		5 Floor Corridor	Peak	997	11/13	62	49	78.0	56.3	471	11,388	980	7 /13	88	71	56.3	404	13,324	4,162
		505 CSD Spec Education W	Peak	637	7/17	88	72	78.0	56.3	969	23,404	2,940	7 /16	89	73	56.3	952	30,051	11,474
		507 Grade 2 NW	Peak	843	7/18	86	72	78.0	56.3	891	21,521	3,220	7 /18	86	72	56.3	891	27,316	10,714
		4 Floor Corridor	Peak	997	11/13	62	49	78.0	56.3	471	11,388	980	7 /13	88	71	56.3	404	13,324	4,162
		410 Grade 1 E	Peak	788	7/9	79	67	78.0	56.3	802	19,369	3,640	7 /10	81	68	56.3	778	22,126	6,762
		412 Grade 1 NE	Peak	796	7/10	81	68	78.0	56.3	817	19,741	3,920	7 /12	86	70	56.3	709	21,924	8,936
		405 Staff Lunch/Conference W	Peak	588	7/17	88	72	78.0	56.3	863	20,844	5,880	7 /16	89	73	56.3	850	26,857	13,480
		407 Grade 1 NW	Peak	843	7/18	86	72	78.0	56.3	891	21,521	3,220	7 /18	86	72	56.3	891	27,316	10,714
		305 Supervisory Office W	Peak	180	7/17	88	72	78.0	56.3	347	8,375	140	7 /16	89	73	56.3	339	10,675	3,194
		307 Kindergarten NW	Peak	921	7/18	86	72	78.0	56.3	844	20,380	3,220	7 /18	86	72	56.3	844	26,000	10,316
		310 Kindergarten NE	Peak	936	7/10	81	68	78.0	56.3	896	21,649	3,360	7 /10	81	68	56.3	896	25,489	6,849
		308 Kindergarten E	Peak	917	7/9	79	67	78.0	56.3	894	21,588	3,220	7 /10	81	68	56.3	857	24,562	6,699
		210 Pre-K NE	Peak	936	7/10	81	68	78.0	56.3	896	21,649	3,360	7 /10	81	68	56.3	896	25,489	6,849
		208 Pre-K E	Peak	923	7/9	79	67	78.0	56.3	895	21,623	3,220	7 /10	81	68	56.3	859	24,594	6,705
		205 Reading/Speech Resorce W	Peak	540	7/17	88	72	78.0	56.3	1,006	24,304	3,920	7 /16	89	73	56.3	990	31,098	12,782
		207 Kindergarten NW	Peak	921	7/18	86	72	78.0	56.3	843	20,375	3,220	7 /18	86	72	56.3	843	25,993	10,315
		109 Exersize Rm NW	Peak	1,268	7/17	88	72	78.0	56.3	1,080	26,083	3,920	7 /16	89	73	56.3	1,064	34,098	13,430
		Basement Corridor	Peak	545	6/20	79	64	78.0	56.3	152	3,668	280	7 /15	89	73	56.3	150	5,137	1,585
AHU-2			**Peak**	**14,576**		**88**	**72**	**78.0**	**56.3**	**14,028**	**338,870**	**52,640**		**89**	**73**	**56.3**	**13,615**	**462,491**	**149,127**
AHU-2			**Block**	**14,576**	**7/17**	**88**	**72**	**78.0**	**56.3**	**11,862**	**286,557**	**52,640**	**7 /16**	**89**	**73**	**56.3**	**11,620**	**381,297**	**176,197**

PEAK HEATING LOADS

MAIN SYSTEM

By DVL

	OA Condition	
	DB	WB
Peak Time	°F	°F
Htg Design	11	7

System	Zone	Room	Block or Peak	Floor Area ft²	SPACE Room Dry Bulb °F	Supply Dry Bulb °F	Space Air Flow cfm	Space Sensible Load Btu/h	COIL Supply Dry Bulb °F	Coil Air Flow cfm	Coil Sensible Load Btu/h
		5 Floor Corridor	Peak	997	72.0	72.0	0	-1,718	72.0	0	-7,079
		505 CSD Spec Education W	Peak	637	72.0	72.0	0	-4,484	72.0	0	-15,499
		507 Grade 2 NW	Peak	843	72.0	72.0	0	-4,783	72.0	0	-14,913
		4 Floor Corridor	Peak	997	72.0	72.0	0	-1,718	72.0	0	-7,079
		410 Grade 1 E	Peak	788	72.0	72.0	0	-3,038	72.0	0	-12,154
		412 Grade 1 NE	Peak	796	72.0	72.0	0	-3,985	72.0	0	-13,277
		405 Staff Lunch/Conference W	Peak	588	72.0	72.0	0	-3,300	72.0	0	-13,111
		407 Grade 1 NW	Peak	843	72.0	72.0	0	-4,783	72.0	0	-14,913
		305 Supervisory Office W	Peak	180	72.0	72.0	0	-2,164	72.0	0	-6,106
		307 Kindergarten NW	Peak	921	72.0	72.0	0	-4,794	72.0	0	-14,386
		310 Kindergarten NE	Peak	936	72.0	72.0	0	-5,299	72.0	0	-15,489
		308 Kindergarten E	Peak	917	72.0	72.0	0	-4,350	72.0	0	-14,511
		210 Pre-K NE	Peak	936	72.0	72.0	0	-5,299	72.0	0	-15,489
		208 Pre-K E	Peak	923	72.0	72.0	0	-4,351	72.0	0	-14,529
		205 Reading/Speech Resorce W	Peak	540	72.0	72.0	0	-4,471	72.0	0	-15,910
		207 Kindergarten NW	Peak	921	72.0	72.0	0	-4,781	72.0	0	-14,371
		109 Exersize Rm NW	Peak	1,268	72.0	72.0	0	-5,659	72.0	0	-17,935
		Basement Corridor	Peak	545	72.0	72.0	0	-74	72.0	0	-1,800
AHU-2			**Peak**	**14,576**	**72.0**	**72.0**	**0**	**-69,052**	**72.0**	**0**	**-228,550**
AHU-2			**Block**	**14,576**	**72.0**	**72.0**	**0**	**-69,050**	**72.0**	**0**	**-228,548**

System Checksums
By DVL

AHU-3

VAV w/Baseboard Heating

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 89 / 73 / 96

CLG SPACE PEAK

Mo/Hr: 8 / 9
OADB: 77

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads						
Skylite Solar	0	0	0	0	0	0
Skylite Cond	0	0	0	0	0	0
Roof Cond	0	0	0	0	0	0
Glass Solar	7,200	0	7,200	4	27,962	28
Glass Cond	2,677	0	2,677	1	342	0
Wall Cond	526	429	955	1	605	1
Partition	0		0	0	0	0
Exposed Floor	0		0	0	0	0
Infiltration	0		0	0	0	0
Sub Total ==>	10,403	429	10,832	6	28,909	29
Internal Loads						
Lights	8,380	2,095	10,475	5	8,380	8
People	55,370		55,370	29	30,870	31
Misc	31,200	0	31,200	16	31,200	31
Sub Total ==>	94,950	2,095	97,045	51	70,450	71
Ceiling Load	461	-461	0	0	399	0
Ventilation Load	0	0	75,997	40	0	0
Dehumid. Ov Sizing			0	0		
Ov/Undr Sizing	0		0	0	0	0
Exhaust Heat		-3,427	-3,427	-2		
Sup. Fan Heat			5,788	3		
Ret. Fan Heat		4,630	4,630	2		
Duct Heat Pkup		0	0	0		
Reheat at Design			0	0		
Grand Total ==>	105,813	3,267	190,865	100.00	99,758	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 11

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass Cond	-12,072	-12,072	10.80
Wall Cond	-911	-1,654	1.48
Partition	0	0	0.00
Exposed Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-12,983	-13,727	12.28
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-743	0	0.00
Ventilation Load	0	0	0.00
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		-98,097	87.72
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Grand Total ==>	-13,727	-111,823	100.00

TEMPERATURES

	Cooling	Heating
SADB	56.3	72.0
Plenum	75.5	71.2
Return	76.5	71.2
Ret/OA	82.9	11.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Vent	2,000	0
Infil	0	0
Supply	4,793	0
MinStop/Rh	0	0
Return	4,793	0
Exhaust	2,000	0
Rm Exh	0	0
Auxiliary	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	41.7	0.0
cfm/ft²	1.56	0.00
cfm/ton	301.34	
ft²/ton	192.95	
Btu/hr·ft²	62.19	-36.44
No. People	147	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	15.9	190.9	121.6	3,906.8	82.9	68.3	80.7	55.0	52.7	55.8
Aux Clg	0.0	0.0	0.0	0	0	0	0	0	0	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	15.9	190.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	3,069		
Part	0		
ExFlr	0		
Roof	0	0	0
Wall	955	468	49

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-13.7	0.0	0.0	0.0
Aux Htg	0.0	0	0	0
Preheat	-98.1	2,000	11	55
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-111.8			

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-3 Dining.trc

TRACE® 700 v6.0 calculated at 03:15 PM on 04/26/2018
Alternative - 1 System Checksums Report Page 1 of 1

PEAK COOLING LOADS

MAIN SYSTEM

By DVL

					SPACE									COIL						
						OA Condition									OA Condition					
System	Zone	Room		Floor Area ft²	Peak Time Mo/Hr	DB °F	WB °F	Room Dry Bulb °F	Supply Dry Bulb °F	Space Air Flow cfm	Space Sensible Load Btu/h	Space Latent Load Btu/h	Peak Time Mo/Hr	DB °F	WB °F	Supply Dry Bulb °F	Coil Airflow cfm	Coil Sensible Load Btu/h	Coil Latent Load Btu/h
		102 Dining Area SE	Peak	1,960	8/9	77	64	75.0	56.3	3,071	63,915	19,600	7 /15	89	73	56.3	2,184	73,583	53,189
		Kitchen	Peak	1,109	7/12	86	70	75.0	56.3	2,000	41,626	4,900	7 /16	89	73	56.3	2,000	48,506	16,352
AHU-3			**Peak**	**3,069**		**77**	**64**	**75.0**	**56.3**	**5,071**	**105,542**	**24,500**		**89**	**73**	**56.3**	**4,184**	**122,062**	**69,541**
AHU-3			**Block**	**3,069**	**8/9**	**77**	**64**	**75.0**	**56.3**	**4,793**	**99,758**	**24,500**	**7 /15**	**89**	**73**	**56.3**	**3,907**	**121,580**	**69,285**

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-3 Dining.trc

TRACE® 700 v6.0 calculated at 03:15 PM on 04/26/2018
Alternative - 1 Peak Clg Loads Main System Report Page 1 of 1

PEAK HEATING LOADS

MAIN SYSTEM

By DVL

	OA Condition	
Peak Time	**DB °F**	**WB °F**
Htg Design	11	7

					SPACE				COIL		
System	**Zone**	**Room**	**Block or Peak**	**Floor Area ft²**	**Room Dry Bulb °F**	**Supply Dry Bulb °F**	**Space Air Flow cfm**	**Space Sensible Load Btu/h**	**Supply Dry Bulb °F**	**Coil Air Flow cfm**	**Coil Sensible Load Btu/h**
		102 Dining Area SE	Peak	1,960	72.0	72.0	0	-13,458	72.0	0	-13,458
		Kitchen	Peak	1,109	72.0	72.0	0	-269	72.0	0	-269
AHU-3			**Peak**	**3,069**	**72.0**	**72.0**	**0**	**-13,727**	**72.0**	**0**	**-13,727**
AHU-3			**Block**	**3,069**	**72.0**	**72.0**	**0**	**-13,727**	**72.0**	**0**	**-13,727**

Project Name: PS-347X
Dataset Name: G:\756 - PS-33X\M\Heating & Cooling Calculations\PS-347X AHU-3 Dining.trc

TRACE® 700 v6.0 calculated at 03:15 PM on 04/26/2018
Alternative - 1 Peak Htg Loads Main System Report Page 1 of 1

Credit Q1.1P: ASHRAE Outdoor Air Assessment

AKRF

AKRF Engineering, P.C.
Environmental and Engineering Consultants
440 Park Avenue South
7th Floor
New York, NY 10016
tel: 212 696-0670
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May 10, 2018

Mr. Bob Kanaparthi
Industrial Hygienist, IEH Division
New York City School Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

Re: **ASHRAE Outdoor Air Assessment**
Proposed P.S. 33X Annex (X347)
2424 Jerome Avenue, Bronx, NY 10468
NYCSCA LLW # 107340; Service ID 68562
AKRF Project No. 80619.46

Dear Mr. Kanaparthi:

At the request of the New York City School Construction Authority (NYCSCA), AKRF Engineering, P.C. (AKRF) conducted an American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) outdoor air assessment for the site of the proposed new annex (X347) to P.S. 33X, located at 2424 Jerome Avenue in the Fordham neighborhood of the Bronx (the "Site"). The assessment was conducted in accordance with the ASHRAE Standard 62.1-2016 (Standard) Section 4.0: Outdoor Air Quality. The assessment was conducted to satisfy the New York City Department of Education/NYCSCA Green Schools Guide Credit Q1.1 R: Minimum IAQ Performance/Increased Ventilation. The assessment consisted of a qualitative evaluation of regional and local air quality, and did not include air sampling, modeling, or other detailed analysis.

Regional Air Quality Compliance Status

Criteria Air Pollutants are those substances for which a National Ambient Air Quality Standard (NAAQS) has been established, as provided in the Clean Air Act. The following table contains a summary of criteria pollutant information for Bronx County provided by the U.S. Environmental Protection Agency's (USEPA) Green Book Non-attainment Areas for Criteria Pollutants website.

	Regional Outdoor Air Quality Pollutants						
	Particulates (PM2.5)	**Particulates (PM10)**	**Carbon Monoxide – 1 hour/8 hours**	**Ozone 8-hour**	**Nitrogen Dioxide**	**Lead**	**Sulfur Dioxide**
Attainment Status	Attainment	Attainment	Attainment	**Non-attainment**	Attainment	Attainment	Attainment

In April 2016, as requested by New York State, USEPA reclassified New York City as a moderate non-attainment area for ozone. Areas classified as moderate non-attainment have 8-hour ozone design value concentrations ranging from 0.086 to 0.100 parts per million (ppm).

Local Survey

Date and Time of Observation

Visual inspection of the Site and adjacent areas was performed on April 4, 2018 by Jacob Menken of AKRF at approximately 10:30 AM.

Site Description

The Site is an approximately 12,300-square foot (SF) asphalt-paved play yard with a track and playground equipment. The Site is being redeveloped by the NYCSCA as an annex for the north-adjacent P.S. 33X. At the time of the inspection, there were no visibility impairments, with weather conditions consisting of overcast skies, 45°F and light winds out of the southeast. AKRF conducted a visual survey of the properties within an approximately 500-foot radius the Site perimeter to inspect for potential point sources of air emissions.

Description of Nearby Facilities

The surrounding properties are a mix of commercial, educational, and residential uses. The Site is bounded to the north by the main P.S. 33X school building, to the south by the existing P.S. 33X annex building (X939), to the east by Walton Avenue, residential properties and a church, and to the west by Jerome Avenue and elevated subway tracks, followed by residential and commercial properties, including a surface parking lot and auto repair shop. A gas station was noted on the south-adjacent block, approximately 500 feet to the south.

Observation of Odors, Irritants, Visible Plumes or Air Contaminants

No odors, irritants, visible plumes or air contaminants were noted during the survey.

Description of Nearby Sources of Vehicle Exhaust

Jerome Avenue, which is a minor arterial roadway with moderate traffic flow, runs north-south, adjacent to the western Site boundary. West Fordham Road, a principal arterial roadway located approximately 450 feet north of the Site, is the nearest roadway with heavy traffic flow.

Description of Nearby Point Sources

Based on a review of USEPA Envirofacts Air Facility System (AFS) database (https://www.epa.gov/enviro/icis-air-search) the following facilities, located within approximately 1,000 feet of the Site, are potential point sources of air emissions:

Site Name	Address	Distance from Site	Air Program Information	Notes
Fordham Auto Plus Inc.	2409 Jerome Avenue Bronx, NY 10468	~180 feet	CAASIP[1] (Operating)	Minor Emissions
2400 Walton Avenue Building	2400 Walton Avenue Bronx, NY 10468	~220 feet	CAASIP[2] (Operating) Title V Permits (Permanently Closed)	Minor Emissions
NYC-HPD 2410 Davidson Ave	2410 Davidson Avenue Bronx, NY 10468	~240 feet	CAASIP[1] (Operating)	Minor Emissions
2400 Davidson Avenue Building	2400 Davidson Avenue Bronx, NY 10468	~280 feet	CAASIP[1] (Operating)	Minor Emissions
Amoco 65425671005	2350 Jerome Avenue Bronx, NY 10468	~500 feet	CAASIP[1] (Operating)	Minor Emissions
2386 Morris Avenue Building	2386 Morris Avenue Bronx, NY 10468	~530 feet	CAASIP[1] (Operating)	Minor Emissions
Kleener King	2439 Creston Avenue Bronx, NY 10468	~640 feet	CAASIP[1] (Operating) CAAMACT (Operating-Perchloroethene)	Minor Emissions
Gaseteria-North Street	2318 Jerome Avenue Bronx, NY 10468	~700 feet	CAASIP[1] (Operating)	Minor Emissions

[1] CAASIP = Clean Air Act State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards

[2] CAAMACT = MACT Standards (40 CFR Part 63)

Discussion and Conclusions

In order to determine the acceptability of outdoor air, the nearby facilities identified during the assessment were evaluated against the following screening criteria[1]:

- Large parking facilities or parking garage exhaust vents adjacent to the Site;
- An atypical (e.g., not at-grade) source of vehicular pollutants, such as a highway or bridge, within 200 feet of the Site;
- A major or large emission source within 1,000 feet of the Site;
- A medical, chemical, or research lab within 400 feet of the Site;
- Manufacturing or processing facilities within 400 feet of the Site; and
- A facility with a New York State Department of Environmental Conservation (NYSDEC) air facility registration within 200 feet the site.

Based on this evaluation and the findings of the local survey, the following source may affect the acceptability of the outdoor air quality at the Site:

- Fordham Auto Plus, an auto repair shop and NYSDEC air registration facility located approximately 180 feet (across Jerome Avenue) from the Site.

Therefore, AKRF recommends conducting further evaluation of emissions from this source to determine whether additional design measures beyond the standard NYCSCA requirements should be incorporated into the HVAC system design for the new annex. Please feel free to contact me at (914) 922-2362 with any questions or concerns.

Sincerely,

Rebecca A. Kinal, P.E
Vice President/Project Manager

---

[1] Based on guidance for evaluation of air quality in the *City Environmental Quality Review Technical Manual* (New York City Mayor's Office of Environmental Coordination, March 2014).

Credit Q1.1P: CFD modeling

PS 347X – Outdoor Air Intake Quality for GSG Prerequisite Q1.1P and LEED v4 EQp1

September 24, 2018

Prepared for: New York City School Construction Authority
Prepared by: Vidaris, Inc.

TABLE OF CONTENTS

TABLE OF FIGURES

Introduction

PS 33X is an existing public school located at 2424 Jerome Avenue, Bronx, New York. A new addition to the adjacent to the existing building is being designed for the New York City School Construction Authority (NYC SCA). The purpose of this analysis is to show that the outdoor air being delivered to the new building occupants meets the minimum requirements of

a) Section 4 of ASHRAE 62.1-2007, as required by 2016 Green Schools Guide (GSG) Prerequisite Q1.1P, "Minimum IAQ Performance", and
b) Section 4 of ASHRAE 62.1-2010, as required by LEED Building Design and Construction v4 (LEED) Prerequisite EQp1, "Minimum IAQ Performance".

Other requirements of the prerequisite are not part of this scope.

Per the prerequisite requirements, the SCA Indoor and Environmental Health (IEH) Unit conducted a site investigation and research during Design Development. For this project, NYC SCA retained AKRF Engineering to prepare an ASHRAE Outdoor Air Assessment Report. The assessment consisted of a qualitative evaluation of regional and local air quality, and did not include air sampling, modeling, or other detailed analysis.

Based on the ASHRAE Outdoor Air Assessment dated May 10, 2018[1], the SCA is concerned that emissions from an auto body shop located nearby can affect the air quality in the school. A copy of the assessment is included in Appendix A.

Vidaris was retained by NYC SCA to conduct computational fluid dynamic (CFD) modeling to estimate the concentrations of pollutants at the outdoor air intake of the school based on this source to determine compliance with GSG and LEED criteria[2]. The concentrations are compared to the EPA criteria pollutants, per ASHRAE 62.1-2007.

Since fluid flow behavior is difficult to predict over a varied topography, Vidaris analyzed different wind speeds and directions. **Based on the CFD modeling, no special filters are required to meet the outdoor air quality requirements of ASHRAE 62.1-2007.**

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[1] ASHRAE Outdoor Air Assessment for Proposed PS 33X Annex (X347) by AKRF Engineering, P.C.

[2] The NYC SCA Green Schools Guide 2016 specifies that the SCA/IEH Unit conducts site investigation and research during Design Development. It is the responsibility of the architect of record or the engineer of record to submit an IEH outdoor air analysis report, and a narrative summarizing the design approach for credit compliance and identifying applicable SCA standards to be incorporated into the design documents. The proposed ventilation system design is to be described, noting any special considerations relating to compliance.

EPA Non-Attainment Areas and Impact on HVAC Design

The first step in considering the effect of site conditions is to check for the status under the Clean Air Act, as determined by the EPA.

The project is located in the Bronx, New York City. On 5/14/16, New York City was defined as a "Moderate ozone non-attainment" area with a 2012-2014 design value of 0.085 ppm and a 2014 4th highest daily maximum 8-hour average of 0.081 ppm. This is less than the 0.107 ppm level where LEED currently recommends employment of air filtration/cleaning to address ozone. Thus, for LEED v4 purposes, special carbon/sorbent filters are not required for ozone mitigation.

According to the ASHRAE Outdoor Air Assessment dated May 10, 2018, the project is not located in an area classified by the EPA as Non-Attainment for Particulate Matter (PM_{10}) and the project is not in a non-attainment area for nitrogen dioxide, sulfur dioxide and lead.

Based on the EPA status for this project region, which does not consider local pollutant sources, no special filtration is required to meet the requirements of ASHRAE 62.1-2007.

Local Pollutant Review

The proposed annex will be located approximately 180 feet from Fordham Auto Plus, an auto body shop. Auto body shops emit volatile organic compounds (VOCs) that are present in the paint solvents and thinners. Emissions from the auto body shop were calculated based on reviewing the materials used to paint vehicles.

Vidaris selected a combination of typical primer, basecoat and clear coat by Nexa Auto Color and reviewed their technical specification document to find out the amount of VOCs present in the paints. An average car requires 3 quarts of primer, 3 quarts of basecoat and 2 quarts of clearcoat. Vidaris assumed that all three coats are applied in an hour. This assumption is conservative since, in reality, this process takes several hours. Please see Appendix B for detailed technical specifications of the paints and calculations for VOCs. Vidaris also assumed that all 7 paint stations in the auto body shop are being used continuously during the peak hour.

New York State Department of Environmental Conservation requires that filters achieving 98% capture efficiency be installed on the exhaust of all spray operations[3]. This analysis assumes that the filers are only 90% efficient.

The proposed site for the annex is also located on Jerome Avenue. Emissions from vehicles were calculated using California's Emissions Factor Inventory (EMFAC2014)[4] and NYSERDA's Inventory of Light Vehicles on New York Roads in 2015. The rate of emissions increases with a decrease in vehicle speed. Moreover, at higher speed the car density is lower because the vehicles must keep a greater distance.

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[3] Environmental Compliance Guide for Auto Body Shops by NYSDEC; December 2009

[4] EMFAC2014 gives data on emissions factors (ROG, TOG, CO, NOX, CO2, PM10, PM2.5) based on vehicle speed and type.

To find the average low speed for vehicles, data from NYC DOT was used. The speed limit on Jerome Avenue is 25 mph[5]. The NYC DOT Mobility Report of October 2016 shows that the average bus speed on Jerome Avenue near the proposed site during evening rush hours (4PM-6PM) is 2-8 mph[6]. Hence 5 mph as the low speed for all vehicles is a reasonable average over a year. An aggregated data for emissions from all vehicle types running at 5 mph was used.

Based on the road length, number of lanes and vehicle distance at 5 mph in the region, a total vehicle population of 136 was estimated. Using the NYSERDA inventory, the Vehicle Miles Travelled was obtained for a total population of 136 vehicles. This was combined with the EMFAC2014 data to get the rate of pollution. Additional information about the pollutant sources and calculations is given in Appendix C.

The average pollution rate by pollutant type is summarized below.

Table 1 Rate of Emissions

Pollutant	Emissions from Jerome Avenue (g/hr)	Emissions from Fordham Auto Plus (g/hr)	Total Emissions (g/hr)
ROG/VOC	251	2754	3005
TOG	342	0	342
CO	2812	0	2812
NOx	267	0	267
CO2	800396	0	800396
PM10	10	0	10
PM2.5	9	0	9

The pollution in the ambient air was modeled as below, using data from NYSDEC and NOAA (see footnotes).

Table 2 Pollution in Ambient Air

Pollutant		
ROG/VOC[7]	12.94	ppb
CO[8]	1.86	ppm
PM10[8]	32	μg/m³
PM2.5[8]	10.3	μg/m³
CO2[9]	404	ppm

Target chemicals such as formaldehyde and others listed in CDPH Standard Methodv1.1, Table 1-4 were not modeled individually.

---

[5] http://www.nyc.gov/html/dot/downloads/pdf/current-pre-vision-zero-speed-limit-maps.pdf

[6] http://www.nyc.gov/html/dot/downloads/pdf/mobility-report-2016-screen-optimized.pdf

[7] https://www.dec.ny.gov/chemical/23781.html

[8] http://www.dec.ny.gov/docs/air_pdf/2016airqualreport.pdf

[9] ftp://aftp.cmdl.noaa.gov/products/trends/co2/co2_annmean_gl.txt

CFD Analysis

Purpose of study

The computational fluid dynamic (CFD) analyses performed to ascertain the possibility of pollution contamination in and around the outside air intake caused by emissions from Fordham Auto Plus and traffic on Jerome Avenue.

Model information

Domain

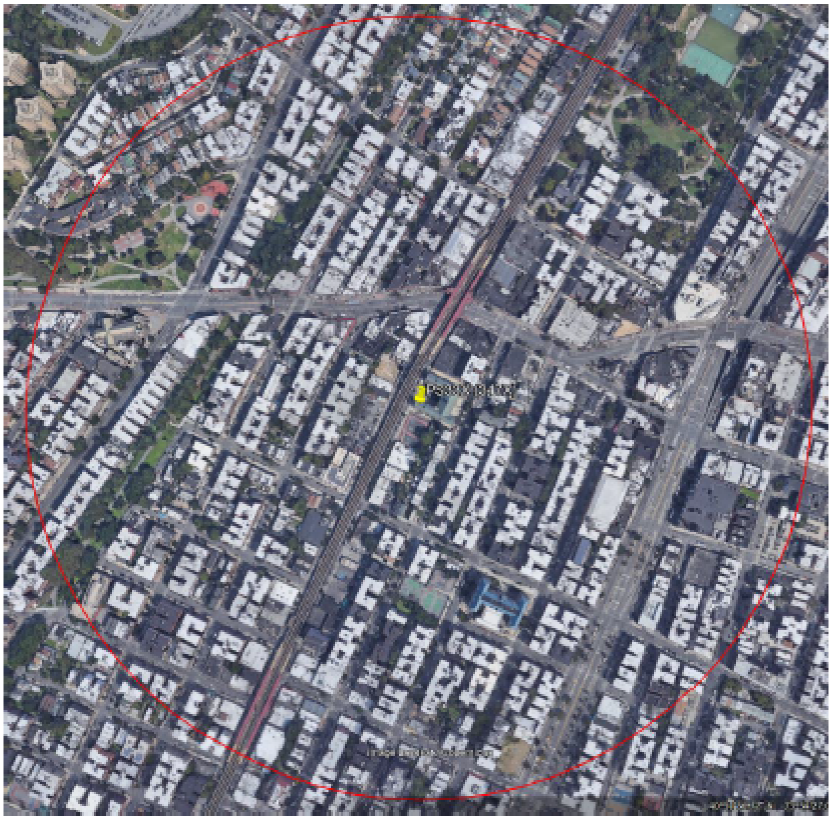


Figure 1 Map showing PS347X and a circle of radius 0.3 miles

Vidaris modeled the building and surrounding topography and neighboring structures within radius of 0.3 miles. The neighboring structures were modeled with a simplified geometry, created by extracting data from Google Earth. The school has 3 air handling units (AHUs) located on the roof. All the units have an outside air intake louver.

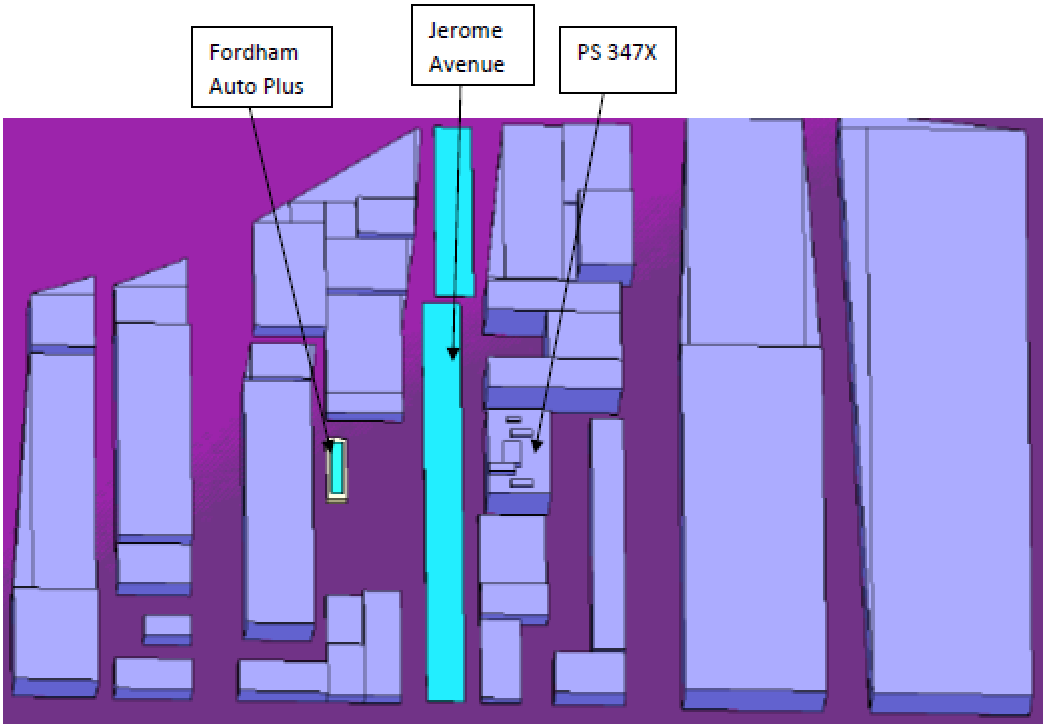


Figure 2 347X and neighboring structures in the CFD model

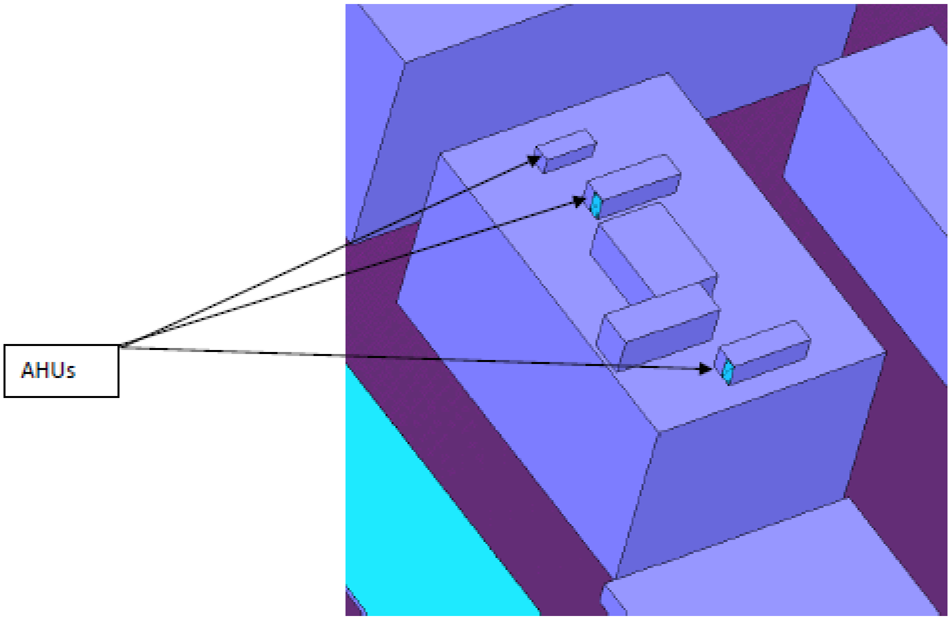


Figure 3 Close-up of the school and HVAC units

Boundary Conditions

The following boundary conditions were used:

- Outdoor air temperature: 15 °F, 89F
- Wind speeds at standard reference point: 2 mph, 7.5mph and 22.5 mph
- Wind orientations: North, South, West, East
- Emissions at steady rate as described in Table 1

The model does not account for infiltration /exfiltration through the building envelope. It focuses on pollutant levels at the OA intakes.

The outdoor air temperature was based on the heating design temperature for NYC from Table D-1 of ASHRAE 90.1.

The standard reference point for wind speed measurements is of 33 ft (10 m) above the ground. The wind speed profile with respect to distance above ground as shown on following figure.

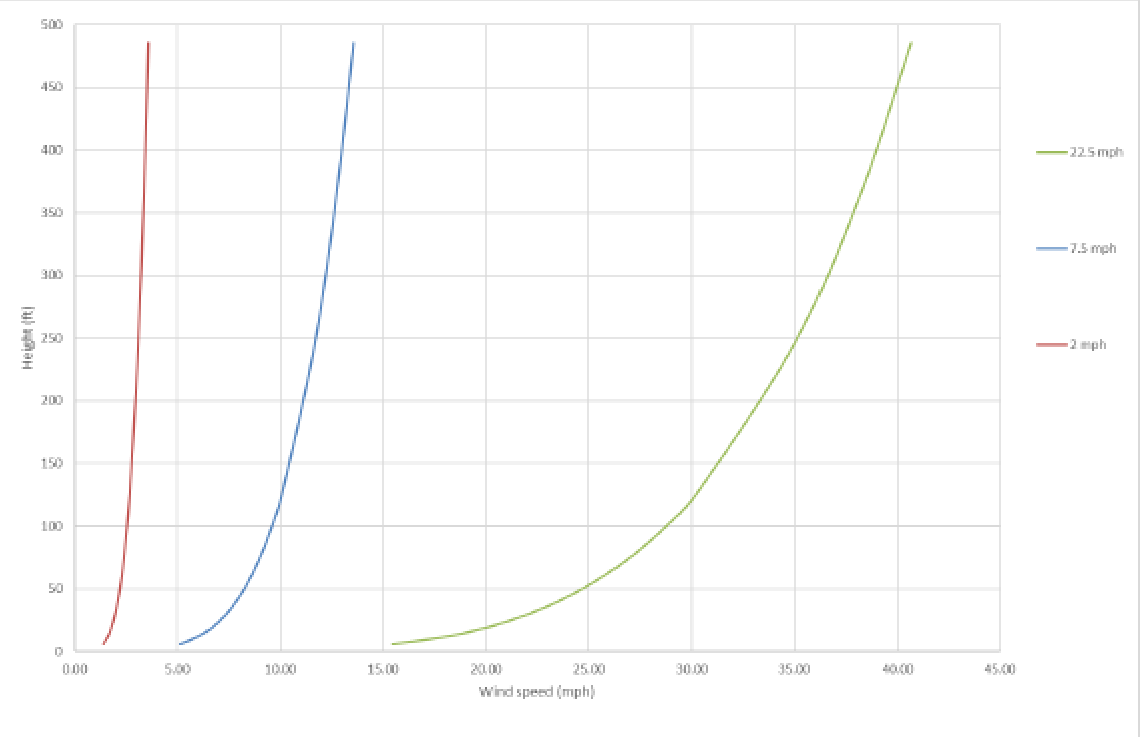


Figure 4 Wind Speed profile for areas exposed to wind flowing over water per chapter 24, ASHRAE Fundamentals 2017. Referenced wind speed is measured 33 feet above the ground: 2 mph, 7.5mph, 22.5 mph.

Results

Summary

The model shows that the pollution levels at the AHU inlets are below the maximum allowed threshold.

Vidaris performed preliminary modeling runs to determine the combination factors which result in the highest risk for contaminants at the inlet of the RTU's. Based on the parametric runs, the risk of contaminants is highest under the following conditions:

- Outdoor air temperature: 89 °F
- Wind speeds at standard reference point: 7.5 mph
- Wind orientation: 65 degrees

Additional information on the parametric runs is provided later in this section. The contaminant levels at the inlet to the AHUs for this condition are summarized in Table 3.

Table 3 Concentration of Pollutants at RTU inlets for Highest Risk Case, 7.5 mph wind, Summer

	Concentration at		
Pollutant	Inlet of AHU-1	Inlet of AHU-2	Inlet of AHU-3
CO (ppm)	2.0	1.9	1.9
PM10 (µg/m³)	33.2	33.0	32.7
PM2.5 (µg/m³)	10.7	10.6	10.5
VOC (µg/m³)	432.3	417.7	244.5
CO_2 (ppm)	419.1	416.3	413.4

The concentrations of individual pollutants were compared against the LEED maximum levels for Indoor Air Quality Assessment.

Table 4 Breakdown of pollutants for Highest Risk Case, 7.5 mph wind, Summer

Pollutant	At inlet of MAU-3	LEED maximum
VOC	432.3 µg/m³	500 µg/m³
CO	2.0 ppm	9 ppm
PM10	33.2 µg/m³	50 µg/m³
PM2.5	10.7 µg/m³	15 µg/m³

The CFD analysis indicates that based on the assumed pollution emissions, the surrounding air meets the air quality requirements of Section 4 of ASHRAE 62.1-2007 and ASHRAE 62.1-2010, necessary for GSG and LEED compliance.

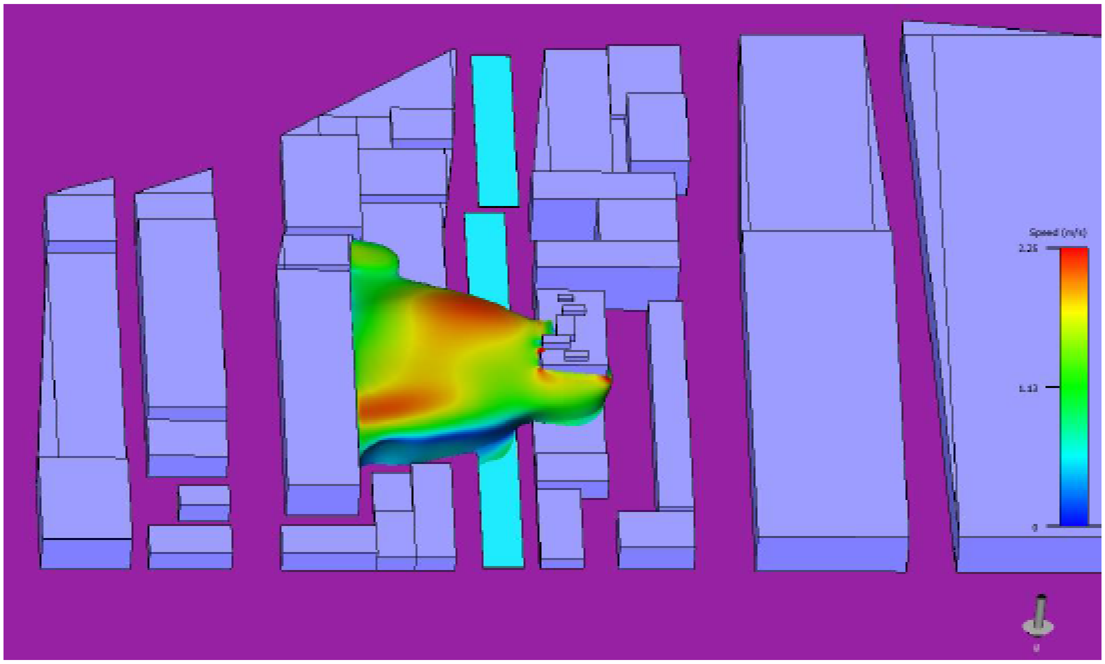


Figure 5 Plot of VOCs at 500 μg/m³ concentration colored by speed, High Risk Conditions

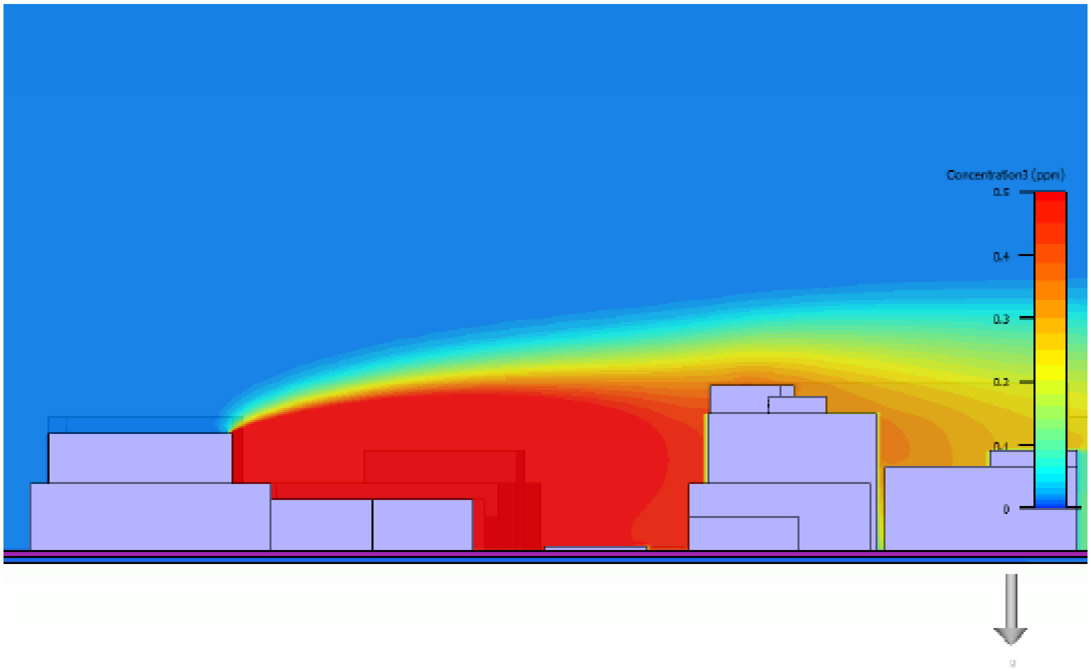


Figure 6 Vertical section at school; Plot of VOC concentration, High Risk Conditions
0.4 PPM equals to 500 μg/m3

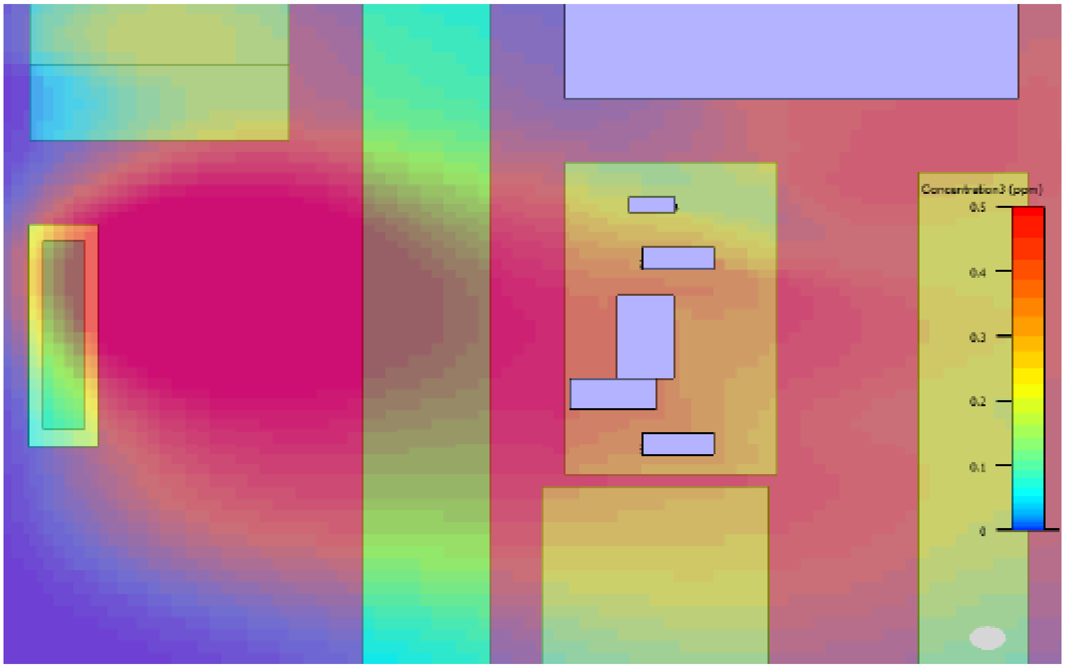


Figure 7 Horizontal section at inlet of AHUs-1,2,3; Plot of VOC concentration, High Risk Conditions
0.4 PPM equals to 500 $\mu g/m^3$

Parametric Runs

Wind Direction

Initially, all four wind orientations (North, South, West, East) were considered. Wind blowing at 65 degrees (straight line from the auto body shop to the school addition) should carry the maximum amount of pollutants to the school. This can also be seen when the map of the area is visually inspected – Fordham Auto plus lies to the north-east of the school addition and that is where most of the pollutants originate. Wind direction was not studied beyond the preliminary stage.

Wind Speed

Three wind speeds (2 mph, 7.5 mph and 22.5 mph) were modeled. Based on the results obtained, it was observed that wind speeds of 7.5 mph lead to much higher concentration of pollutants at one or more of the AHU inlets. The following results were observed:

- Wind speed of 2 mph does not have enough energy to reach over the taller building behind the auto body shop -- and then to pull with much force the pollutants towards to school
- Wind speed of 7.5 mph leads to the highest concentration of pollutants, which was observed at the inlet to AHU-1.
- The 22.5 mph wind speed dissipates the pollutants.

Table 5 Results for different wind speed (wind blowing at 65 degrees)

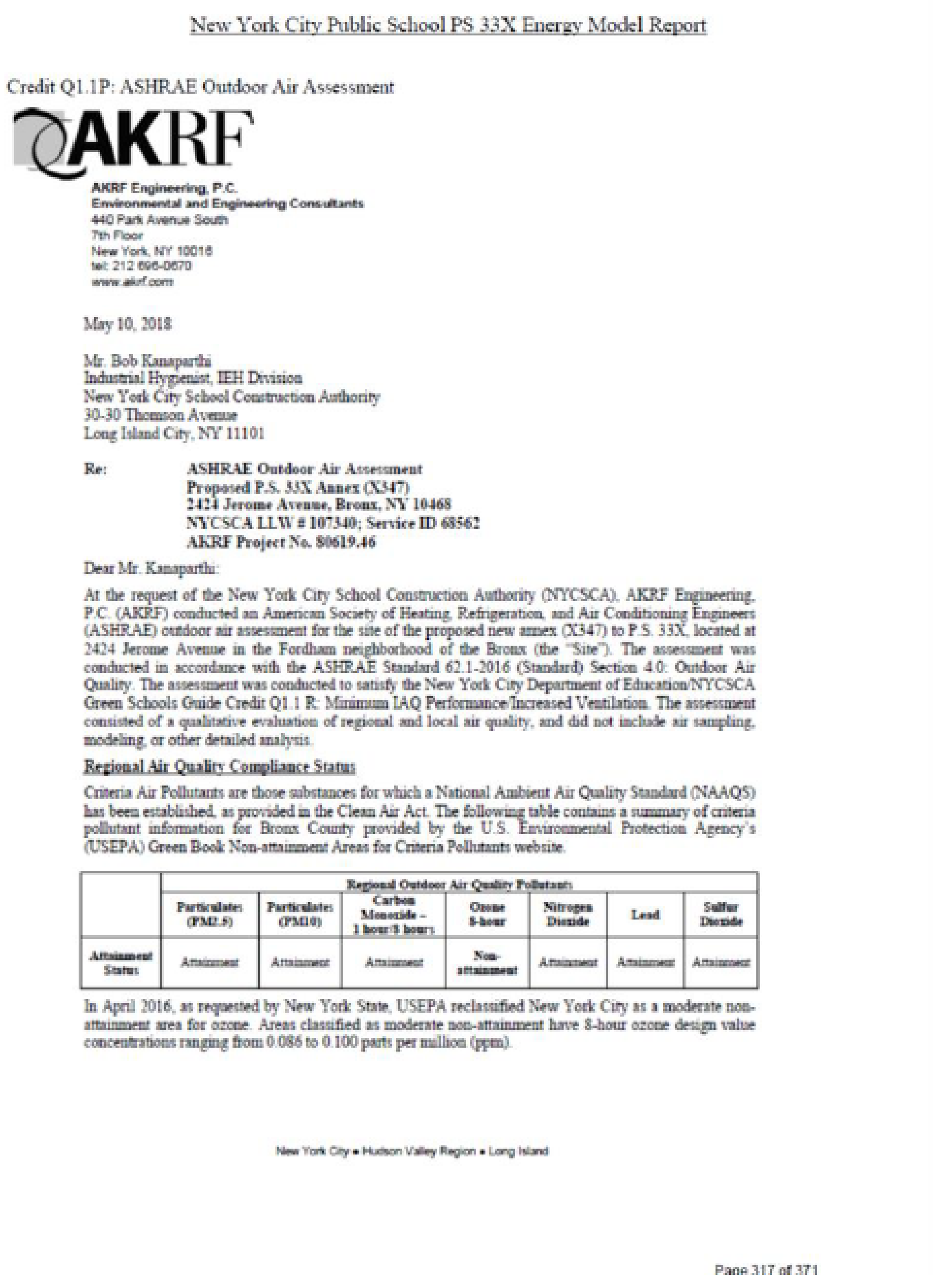
	Concentration of VOC in Summer conditions (PPM)		
Wind Speed	**Inlet of AHU-1**	**Inlet of AHU-2**	**Inlet of AHU-3**
2 mph	135.2	198.5	209.8
7.5 mph	432.3	417.7	244.5
22.5 mph	183.1	181.2	85.8

QUALIFICATION OF RESULTS

In general, CFD analyses are a simplified representation of reality. There are limitations regarding how close a computer model can predict reality. These limitations stem from the capabilities of the software, the simplifications in the model, and the fact that real-life construction and operation is imperfect.

- "Computational fluid dynamics (CFD) models attempt to resolve airflow around buildings by solving the Navier-Stokes equations at finite grid locations.
- CFD models are currently used to model internal flows, but are insufficient to accurately model atmospheric turbulence. (24.10 2009 ASHRAE Handbook—Fundamentals)"
- "Based on the current state of the art, CFD models should be used with extreme caution when modeling exhaust plumes from laboratory pollutant sources. Currently, CFD models can both over- and under predict concentration levels by orders of magnitude, leading to potentially unsafe designs. If a CFD study is conducted for such an application, supporting full-scale or wind tunnel validation studies should be carried out. (45.10 2011 ASHRAE Handbook—HVAC Applications)"
- "Measurements on small-scale models in wind tunnels or water channels can provide information for design before construction. These measurements can also be used as an economical method of performance evaluation for existing facilities. (24.10 2009 ASHRAE Handbook—Fundamentals)"

APPENDIX A: ASHRAE OUTDOOR AIR ASSESSMENT REPORT



Credit Q1.1P: ASHRAE Outdoor Air Assessment

AKRF

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tel: 212 696-0670
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May 10, 2018

Mr. Bob Kanaparthi
Industrial Hygienist, IEH Division
New York City School Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

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2424 Jerome Avenue, Bronx, NY 10468
NYCSCA LLW # 107340; Service ID 68562
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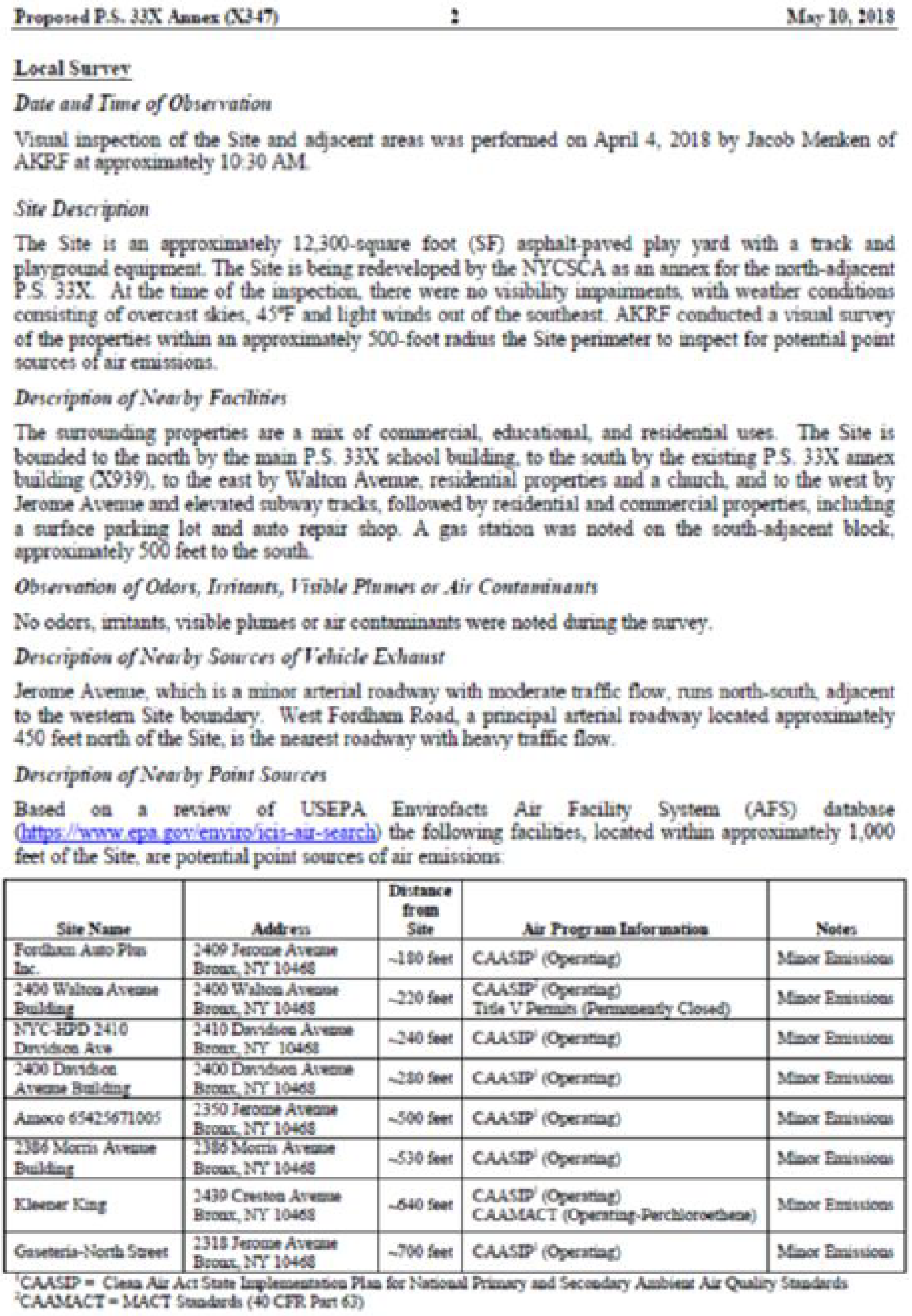
	Regional Outdoor Air Quality Pollutants						
	Particulates (PM2.5)	**Particulates (PM10)**	**Carbon Monoxide – 1 hour/8 hours**	**Ozone 8-hour**	**Nitrogen Dioxide**	**Lead**	**Sulfur Dioxide**
Attainment Status	Attainment	Attainment	Attainment	**Non-attainment**	Attainment	Attainment	Attainment

In April 2016, as requested by New York State, USEPA reclassified New York City as a moderate non-attainment area for ozone. Areas classified as moderate non-attainment have 8-hour ozone design value concentrations ranging from 0.086 to 0.100 parts per million (ppm).



Local Survey

Date and Time of Observation

Visual inspection of the Site and adjacent areas was performed on April 4, 2018 by Jacob Menken of AKRF at approximately 10:30 AM.

Site Description

The Site is an approximately 12,300-square foot (SF) asphalt-paved play yard with a track and playground equipment. The Site is being redeveloped by the NYCSCA as an annex for the north-adjacent P.S. 33X. At the time of the inspection, there were no visibility impairments, with weather conditions consisting of overcast skies, 45°F and light winds out of the southeast. AKRF conducted a visual survey of the properties within an approximately 500-foot radius the Site perimeter to inspect for potential point sources of air emissions.

Description of Nearby Facilities

The surrounding properties are a mix of commercial, educational, and residential uses. The Site is bounded to the north by the main P.S. 33X school building, to the south by the existing P.S. 33X annex building (X939), to the east by Walton Avenue, residential properties and a church, and to the west by Jerome Avenue and elevated subway tracks, followed by residential and commercial properties, including a surface parking lot and auto repair shop. A gas station was noted on the south-adjacent block, approximately 500 feet to the south.

Observation of Odors, Irritants, Visible Plumes or Air Contaminants

No odors, irritants, visible plumes or air contaminants were noted during the survey.

Description of Nearby Sources of Vehicle Exhaust

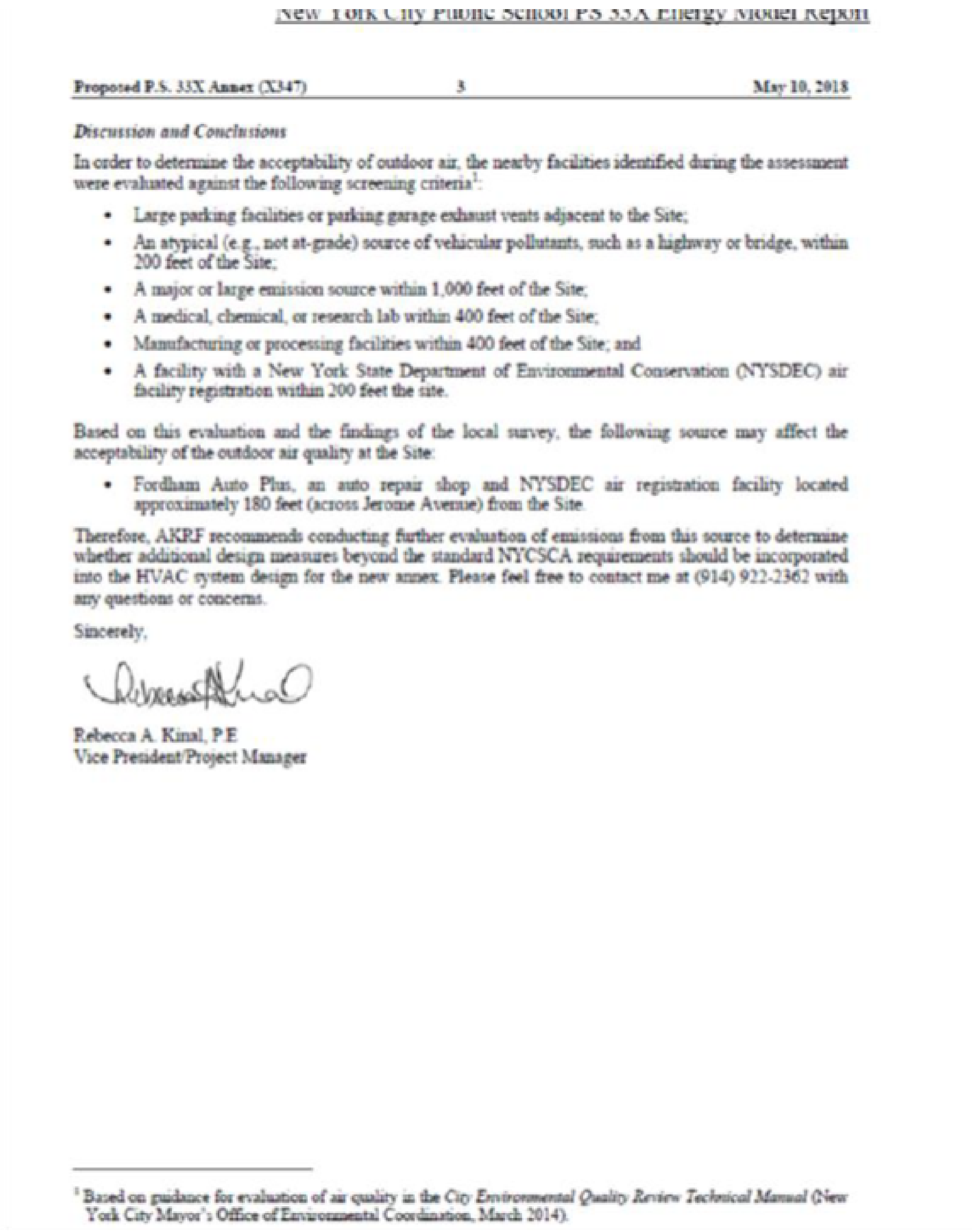
Jerome Avenue, which is a minor arterial roadway with moderate traffic flow, runs north-south, adjacent to the western Site boundary. West Fordham Road, a principal arterial roadway located approximately 450 feet north of the Site, is the nearest roadway with heavy traffic flow.

Description of Nearby Point Sources

Based on a review of USEPA Envirofacts Air Facility System (AFS) database (https://www.epa.gov/enviro/icis-air-search) the following facilities, located within approximately 1,000 feet of the Site, are potential point sources of air emissions:

Site Name	Address	Distance from Site	Air Program Information	Notes
Fordham Auto Plus Inc.	2409 Jerome Avenue Bronx, NY 10468	~180 feet	CAASIP[1] (Operating)	Minor Emissions
2400 Walton Avenue Building	2400 Walton Avenue Bronx, NY 10468	~220 feet	CAASIP[1] (Operating) Title V Permits (Permanently Closed)	Minor Emissions
NYC-HPD 2410 Davidson Ave	2410 Davidson Avenue Bronx, NY 10468	~240 feet	CAASIP[1] (Operating)	Minor Emissions
2400 Davidson Avenue Building	2400 Davidson Avenue Bronx, NY 10468	~280 feet	CAASIP[1] (Operating)	Minor Emissions
Amoco 65425671005	2350 Jerome Avenue Bronx, NY 10468	~500 feet	CAASIP[1] (Operating)	Minor Emissions
2386 Morris Avenue Building	2386 Morris Avenue Bronx, NY 10468	~530 feet	CAASIP[1] (Operating)	Minor Emissions
Kleener King	2430 Creston Avenue Bronx, NY 10468	~640 feet	CAASIP[1] (Operating) CAAMACT (Operating-Perchloroethene)	Minor Emissions
Gasateria-North Street	2318 Jerome Avenue Bronx, NY 10468	~700 feet	CAASIP[1] (Operating)	Minor Emissions

[1]CAASIP = Clean Air Act State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
[2]CAAMACT = MACT Standards (40 CFR Part 63)



Discussion and Conclusions

In order to determine the acceptability of outdoor air, the nearby facilities identified during the assessment were evaluated against the following screening criteria[1]:

- Large parking facilities or parking garage exhaust vents adjacent to the Site;
- An atypical (e.g., not at-grade) source of vehicular pollutants, such as a highway or bridge, within 200 feet of the Site;
- A major or large emission source within 1,000 feet of the Site;
- A medical, chemical, or research lab within 400 feet of the Site;
- Manufacturing or processing facilities within 400 feet of the Site; and
- A facility with a New York State Department of Environmental Conservation (NYSDEC) air facility registration within 200 feet the site.

Based on this evaluation and the findings of the local survey, the following source may affect the acceptability of the outdoor air quality at the Site:

- Fordham Auto Plus, an auto repair shop and NYSDEC air registration facility located approximately 180 feet (across Jerome Avenue) from the Site.

Therefore, AKRF recommends conducting further evaluation of emissions from this source to determine whether additional design measures beyond the standard NYCSCA requirements should be incorporated into the HVAC system design for the new annex. Please feel free to contact me at (914) 922-2362 with any questions or concerns.

Sincerely,

Rebecca A. Kinal, P.E.
Vice President/Project Manager

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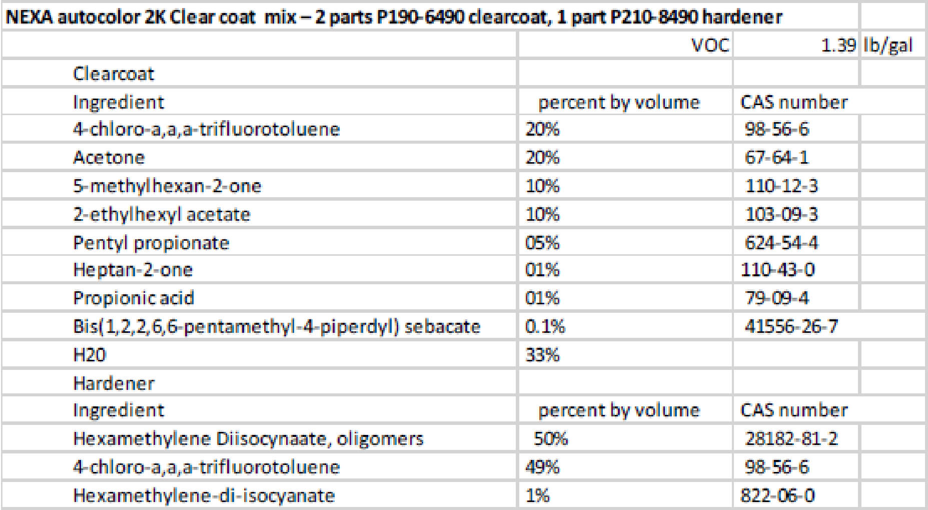
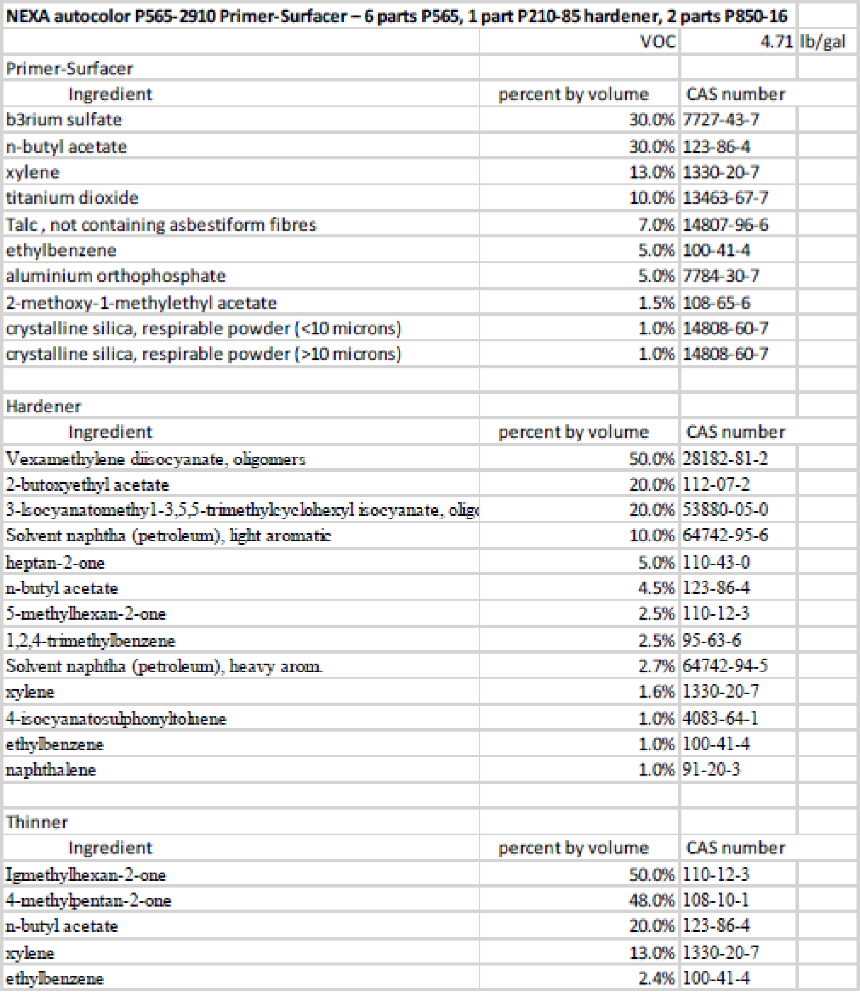
[1] Based on guidance for evaluation of air quality in the *City Environmental Quality Review Technical Manual* (New York City Mayor's Office of Environmental Coordination, March 2014).

APPENDIX B: SOURCE OF POLLUTANTS – AUTO BODY SHOP



NEXA autocolor 2K Clear coat mix – 2 parts P190-6490 clearcoat, 1 part P210-8490 hardener			
	VOC	1.39	lb/gal
Clearcoat			
Ingredient	percent by volume	CAS number	
4-chloro-a,a,a-trifluorotoluene	20%	98-56-6	
Acetone	20%	67-64-1	
5-methylhexan-2-one	10%	110-12-3	
2-ethylhexyl acetate	10%	103-09-3	
Pentyl propionate	05%	624-54-4	
Heptan-2-one	01%	110-43-0	
Propionic acid	01%	79-09-4	
Bis(1,2,2,6,6-pentamethyl-4-piperdyl) sebacate	0.1%	41556-26-7	
H20	33%		
Hardener			
Ingredient	percent by volume	CAS number	
Hexamethylene Diisocynaate, oligomers	50%	28182-81-2	
4-chloro-a,a,a-trifluorotoluene	49%	98-56-6	
Hexamethylene-di-isocyanate	1%	822-06-0	

NEXA autocolor 2K Basecoat standard mix – 1 part P422, 1 part P850-16			
	VOC	5.93	lb/gal
Basecoat			
Ingredient	percent by volume	CAS number	
n-butyl acetate	90%	123-86-4	
xylene	50%	1330-20-7	
2-methoxy-1-methylethyl acetate	20%	108-65-6	
5-methylhexan-2-one	10%	110-12-3	
Solvent naphtha	10%	64742-95-6	
Titanium dioxide	10%	13463-67-7	
ethylbenzene	5%	100-41-4	
butan-1-ol	5%	71-36-3	
1,2,40trimethylbenzene	5%	95-63-6	
Aluminium oxide	5%	1344-28-1	
Azacyclotridecan-2-onee, homopolymer	5 %	25038-74-8	
Diiron trioxide	5%	1309-37-1	
Mica-group minerals	1%	12001-26-2	
Magnesium fluoride	1%	7783-40-6	
Ligroine	1%	8032-32-4	
Carbon black, respirable powder	1%	1333-86-4	
Toluene	1%	108-88-3	
Mesitylene	1%	108-67-8	
Naphtha(petroleum)	1%	64741-65-7	
n-butyl propionate	1%	590-01-2	
cumene	1%	98-82-8	
Rosin, oligomers	1%	65997-05-9	
2-methoxypropyl acetate	1%	70657-70-4	
2,3-epoxypropyl neodecanoate	1%	26761-45-5	
Thinner			
Density – 6.84 lbs / gal			
Ingredient	percent by volume	CAS number	
5-methylhexan-2-one	40%	110-12-3	
4-methylpentan-2-one	40%	108-10-1	
xylene	5%	1330-20-7	
2-ethylhexyl acetate	5%	103-09-3	
Solvent naphtha	5%	64742-95-6	
1,2,40trimethylbenzene	3%	95-63-6	
ethylbenzene	1.7%	100-41-4	
cumene	1%	98-82-8	

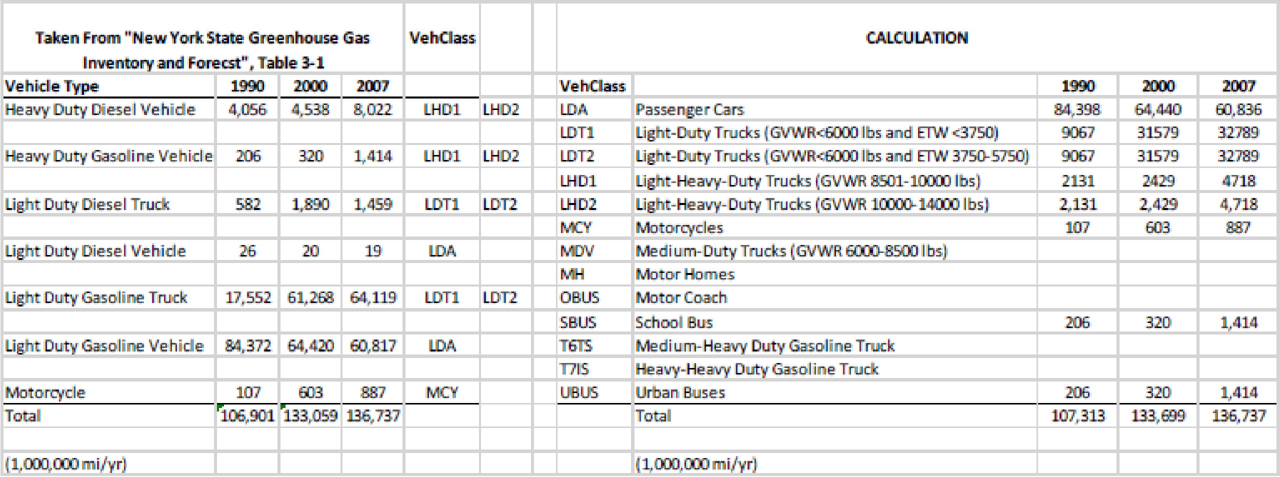


NEXA autocolor P565-2910 Primer-Surfacer – 6 parts P565, 1 part P210-85 hardener, 2 parts P850-16			
	VOC	4.71	lb/gal
Primer-Surfacer			
Ingredient	percent by volume	CAS number	
b3rium sulfate	30.0%	7727-43-7	
n-butyl acetate	30.0%	123-86-4	
xylene	13.0%	1330-20-7	
titanium dioxide	10.0%	13463-67-7	
Talc , not containing asbestiform fibres	7.0%	14807-96-6	
ethylbenzene	5.0%	100-41-4	
aluminium orthophosphate	5.0%	7784-30-7	
2-methoxy-1-methylethyl acetate	1.5%	108-65-6	
crystalline silica, respirable powder (<10 microns)	1.0%	14808-60-7	
crystalline silica, respirable powder (>10 microns)	1.0%	14808-60-7	
Hardener			
Ingredient	percent by volume	CAS number	
Vexamethylene diisocyanate, oligomers	50.0%	28182-81-2	
2-butoxyethyl acetate	20.0%	112-07-2	
3-Isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate, olig	20.0%	53880-05-0	
Solvent naphtha (petroleum), light aromatic	10.0%	64742-95-6	
heptan-2-one	5.0%	110-43-0	
n-butyl acetate	4.5%	123-86-4	
5-methylhexan-2-one	2.5%	110-12-3	
1,2,4-trimethylbenzene	2.5%	95-63-6	
Solvent naphtha (petroleum), heavy arom.	2.7%	64742-94-5	
xylene	1.6%	1330-20-7	
4-isocyanatosulphonyltoluene	1.0%	4083-64-1	
ethylbenzene	1.0%	100-41-4	
naphthalene	1.0%	91-20-3	
Thinner			
Ingredient	percent by volume	CAS number	
Igmethylhexan-2-one	50.0%	110-12-3	
4-methylpentan-2-one	48.0%	108-10-1	
n-butyl acetate	20.0%	123-86-4	
xylene	13.0%	1330-20-7	
ethylbenzene	2.4%	100-41-4	

APPENDIX C: SOURCE OF POLLUTANTS - TRAFFIC

EMFAC2014 (v1.0.7) Emission Rates													
Region Type: Statewide													
Region: California													
Calendar Year: 2017													
Season: Annual													
Vehicle Classification: EMFAC2011 Categories													
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW													
						mi/day	gram/veh-mile	gram/veh-mile	gram/veh-mile	gram/veh-mile	gram/veh-mile	gram/veh-mile	gram/veh-mile
Region	CalYr	VehClass	MdlYr	Speed	Fuel	VMT	ROG_RUNEX	TOG_RUNEX	CO_RUNEX	NOx_RUNEX	CO2_RUNEX	PM10_RUNEX	PM2_5_RUNEX
Statewide	2017	LDA	Aggregated	5	GAS	938511.5105	0.151294323	0.214483287	1.987134089	0.175315144	988.3009307	0.01175757	0.010817573
Statewide	2017	LDT1	Aggregated	5	GAS	82697.11122	0.480374648	0.661387953	7.153270782	0.580357296	1161.846787	0.022692751	0.020908989
Statewide	2017	LDT2	Aggregated	5	GAS	354766.0727	0.21432272	0.305434127	2.923718393	0.357613675	1334.68687	0.012036352	0.011075101
Statewide	2017	LHD1	Aggregated	5	GAS	195140.4523	0.450227091	0.64819599	5.328907219	0.790280624	1404.594266	0.010906922	0.010036924
Statewide	2017	LHD2	Aggregated	5	GAS	31447.60501	0.249570681	0.361706671	2.730893965	0.542571114	1492.416129	0.007725231	0.00710547
Statewide	2017	MCY	Aggregated	5	GAS	10298.30336	13.21347885	15.98631029	60.28676158	1.484627033	543.3475889	0.009350837	0.008796928
Statewide	2017	MDV	Aggregated	5	GAS	239543.3436	0.401263099	0.560835886	4.932856388	0.609014299	1760.932895	0.012639272	0.011641149
Statewide	2017	MH	Aggregated	5	GAS	4915.761191	1.342870477	1.789930984	23.90687092	1.399260875	3932.873375	0.01675651	0.015514648
Statewide	2017	OBUS	Aggregated	5	GAS	5050.916969	0.553200011	0.79993857	4.642460368	1.112950075	3891.618334	0.005176993	0.004764552
Statewide	2017	SBUS	Aggregated	5	GAS	2003.889652	0.90494844	1.320498639	6.941540811	1.630983769	1848.851173	0.009681113	0.008901426
Statewide	2017	T6TS	Aggregated	5	GAS	9897.336003	1.163558017	1.662318994	11.56320754	1.946463404	3898.616723	0.009264781	0.00854121
Statewide	2017	T7IS	Aggregated	5	GAS	670.7077748	4.644059008	6.582505951	77.05037312	6.988114251	4273.272306	0.006481312	0.006011949
Statewide	2017	UBUS	Aggregated	5	GAS	9393.869964	2.310287533	3.288070205	17.31417285	2.523543244	3909.452156	0.008504881	0.007862002

Taken from "Assessment of Carbonaceous PM2.5 for New York and the Region", TABLE 3-9								CALCULATIONS				
county	population (2000 Census)	Percent of Total NYS Population	County In NYMA	Gasoline LDV VMT in CY 2002 (1,000,000 mi/yr)	Percent Total NYS Gasoline LDV VMT	Per Capita Gasoline LDV/VMT (1000 mi / person / yr)		**Gasoline LDV VMT per day**	**Gasoline LDV VMT per hour**		**VMT / person / day**	**VMT / person / hour**
Albany	294,565	1.6	No	3,280.1	2.5	11.1		8986575	374440.6		30.41096	1.267123
Bronx	1,332,650	7	Yes	4,327.8	3.3	3.2		11856986	494041.1		8.767123	0.365297
Erie	950,265	5	No	8,132.8	6.3	8.6		22281644	928401.8		23.56164	0.981735
Kings	2,465,326	13	Yes	4,487.6	3.5	1.8		12294795	512283.1		4.931507	0.205479
Monroe	735,343	3.9	No	6,752.8	5.2	9.2		18500822	770867.6		25.20548	1.050228
Nassau	1,334,544	7	Yes	10,610.0	8.2	8		29068493	1211187		21.91781	0.913242
New York	1,537,195	8.1	Yes	3,987.3	3.1	2.6		10924110	455171.2		7.123288	0.296804
Onondaga	458,336	2.4	No	4,307.4	3.3	9.4		11801096	491712.3		25.75342	1.073059
Orange	341,367	1.8	No	4,038.3	3.1	11.8		11063836	460993.2		32.32877	1.347032
Putnam	95,745	0.5	No	2,749.5	2.1	28.7		7532877	313869.9		78.63014	3.276256
Queens	2,229,379	11.7	Yes	7,160.7	5.5	3.2		19618356	817431.5		8.767123	0.365297
Richmond	443,728	2.3	Yes	1,827.7	1.4	4.1		5007397	208641.6		11.23288	0.468037
Rockland	286,753	1.5	Yes	2,405.1	1.9	8.4		6589315	274554.8		23.0137	0.958904
Suffolk	1,419,369	7.5	Yes	17,886.0	13.8	12.6		49002740	2041781		34.52055	1.438356
Westchester	923,459	4.9	Yes	8,012.9	6.2	8.7		21953151	914714.6		23.83562	0.993151
TOTAL		78.2		89,966	69.4							



Taken From "New York State Greenhouse Gas Inventory and Forecst", Table 3-1				VehClass			CALCULATION				
Vehicle Type	**1990**	**2000**	**2007**				**VehClass**		**1990**	**2000**	**2007**
Heavy Duty Diesel Vehicle	4,056	4,538	8,022	LHD1	LHD2		LDA	Passenger Cars	84,398	64,440	60,836
							LDT1	Light-Duty Trucks (GVWR<6000 lbs and ETW <3750)	9067	31579	32789
Heavy Duty Gasoline Vehicle	206	320	1,414	LHD1	LHD2		LDT2	Light-Duty Trucks (GVWR<6000 lbs and ETW 3750-5750)	9067	31579	32789
							LHD1	Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs)	2131	2429	4718
Light Duty Diesel Truck	582	1,890	1,459	LDT1	LDT2		LHD2	Light-Heavy-Duty Trucks (GVWR 10000-14000 lbs)	2,131	2,429	4,718
							MCY	Motorcycles	107	603	887
Light Duty Diesel Vehicle	26	20	19	LDA			MDV	Medium-Duty Trucks (GVWR 6000-8500 lbs)			
							MH	Motor Homes			
Light Duty Gasoline Truck	17,552	61,268	64,119	LDT1	LDT2		OBUS	Motor Coach			
							SBUS	School Bus	206	320	1,414
Light Duty Gasoline Vehicle	84,372	64,420	60,817	LDA			T6TS	Medium-Heavy Duty Gasoline Truck			
							T7IS	Heavy-Heavy Duty Gasoline Truck			
Motorcycle	107	603	887	MCY			UBUS	Urban Buses	206	320	1,414
Total	106,901	133,059	136,737					Total	107,313	133,699	136,737
(1,000,000 mi/yr)								(1,000,000 mi/yr)			

APPENDIX D: MODEL CONVERGENCE

Mesh

The fine grid meshing was used next to the school building with focus on the OA intake inlet, based on the information provided by the design team. The total numbers of grids cells in the VFD model is 2,238,273. The shape of the mesh is rectangular cuboid. The maximum aspect ratio in the region around the school is 5.0.

Residuals

The run with 2 mph wind speed did not achieve optimal convergence due to turbulence. However, the trends pertaining to VOCs are valid.

The CFD models for 7.5 mph and 22.5 mph wind speed were allowed to run until steady state convergence was achieved. The maximum residual for the pollutant concentration was in the order of e-5; and in the order of e-7 for VOCs.

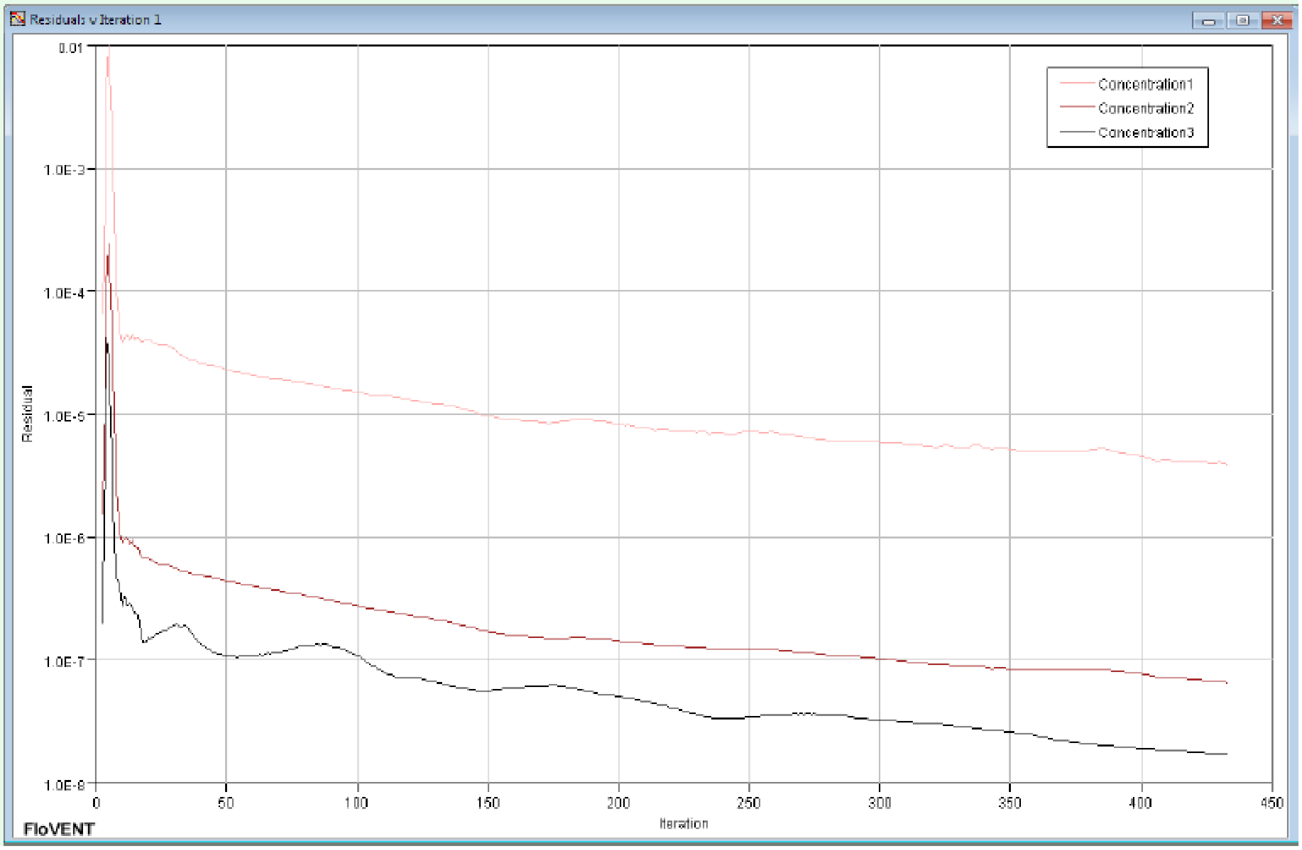
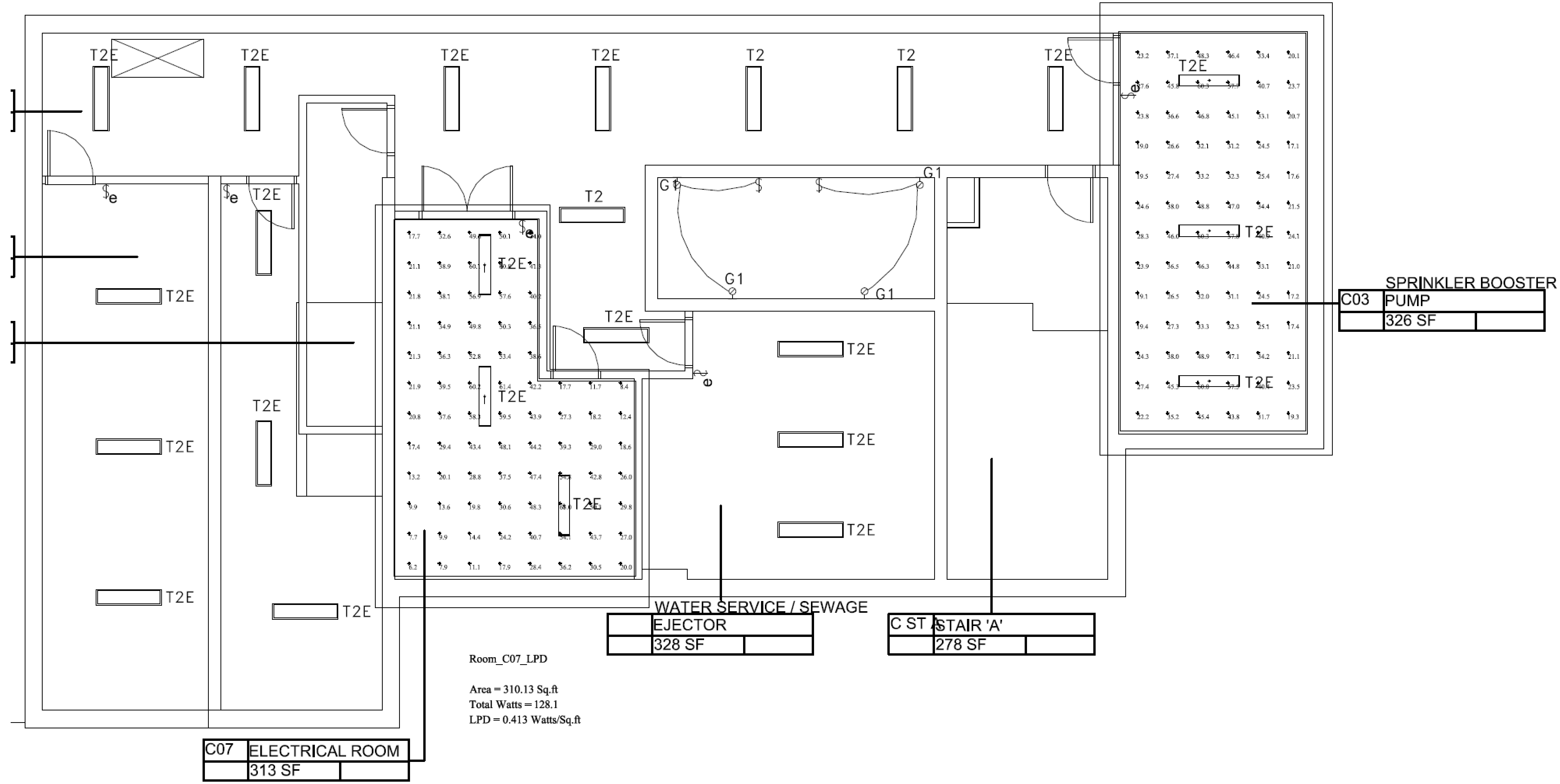


Figure 8 Plot of Residuals of pollutant concentration vs Iteration, High Risk Conditions

Credit Q7.5R: Point-by-point lighting level (photometric) and LPD calculations for typical and non-typical areas



Room_C07_LPD

Area = 310.13 Sq.ft
Total Watts = 128.1
LPD = 0.413 Watts/Sq.ft

Luminaire Schedule									
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Lum. Lumens	[MANUFAC]
▭	6	T2	SINGLE	N.A.	0.900	LAW4-35ML-EU	42.7	4904	COLUMBIA LIGHTING

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Room_C03_Workplane	Illuminance	Fc	33.64	60.3	17.1	1.97	3.53
Room_C07_Workplane	Illuminance	Fc	33.85	63.0	6.2	5.46	10.16

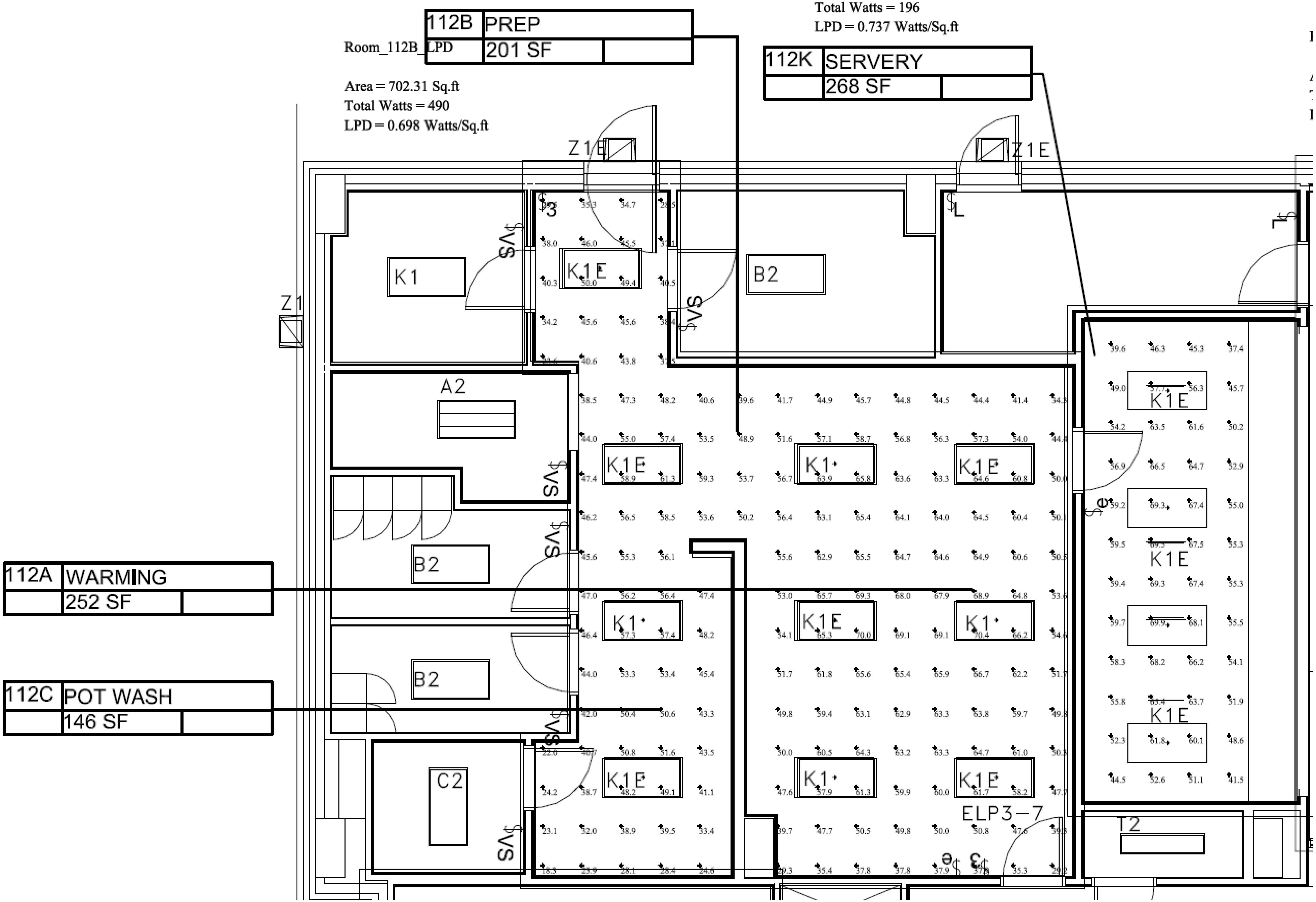
LPD Area Summary			
Label	Area	Total Watts	LPD
Room_C03_LPD	334.38	128.1	0.383
Room_C07_LPD	310.13	128.1	0.413

Room_112K_LPD

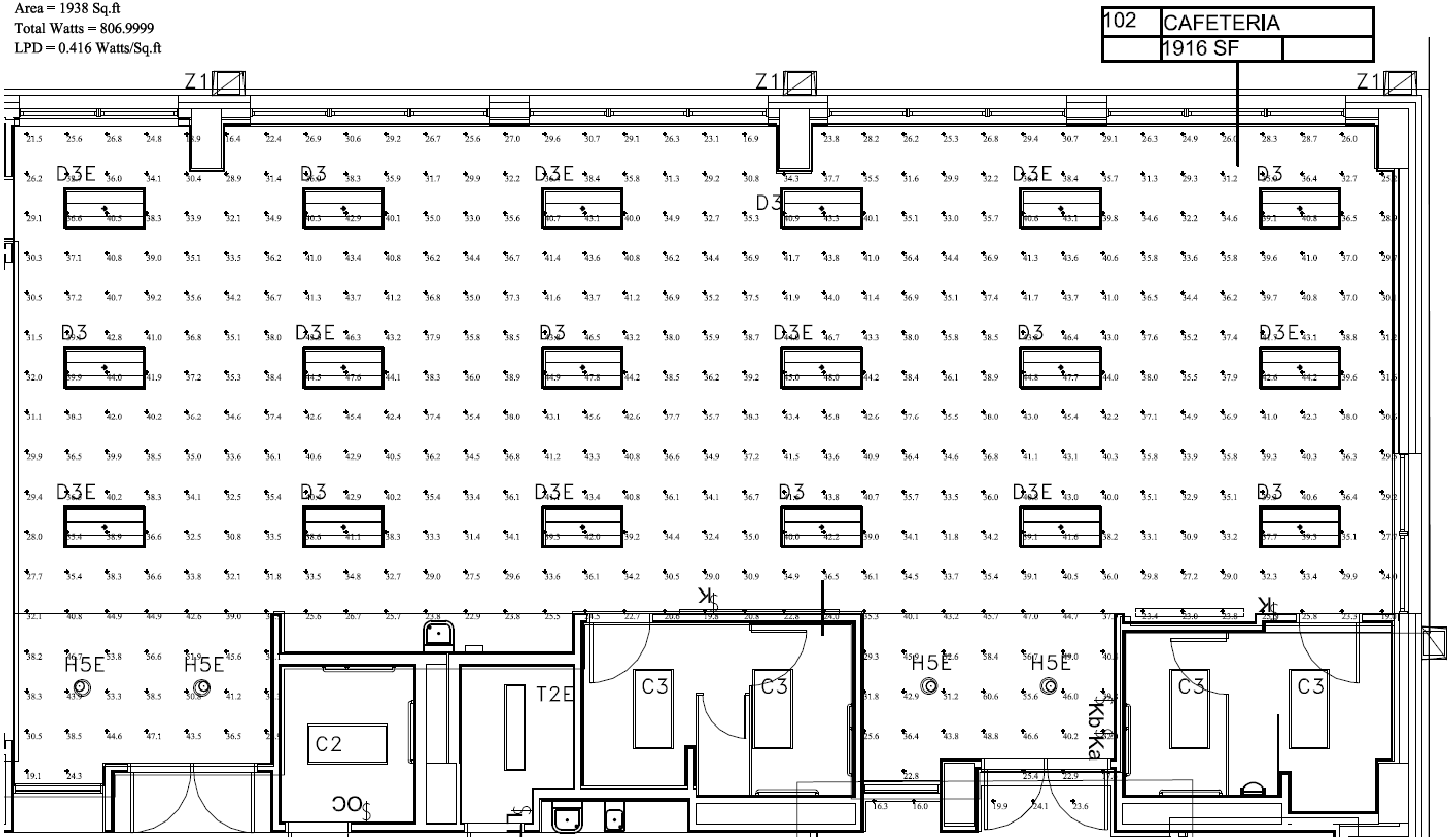
Area = 266.06 Sq.ft
Total Watts = 196
LPD = 0.737 Watts/Sq.ft

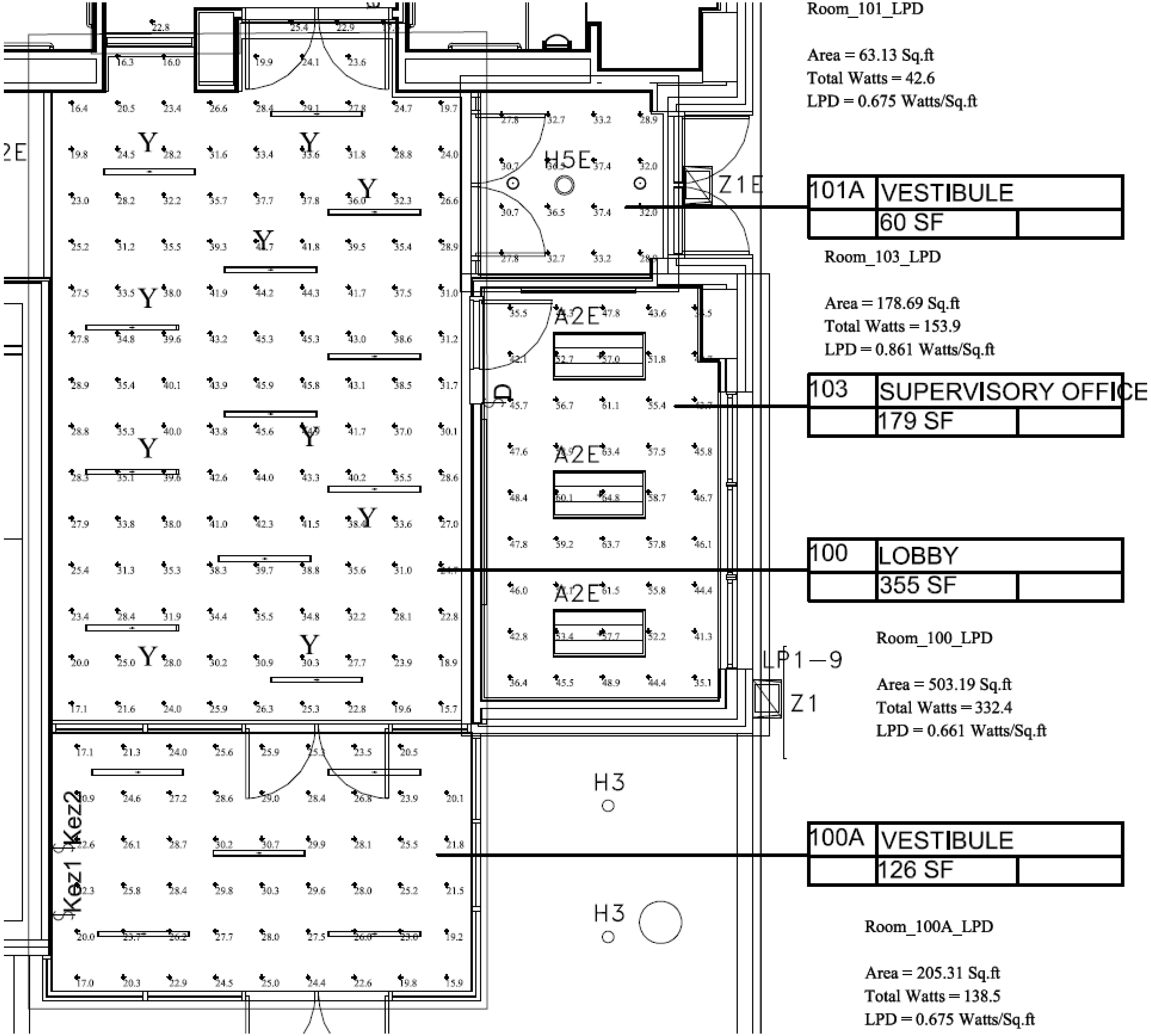
Room_112B_LPD

Area = 702.31 Sq.ft
Total Watts = 490
LPD = 0.698 Watts/Sq.ft



Area = 1938 Sq.ft
Total Watts = 806.9999
LPD = 0.416 Watts/Sq.ft





Room_101_LPD

Area = 63.13 Sq.ft
Total Watts = 42.6
LPD = 0.675 Watts/Sq.ft

Room_103_LPD

Area = 178.69 Sq.ft
Total Watts = 153.9
LPD = 0.861 Watts/Sq.ft

Room_100_LPD

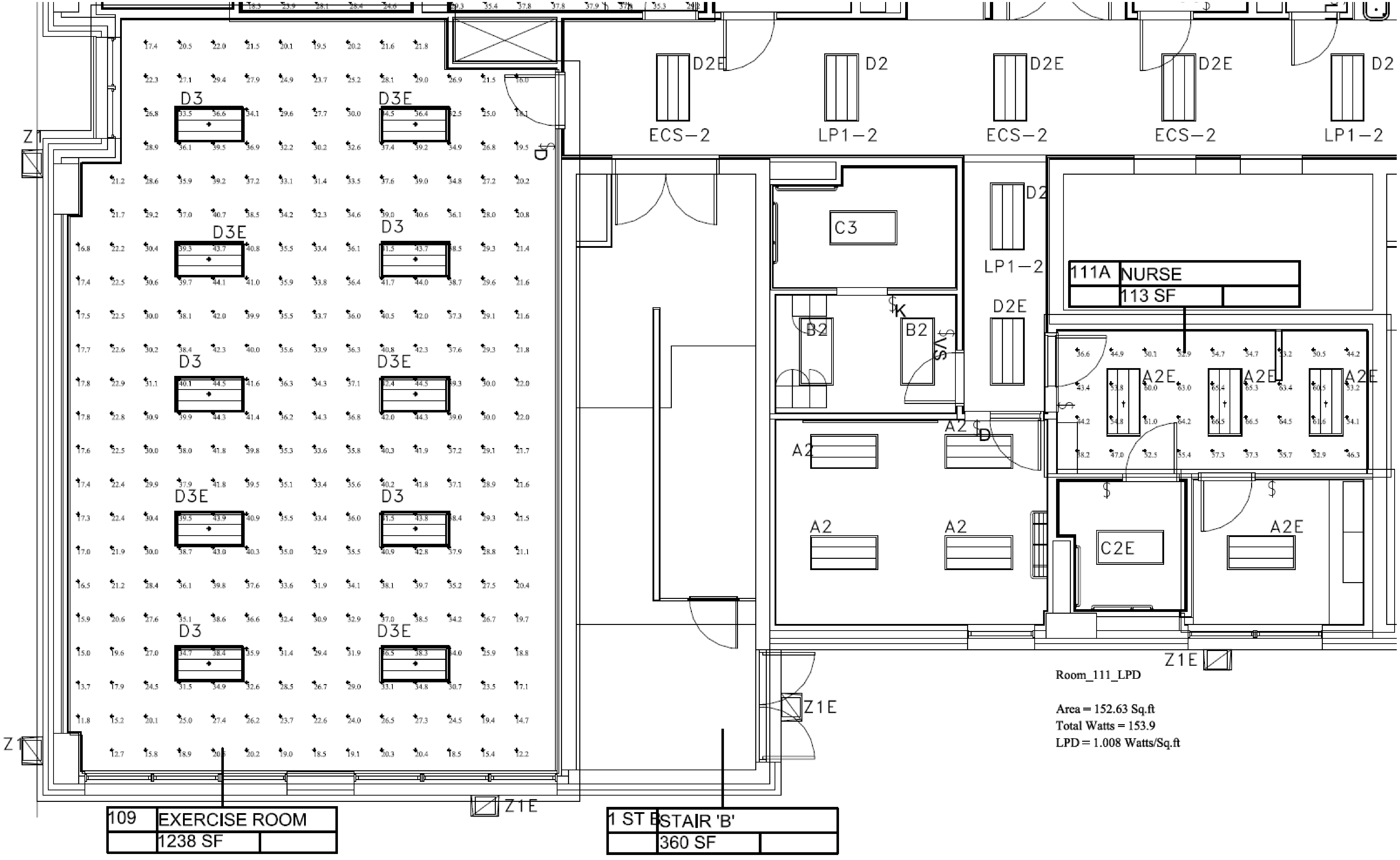
Area = 503.19 Sq.ft
Total Watts = 332.4
LPD = 0.661 Watts/Sq.ft

Room_100A_LPD

Area = 205.31 Sq.ft
Total Watts = 138.5
LPD = 0.675 Watts/Sq.ft

Room_109_LPD

Area = 1248 Sq.ft
Total Watts = 401
LPD = 0.321 Watts/Sq.ft



Room_111_LPD

Area = 152.63 Sq.ft
Total Watts = 153.9
LPD = 1.008 Watts/Sq.ft

Luminaire Schedule									
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Total Watts	Lum. Lumens	[MANUFAC]
⊡	28	D3	SINGLE	N.A.	0.900	2CAG42L835-4-DS-UNV	1122.8	4406	PHILIPS DAY-BRITE - PHILIPS CFI
⊙	6	H5	SINGLE	N.A.	0.900	C6RN+C6L25835WZ10U+C6RDLCL	127.8	2307	PHILIPS LIGHTOLIER
⊡	14	K1	SINGLE	N.A.	0.900	CSEDO-24-45L35K-DCC-DV-2F-2H-SYM	686	5462	Kenall Manufacturing
⊡	6	A2	SINGLE	N.A.	0.900	2CAG55L835-4-DS-UNV	307.8	5553	PHILIPS DAY-BRITE - PHILIPS CFI
▭	17	Y	SINGLE	N.A.	0.900	3901LBGRS447VOLTSE 3 INCH X 4FT LINEAR RECESSED LED	470.9	2203	PHILIPS LEDALITE

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_101 @ 18 INCHES AFF	Illuminance	Fc	32.40	37.4	27.8	1.17	1.35
Room_100_Floor	Illuminance	Fc	32.33	45.9	15.7	2.06	2.92
Room_100A_Floor	Illuminance	Fc	24.73	30.7	15.9	1.56	1.93
Room_102_Workplane	Illuminance	Fc	36.46	60.6	16.4	2.22	3.70
Room_103_Workplane	Illuminance	Fc	50.26	64.8	34.5	1.46	1.88
Room_109_Workplane	Illuminance	Fc	30.67	44.5	11.8	2.60	3.77
Room_111_Workplane	Illuminance	Fc	54.72	66.5	36.6	1.50	1.82
Room_112B_Workplane	Illuminance	Fc	50.73	70.4	18.3	2.77	3.85
Room_112K_Workplane	Illuminance	Fc	57.32	69.9	37.4	1.53	1.87

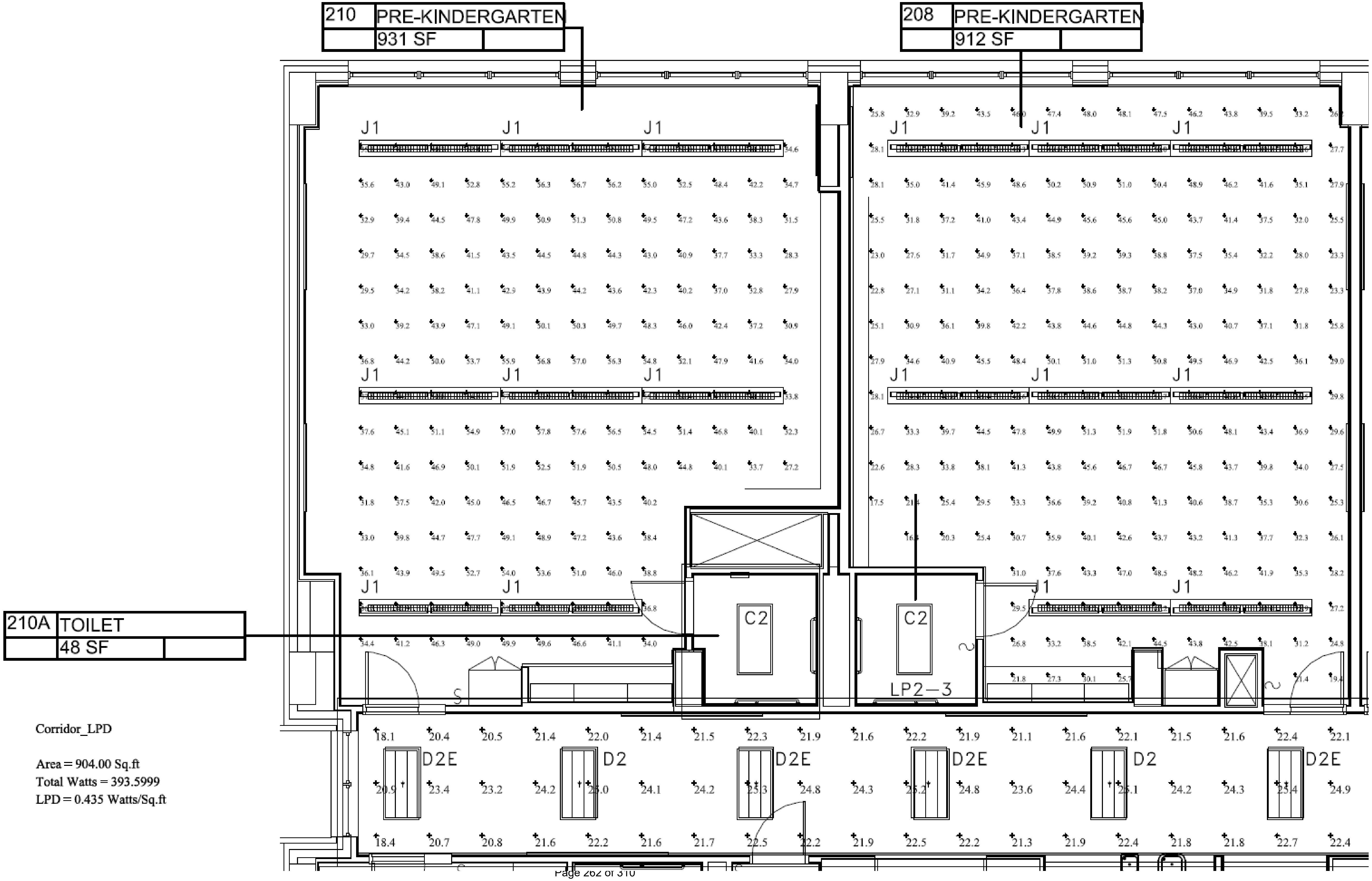
LPD Area Summary			
Label	Area	Total Watts	LPD
Room_100_LPD	503.19	332.4	0.661
Room_100A_LPD	205.31	138.5	0.675
Room_101_LPD	63.13	42.6	0.675
Room_102_LPD	1938	806.9999	0.416
Room_103_LPD	178.69	153.9	0.861
Room_109_LPD	1248	401	0.321
Room_111_LPD	152.63	153.9	1.008
Room_112B_LPD	702.31	490	0.698
Room_112K_LPD	266.06	196	0.737

Room_210_LPD

Area = 915.50 Sq.ft
Total Watts = 452.7999
LPD = 0.495 Watts/Sq.ft

Room_208_LPD

Area = 898.50 Sq.ft
Total Watts = 452.7999
LPD = 0.504 Watts/Sq.ft

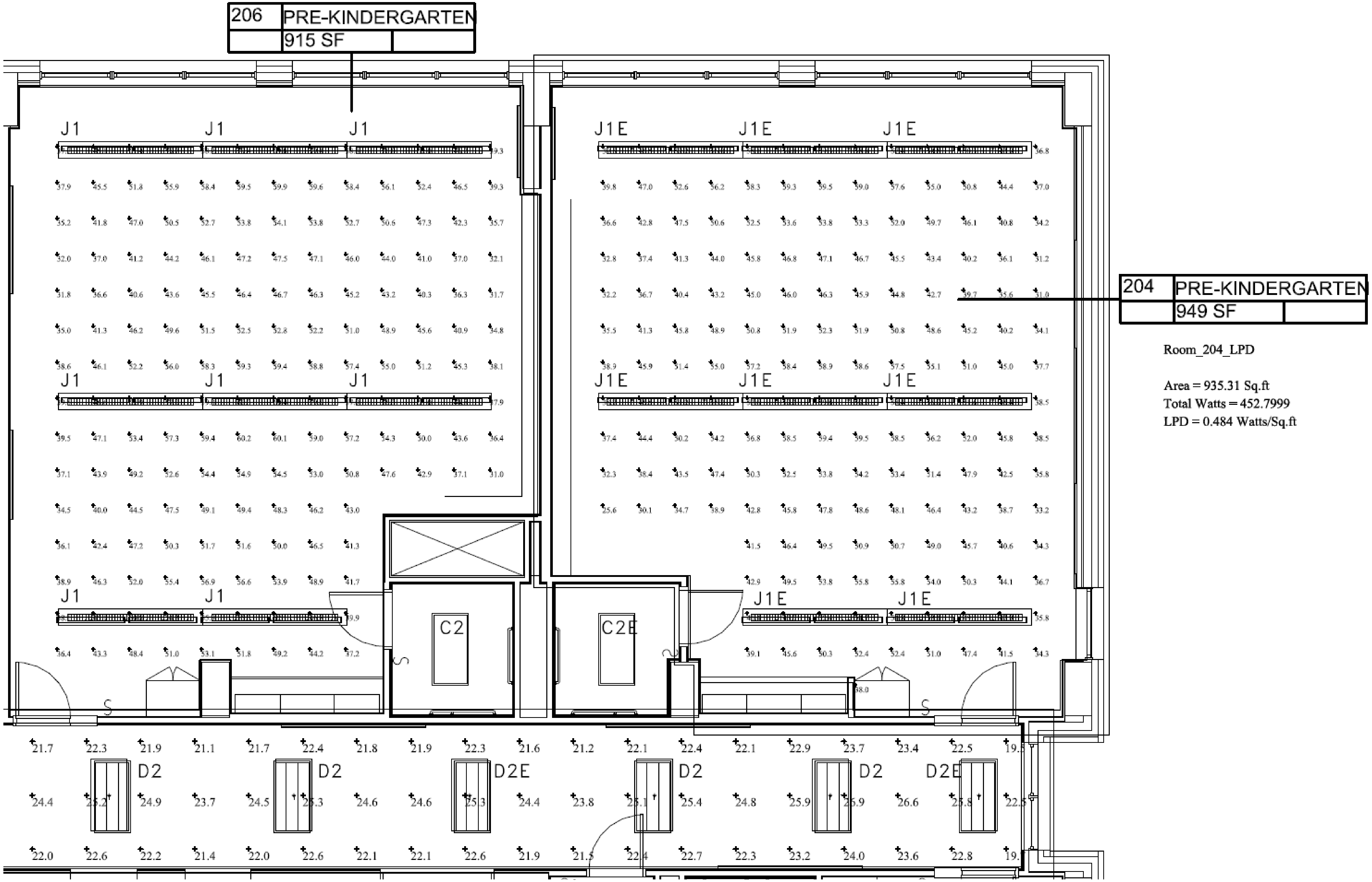


Corridor_LPD

Area = 904.00 Sq.ft
Total Watts = 393.5999
LPD = 0.435 Watts/Sq.ft

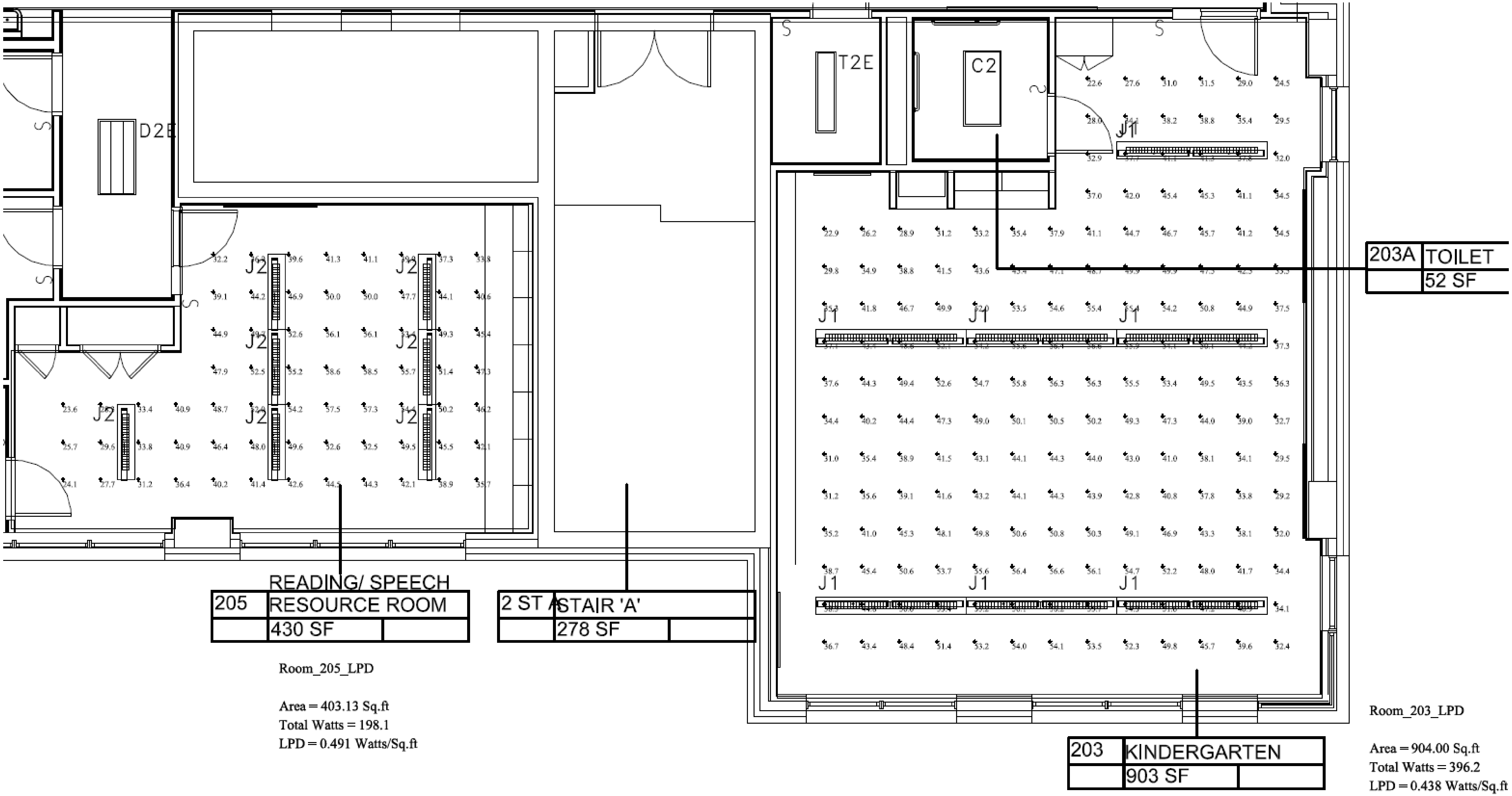
Room_206_LPD

Area = 899.75 Sq.ft
Total Watts = 452.7999
LPD = 0.503 Watts/Sq.ft



Room_204_LPD

Area = 935.31 Sq.ft
Total Watts = 452.7999
LPD = 0.484 Watts/Sq.ft

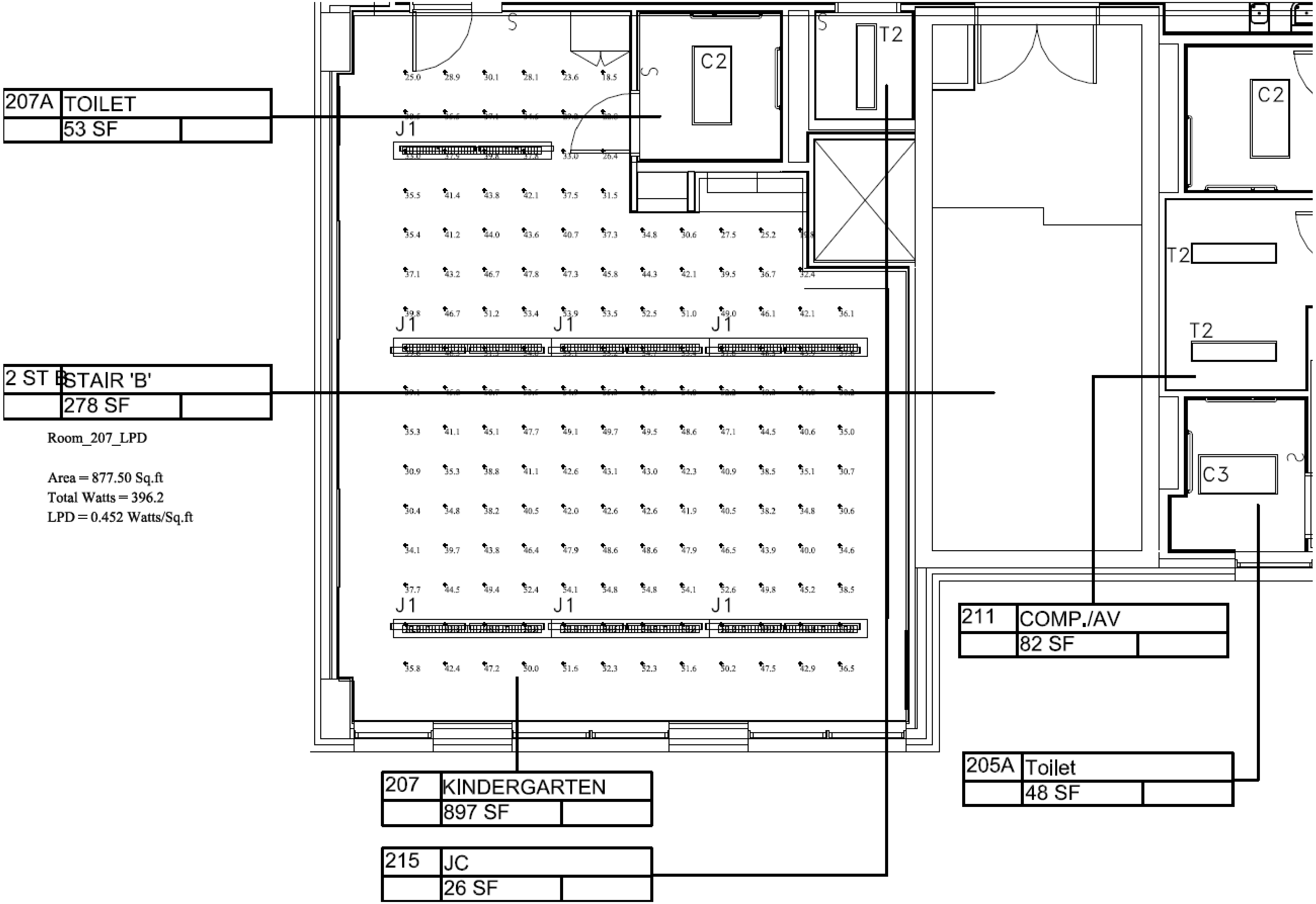


Room_205_LPD

Area = 403.13 Sq.ft
Total Watts = 198.1
LPD = 0.491 Watts/Sq.ft

Room_203_LPD

Area = 904.00 Sq.ft
Total Watts = 396.2
LPD = 0.438 Watts/Sq.ft



Room_207_LPD

Area = 877.50 Sq.ft
Total Watts = 396.2
LPD = 0.452 Watts/Sq.ft

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Total Watts	[MANUFAC]
▭	99	J ALT 2	SINGLE	N.A.	0.900	7406LBEQN-RUN-7-VOLTS-E-FINISH	28.3	2801.7	PHILIPS LEDALITE
□	12	D2	SINGLE	N.A.	0.900	2CAG36L8354-DS-UNV	32.8	393.6	PHILIPS DAY-BRITE - PHILIPS CFI

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_Corr at 18 inches	Illuminance	Fc	22.78	26.9	18.1	1.26	1.49
Room_203_Workplane	Illuminance	Fc	43.65	56.6	22.6	1.93	2.50
Room_204_Workplane	Illuminance	Fc	47.27	59.8	25.6	1.85	2.34
Room_205_Workplane	Illuminance	Fc	44.28	58.6	23.6	1.88	2.48
Room_206_Workplane	Illuminance	Fc	48.14	60.4	31.0	1.55	1.95
Room_207_Workplane	Illuminance	Fc	42.72	55.3	18.5	2.31	2.99
Room_208_Workplane	Illuminance	Fc	38.34	52.1	16.4	2.34	3.18
Room_210_Workplane	Illuminance	Fc	45.28	57.9	27.2	1.66	2.13

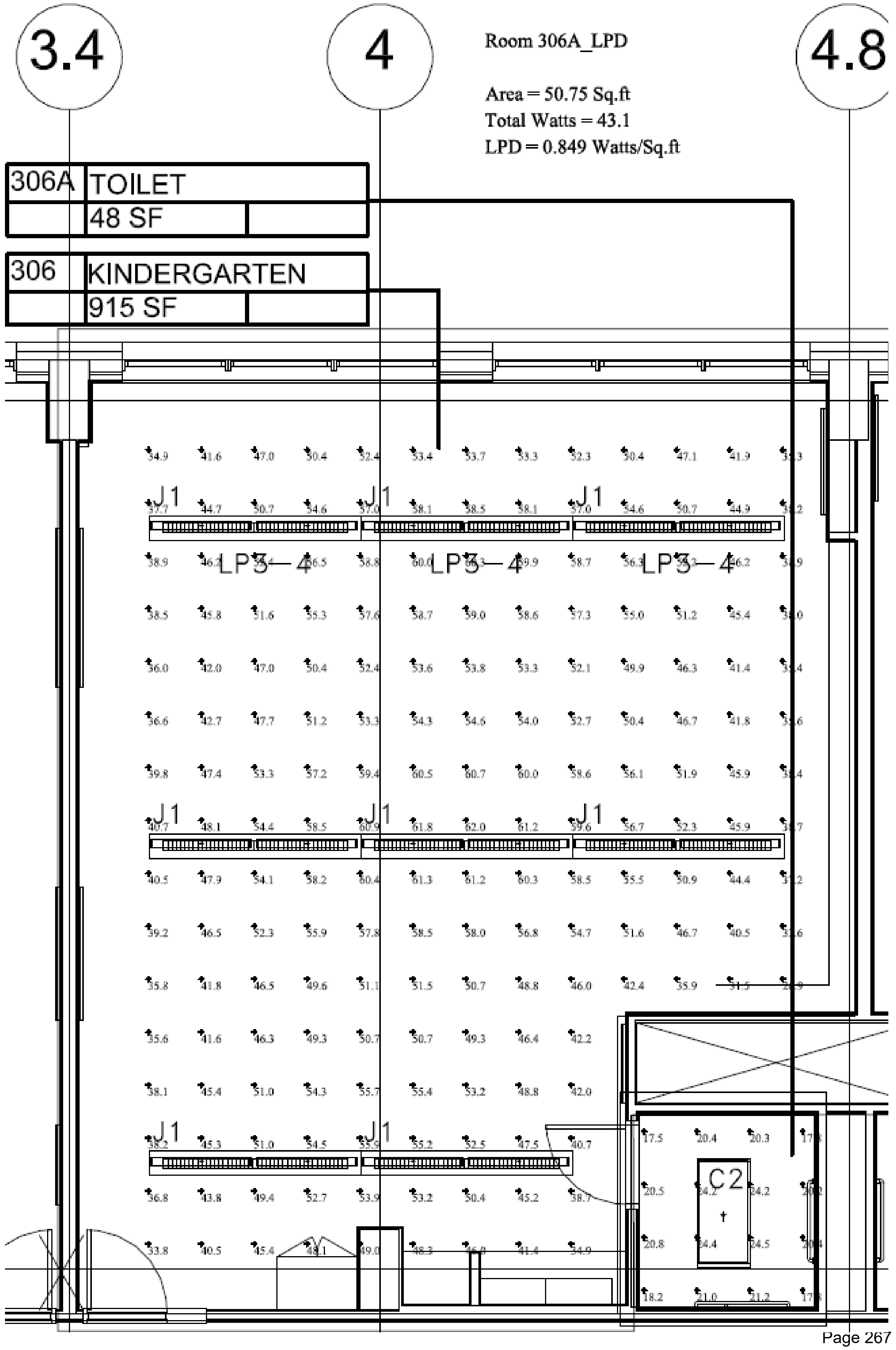
LPD Area Summary

Label	Area	Total Watts	LPD
Corridor_LPD	904	393.5999	0.435
Room_203_LPD	904	396.2	0.438
Room_204_LPD	935.31	452.7999	0.484
Room_205_LPD	403.13	198.1	0.491
Room_206_LPD	899.75	452.7999	0.503
Room_207_LPD	877.5	396.2	0.452
Room_208_LPD	898.5	452.7999	0.504
Room_210_LPD	915.5	452.7999	0.495

Area = 931.38 Sq.ft
Total Watts = 452.7999
LPD = 0.486 Watts/Sq.ft

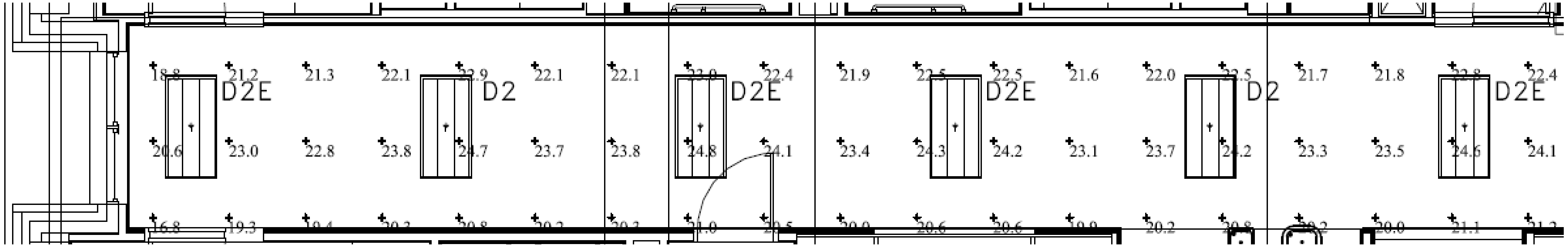
Room 306A_LPD

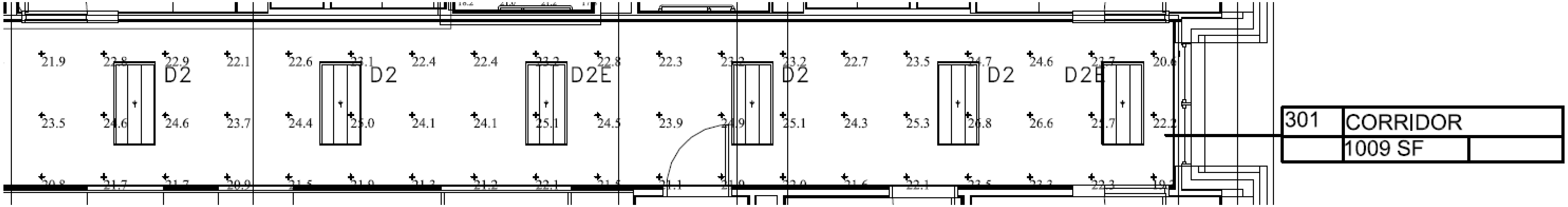
Area = 50.75 Sq.ft
Total Watts = 43.1
LPD = 0.849 Watts/Sq.ft



Corridor_LPD

Area = 915.88 Sq.ft
Total Watts = 393.5999
LPD = 0.430 Watts/Sq.ft





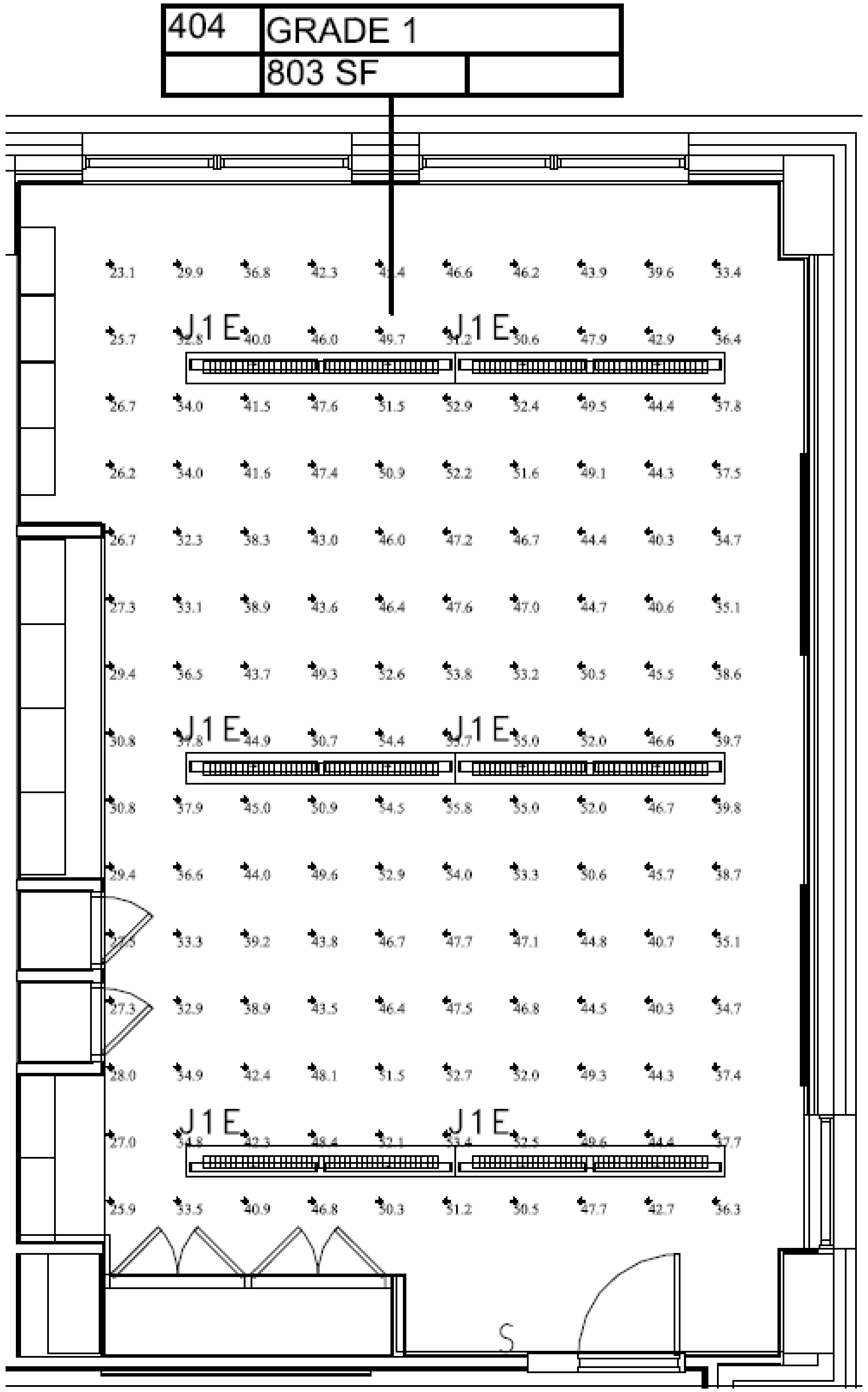
Luminaire Schedule											
Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Total Watts	Lumens/Lamp	Lum. Lumens	[MANUFAC]
▭	16	J	SINGLE	N.A.	0.900	7406LBEQN-RUN-7-VOLTS-E-FINISH	28.3	452.8	N.A.	3513	PHILIPS LEDALITE
▫	12	D2	SINGLE	N.A.	0.900	2CAG36L835-4-DS-UNV-DIM-DAYOCC 2X4 RECESSED SOFT LIGHT	32.8	393.6	N.A.	3617	PHILIPS DAY-BRITE - PHILIPS CFI
▫	1	C2	SINGLE	N.A.	0.900	2TF43L835-4-FS-02F-UNV	43.1	43.1	N.A.	4180	PHILIPS DAY-BRITE - PHILIPS CFI

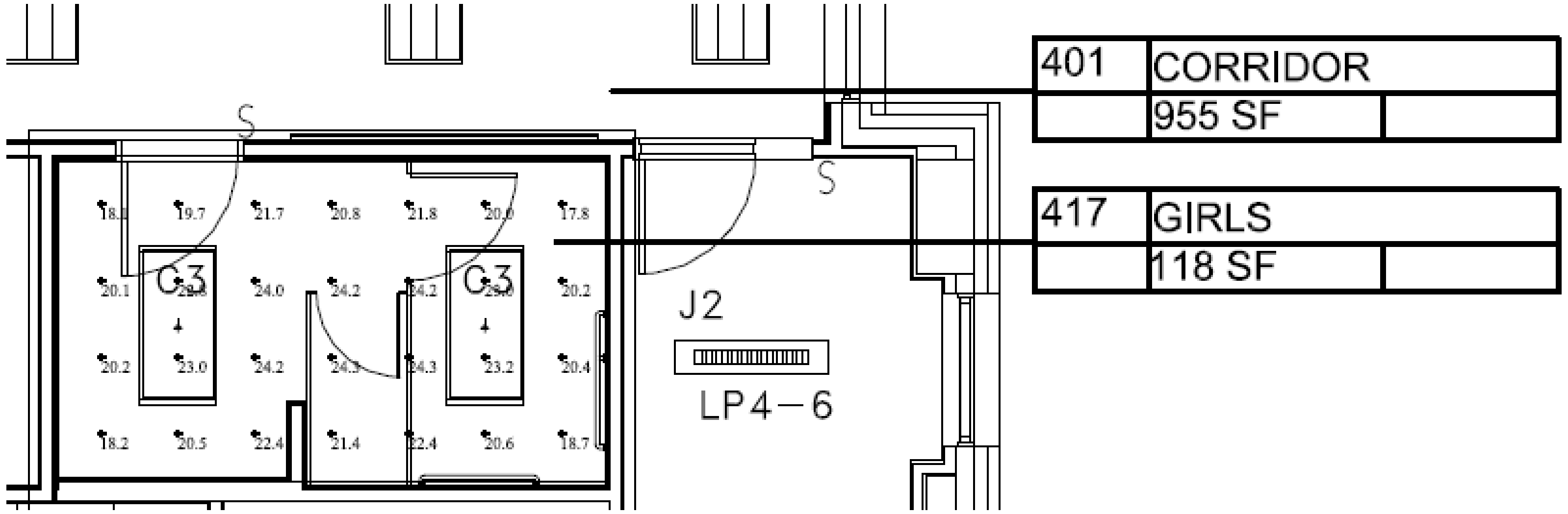
Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts_@ 18 INCHES AFF	Illuminance	Fc	22.50	26.8	16.8	1.34	1.60
Room 306A_Floor	Illuminance	Fc	20.84	24.5	17.5	1.19	1.40
Room_306_Workplane	Illuminance	Fc	49.31	62.0	26.9	1.83	2.30

LPD Area Summary			
Label	Area	Total Watts	LPD
Corridor_LPD	915.88	393.5999	0.430
Room 306A_LPD	50.75	43.1	0.849
Room_306_LPD	931.38	452.7999	0.486

Room_404_LPD

Area = 748.56 Sq.ft
Total Watts = 339.6
LPD = 0.454 Watts/Sq.ft





Room_417_LPD

Area = 123.25 Sq.ft
Total Watts = 65.6
LPD = 0.532 Watts/Sq.ft

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Total Watts	[MANUFAC]
▭	2	C3	SINGLE	N.A.	0.900	2CAF36L835-4-DS-UNV 2X4 FLANGED FOR HARD	32.8	65.6	PHILIPS DAY-BRITE - PHILIPS CFI
▭	12	J ALT 2	SINGLE	N.A.	0.900	7406LBEQN-RUN-7-VOLTS-E-FINISH	28.3	339.6	PHILIPS LEDALITE

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Room_404_Workplane	Illuminance	Fc	42.99	55.8	23.1	1.86	2.42
Room_417_Floor	Illuminance	Fc	21.51	24.3	17.8	1.21	1.37

LPD Area Summary

Label	Area	Total Watts	LPD
Room_404_LPD	748.56	339.6	0.454
Room_417_LPD	123.25	65.6	0.532

Credit Q8.1P & Q8.2: Acoustical 60% review.

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June 4, 2018

John Doherty, AIA
Mitchell | Giurgola Architects, LLP
630 Ninth Avenue, Suite 711
New York, NY 10036

Re: PS 347X Standalone Annex – Bronx, New York
60% Construction Documents Drawing Submission – Acoustical Review Report

Dear Mr. Doherty:

AKRF has completed a review of the PS 347X project 4/30/18 60% Construction Design architectural, structural and mechanical drawings package. Acoustical comments related to architectural, structural and MEP issues for the project are outlined below.

Action Item Ref	Description	Drawings / Ref	Issue	Action Required
ARCHITECTURAL				
A-1	Reading/Speech Resource Room (205) Partition Type K0.2	A102	Elevator Shaft Wall and Structure-borne Noise	Consider a free-standing stud (i.e., no bracing back to elevator shear wall) with a minimum 1/2-to-1-inch air gap separating the elevator shaft wall from the metal stud.
A-2	CSD Special Education (505) Partition Type K0.2	A105		Refer to Action Item A-1
A-3	Classroom Entry Doors Minimum STC-35 Rating Required	A910 and A911	Door Schedule/ STC Rating Coordination	Include *"Min. STC 35"* note in the Door Schedule "Remarks."
A-4	Classroom Entry Doors Head/Jamb/Door Bottom Sound Seals Required	A912 Detail 3	Door Details/ Acoustic Sound Seal Coordination	Details should include sound seals at the head, jamb, and door bottom locations.
A-5	Classroom Entry Doors Thresholds Required	A912	Maintain Acoustical Integrity	Flat, ungrooved thresholds are needed to maintain acoustical integrity. Door details should include thresholds.
A-6	Classroom Entry Doors Hollow Metal Frames	A912 Detail 3	Limit Noise Flanking from Corridor to Classrooms	Loosely pack hollow metal door frames with insulation (fiberglass or mineral wool) and fully seal to perimeter wall constructions with non-hardening acoustic caulk. Details should include insulation and caulking notes as appropriate.
A-7	Classroom Entry Door/Frame Side-lite Design	A912 Detail 6	DR 1.3.1.9 Glazing Minimum STC-35 Rating Required	Design to include minimum 1/4-inch thick laminated glass.
A-8	Cafeteria 102 Below Classrooms 204, 206, & 208	A801 and A900	DR 5.4.1, B.6 Acoustical Ceiling	2'x4' ceiling tile should be specified with the following minimum acoustic ratings: NRC 0.90 and CAC 40. Consider the following vendors/products:

<table>
<tr><th>Action Item Ref</th><th>Description</th><th>Drawings / Ref</th><th>Issue</th><th>Action Required</th></tr>
<tr><td></td><td></td><td></td><td>Tile Requirements</td><td>• Armstrong “Lyra High CAC” (<i>model #8732</i>).
• CertainTeed “Adagio” (<i>model #1660-IOF-1</i>).
• Rockfon “Sonar dB”.
Throughout the footprint of the Cafeteria, provide minimum 3-inch thick, 2.5 pcf density mineral wool loose laid over the top of the ceiling tile. Architect to review weight limit requirements of acoustic ceiling tile and grid system and modify as necessary to account for the added weight.</td></tr>
<tr><td>A-9</td><td>Boiler Room 510 Above Classrooms 410 & 412</td><td>A804</td><td>DR 1.3.1.9
Floor/Ceiling Assembly Airborne STC-60 Rating Required</td><td>Design to include minimum 3-inch thick, 2.5 pcf density mineral wool batt insulation above acoustic ceiling tile (ACT). Architect to review weight limit requirements of acoustic ceiling tile and grid system and modify as necessary to account for the added weight.</td></tr>
<tr><td colspan="5">STRUCTURAL</td></tr>
<tr><td>S-1</td><td>5th Floor Boiler Room Equipment
Boilers, Pumps, Heat Exchangers, Hot Water Heaters, etc.</td><td>S105</td><td>Housekeeping Pads not Shown on Drawings</td><td>Structural drawings to include the location of housekeeping pads as coordinated with architectural and mechanical drawings.</td></tr>
<tr><td colspan="5">MECHANICAL</td></tr>
<tr><td>M-1</td><td>VAV Boxes
Discharge Air Silencer Selection/Dynamic Insertion Loss (DIL) Values</td><td>M101-M105</td><td>DR 6.2.25
Meeting Background HVAC Design Goals in Classrooms/Library/ CSD Rooms</td><td>The following octave band DIL’s are required:
<table>
<tr><td>Freq.</td><td>63</td><td>125</td><td>250</td><td>500</td><td>1k</td><td>2k</td><td>4k</td><td>8k</td></tr>
<tr><td>DIL</td><td>10</td><td>11</td><td>13</td><td>17</td><td>24</td><td>31</td><td>18</td><td>10</td></tr>
</table>
DIL values are based on Vibro-Acoustics ultra-low velocity rectangular film lined silencer (Model: RFL-ULV-AC4). Silencer length = 3-ft and pressure drop = 0.11 inch w.g.
See attached Markup of the Duct Silencer Schedule on M002.00.</td></tr>
<tr><td>M-2</td><td>AHU-1 Return Air Noise</td><td>M105</td><td>DR 6.2.25
Meeting Background HVAC Design Goals in Classrooms</td><td>Add 1-inch thick acoustical lining* for minimum 20 feet downstream of AHU return duct opening.
<i>*Note: Lining shall adhere to SCA criteria including: (1) meeting ASTM C1338, G21, and G22 properties and (2) coated with an acrylic polymer. Liners that meet these criteria include Johns Manville “Linacoustic R-300”, CertainTeed “ToughGard T Textile Liner”, or similar.</i></td></tr>
<tr><td>M-3</td><td>Volume Damper Design
Classrooms, Reading/Speech Room, Library, Exercise Room, Offices, and Cafeteria</td><td>M101-M105</td><td>DR 6.2.25
Limit Aerodynamically Generated Noise</td><td>Locate volume dampers (and other balancing/control dampers) a minimum of four (4) duct diameters up-stream of all supply/return air terminal grilles, registers, and diffusers. Subsequent drawing set should clearly indicate volume dampers.</td></tr>
<tr><td>M-4</td><td>Classrooms, Reading/Speech Room, Library, Exercise Room, Offices, and Cafeteria</td><td>M101-M105
Ref: M501</td><td>Flexible Ducts Diffusor Noise/Poor Air Distribution Profile</td><td>Improperly designed/installed flexible duct can increase background noise levels anywhere from 12-15 decibels. Flexible duct should be no greater than 5 feet length (preferably 3 feet) and should be specified as non-metallic type (e.g., Flexmaster USA Type 6B). For coordination purposes, include attached Sketch 170293-01.</td></tr>
<tr><td>M-5</td><td>AHU-1
44”x24” Supply Air & 50”x24” Return Air Ducts</td><td>M105</td><td>DR 6.2.25
Controlling Break-Out Noise in 5th</td><td>In lieu of lighter 22/20-guage ducts, all main supply and return ducts located within the footprint of the classroom to include minimum 18-gauge sheetmetal.</td></tr>
</table>

Action Item Ref	Description	Drawings / Ref	Issue	Action Required
			Floor Classrooms	For coordination purposes, include a note on M105.
M-6	Exhaust Fan Ductwork		DR 6.2.25 Controlling Break-Out Noise in 5th Floor Classrooms	Refer to Action Item M-5.
M-7	Rooftop Mounted Downblast/Upblast Exhaust Fans Located Above Classroom(s)	M504 "Roof Exhaust Fan Detail"	Structureborne/ Vibration Isolation	In lieu of a pre-fabricated non-isolated curb, consider including vibration isolated curbs similar to Kinetics "KSCR" (see attached cutsheet) or equal. These curbs have been successfully used in this application by the vendor.
SPECIFICATIONS				
Spec-1	Wood Doors	08210	Meeting DR 1.3.1.9 STC-35 Requirement	See attached specification markups.
Spec-2	Vibration Isolation	15504	Coordination	
Spec-3	Packaged Modular Outdoor Chillers	15660	NYC Noise Code	

If you have any questions, please do not hesitate to contact me at mmanis@akrf.com or 646-388-9553.

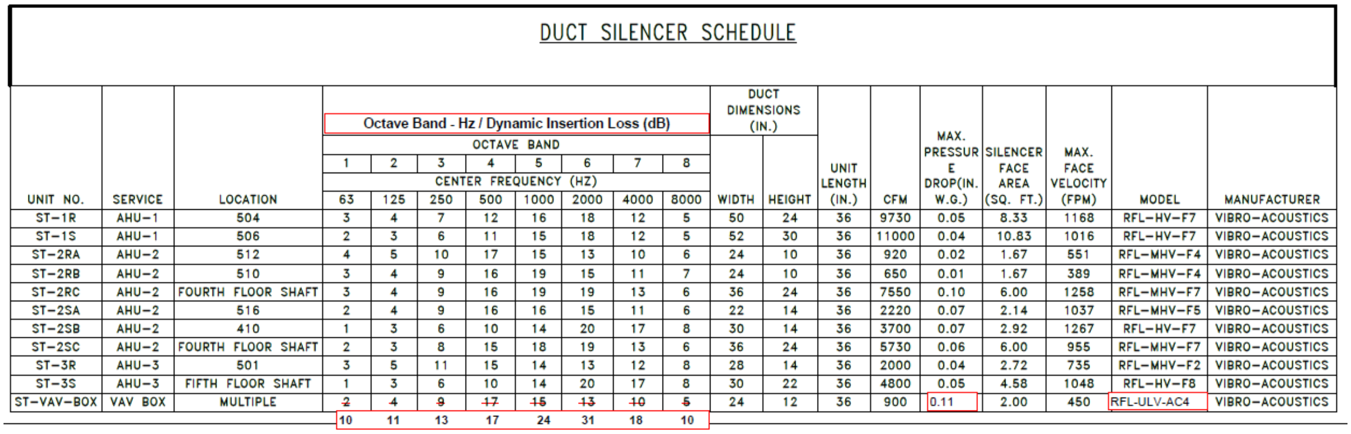
Sincerely,

Matthew Manis

Matthew Manis
Technical Director – Acoustics, Noise & Vibration

cc: Wai Yin / Mitchell | Giurgola Architects, LLP
Yuriy Shiller, Arkady Kats, Jose Valencia / DVL Consulting Engineers
Andre Brzozowski, Marco Coco / Thornton Tomasetti
Lucas Johnson / AKRF, Inc.

Mark-ups



DUCT SILENCER SCHEDULE

			Octave Band - Hz / Dynamic Insertion Loss (dB)								DUCT DIMENSIONS (IN.)								
			OCTAVE BAND																
			1	2	3	4	5	6	7	8									
			CENTER FREQUENCY (HZ)																
UNIT NO.	SERVICE	LOCATION	63	125	250	500	1000	2000	4000	8000	WIDTH	HEIGHT	UNIT LENGTH (IN.)	CFM	MAX. PRESSURE DROP(IN. W.G.)	SILENCER FACE AREA (SQ. FT.)	MAX. FACE VELOCITY (FPM)	MODEL	MANUFACTURER
ST-1R	AHU-1	504	3	4	7	12	16	18	12	5	50	24	36	9730	0.05	8.33	1168	RFL-HV-F7	VIBRO-ACOUSTICS
ST-1S	AHU-1	506	2	3	6	11	15	18	12	5	52	30	36	11000	0.04	10.83	1016	RFL-HV-F7	VIBRO-ACOUSTICS
ST-2RA	AHU-2	512	4	5	10	17	15	13	10	6	24	10	36	920	0.02	1.67	551	RFL-MHV-F4	VIBRO-ACOUSTICS
ST-2RB	AHU-2	510	3	4	9	16	19	15	11	7	24	10	36	650	0.01	1.67	389	RFL-MHV-F4	VIBRO-ACOUSTICS
ST-2RC	AHU-2	FOURTH FLOOR SHAFT	3	4	9	16	19	19	13	6	36	24	36	7550	0.10	6.00	1258	RFL-MHV-F7	VIBRO-ACOUSTICS
ST-2SA	AHU-2	516	2	4	9	16	16	15	11	6	22	14	36	2220	0.07	2.14	1037	RFL-MHV-F5	VIBRO-ACOUSTICS
ST-2SB	AHU-2	410	1	3	6	10	14	20	17	8	30	14	36	3700	0.07	2.92	1267	RFL-HV-F7	VIBRO-ACOUSTICS
ST-2SC	AHU-2	FOURTH FLOOR SHAFT	2	3	8	15	18	19	13	6	36	24	36	5730	0.06	6.00	955	RFL-MHV-F7	VIBRO-ACOUSTICS
ST-3R	AHU-3	501	3	5	11	15	14	13	12	8	28	14	36	2000	0.04	2.72	735	RFL-MHV-F2	VIBRO-ACOUSTICS
ST-3S	AHU-3	FIFTH FLOOR SHAFT	1	3	6	10	14	20	17	8	30	22	36	4800	0.05	4.58	1048	RFL-HV-F8	VIBRO-ACOUSTICS
ST-VAV-BOX	VAV BOX	MULTIPLE	~~2~~	~~4~~	~~9~~	~~17~~	~~15~~	~~13~~	~~10~~	~~5~~	24	12	36	900	0.11	2.00	450	RFL-ULV-AC4	VIBRO-ACOUSTICS
			10	11	13	17	24	31	18	10									

6

SECTION 08210
WOOD DOORS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

3

A. Provide all interior flush wood doors with wood veneer, factory-finished, prefit and premachined as indicated on the Drawings and as specified herein.

B. Reference Specification: 08730: Thresholds, Weatherstripping and Seals

1.02 SUSTAINABILITY REQUIREMENTS

A. Sustainability requirements included in the Section are as follows:

1. Restrictions on the use of urea-formaldehyde containing materials.

4

B. The Contractor shall implement practices and procedures to meet the Project's sustainable requirements. The Contractor shall ensure that the requirements related to these goals, as defined in Specification Section S01352, Sustainability Requirements, and as specified in this Section, are implemented to the fullest extent. Substitutions or other changes to the work shall not be proposed by the Contractor or their sub-contractors if such changes compromise the stated Sustainable Design Performance Criteria.

1.03 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. Architectural Woodwork Institute's (AWI) Architectural Woodwork Standards (AWS) Section 9 Doors, Section 5 Finishing, Section 4 Sheet products.

With the written permission of the Architect, sample doors may be incorporated into the finished work.

4. Perforated Metal panels - 12" by 12" corner sample with frame and finish.

5. Door Louver.

D. Quality Assurance Certifications (per Par. 1.05 C.)

E. Warranty per Article 1.08

F. Certification and '

G. STC test certificate for acoustical doors.

ASTM E90

classroom entry

including all scheduled perimeter sound seals, and automatic drop bottoms.

1. Classroom entry doors to achieve minimum STC 35.

H. Low Emitting Materials Compliance Submittals

1. Provide documentation for each adhesive and glue to be used indicating that the adhesives and glues comply with V.O.C. requirements as stated in Specification Section G01600.

I. Sustainability Submittals

1. Submit manufacturer's documentation that composite wood doors used within the weatherproofing/waterproof membrane (interior) of the building are manufactured without the use of any added urea-formaldehyde. This requirement includes binders, and laminating adhesives used in the shop. Submit manufacturer's documentation of the resin used in lieu of urea-formaldehyde.

1.05 QUALITY ASSURANCE

A. Standards

Unless otherwise specified, comply with the applicable requirements of the "Architectural Woodwork Standards (2009)" (AWS), Sections 4, 5 and 9, Premium Grade.

B. Manufacturer

Minimum 5 years successful experience in manufacturing the type of doors specified.

D. Transom and Side Panels

Panels of identical quality and appearance as associated wood doors where panels are indicated in the same framing system as wood doors.

E. Acoustical Doors

Doors shall comply with all applicable requirements for solid core flush interior doors and in addition shall comply with requirements as hereinafter specified.

1. Thickness: $1^3/_4$".

including seals and frame

2. STC for operable leaf: 35 , tested in accordance with ASTM E90. Submit test report to the Authority.

3. Finish of door: as indicated on the Drawings.

4. Contractor shall submit letter to the Authority indicating that the acoustical door proposed will be installed per manufacturer's recommendations to provide acoustical rating range noted above.

5. Acoustical seal set

   Perimeter seal provided to meet specified acoustical rating. Finish to match door hardware.

6. Threshold Seal: Plunger operated, self-retracting neoprene gasket sweep. Mechanism to be completely housed in bottom of door.

7. Door with vision panel

   a) Provide factory installed lite to meet specified acoustical rating

   or

   b) Provide cutout for glazing to receive noise reducing glass as specified under Section 08800.

   c) Classroom entry doors with vision panel to achieve minimum STC 35.

C. Vibration isolation equipment installed outdoors shall be designed and installed to resist wind loads in accordance with the NYC Building Code.

3.02 SUPPLEMENTAL INSTALLATION

A. At each equipment location, provide the required deflection under the imposed load to produce uniform loading and deflection even when equipment weight is not evenly distributed. Jack inertia blocks and bases into position and wedge in place before spring loading; leveling bolts shall not be used as jacking screws. After equipment is in place and springs are loaded through leveling bolts, remove wedges and jacks. Isolators shall be suitable for the lowest operating speed of the equipment.

B. Where the floor is waterproofed or finished with waterproof cement, install vibration isolation in such manner that the waterproofing is not damaged.

C. Isolation equipment shall be in accordance with the following table:

Lowest RPM	Inches Deflection (Min.)	% Efficiency (Min.)	Type
1750 & over	.25	95	Single neoprene-in-shear
1200-1749	.50	95	Double neoprene-in-shear
1000-1199	.75	95	Spring
570-999	1.25	90-95	Spring
520-569	1.5	90	Spring
330-519	2.0	80-90	Spring
Up to 329	3.5	80	Spring
VFD	4.0	80	Spring

requirement with isolators internal to the container providing the isolators meet the above minimum isolator efficiencies.

J. Per Section MC 928.3.5, all pumps of 3 horsepower or more located on any floor other than a floor on grade shall be supported on vibration isolators having a minimum isolation efficiency of 90 percent at the lowest disturbing frequency. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of 1/4”.

K. Per Section MC 928.3.6, compressors and drives located on a floor other than a floor on grade shall be mounted on vibration isolators having a minimum isolation efficiency of 90 percent at the lowest disturbing frequency. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of 1/4”.

L. Duct Connections to Fan Equipment: As per Section MC 928.3.9, flexible connections shall be installed between fan equipment and connecting ductwork.

3.03 SCHEDULE

A. Provide vibration isolation supports for HVAC equipment as indicated in this schedule. Contractor shall submit a schedule for approval by Engineer of Record indicating the type of support for each item of Plumbing & Drainage Equipment and each item of Electrical Equipment.

Equipment	Location	Type of Support
Air Handling Unit	roof mounted	springs on elevated steel platform
Chiller	roof mounted	springs on elevated steel platform
Fans	mounted above grade	Springs on Integral Structural Steel Base
Pump, 3 H.P. or more	upper floor	inertia block
Pipe, refrigerant	equipment room	spring and D.D.* hanger
Pipe, hot and/	at pumps	spring and D.D.*

or chilled water		hanger
VAV Box	Ceiling Hung	spring and D.D. hanger

*D.D. = Double Deflecting

Heat Exchangers	Mounted	Elastomer pad Isolator

3.04 FIELD QUALITY CONTROL

A. On completion of the vibration isolation system herein specified, the representative of the vibration isolation manufacturer shall inspect the completed systems and report in writing any installation error, improperly selected isolation devices, or any other faults that could affect performance. Submit report indicating steps taken to properly complete the isolation work. Both of these reports shall be reviewed by the Authority for final approval.

END OF SECTION

G. All warranties signed by the Manufacturer specified in this Section

H. Maintenance materials

I. Start-up service reports

J. Operation and Maintenance Data: Submittals shall include all the required refrigeration equipment including the Operation and Maintenance manuals; and the maintenance data specified in Section 15501.

K. Certificate: Contractor's start-up and demonstration affidavit

L. Manufacturer's Octave Band Sound Pressure Level at 30-feet.

1.05 SUPPLEMENTAL QUALITY ASSURANCE

A. Codes and Standards

1. Capacity ratings shall be in accordance with ARI 550/590 Standard.

2. Refrigeration system shall be constructed in accordance with ASHRAE 15-2010: Safety Standard for Refrigeration Systems as modified by NYC Mechanical Code Chapter 11.

3. Packaged air cooled modular chiller shall meet the minimum COP/Efficiency levels as prescribed in the 2016 New York City Energy Conservation Code and ASHRAE 90.1-2013 as modified by Appendix CA of the 2016 NYCECC at both full load and partial load (i.e. Integrated Part Load Value-IPLV).

4. All electrical components shall be UL or ETL listed and labeled. Wiring internal to the unit shall be wired to a numbered terminal strip for simplified identification and ease of trouble shooting.

5. Comply with the 1990 Clean Air Act and all other Federal, State and City Codes and Regulations.

6. NFPA latest recommendations.

B. Permits necessary for work in connection with the installation of the refrigeration equipment and the operation thereof shall be obtained by the Contractor, free of charge to the Authority, from the Department of Buildings, Fire Department, Department of Buildings Electrical independent of other circuits from a refrigeration and electrical stand-point. The multi-circuit chiller must be able to produce chilled water even in the even of a failure of one or more refrigerant circuits.

H. Chiller Modules shall be ETL listed or UL listed in accordance with UL Standard 1995, CSA certified per Standard C22.2#236, and bear the ASME UM stamp on all water-to-refrigerant heat exchangers.

I. Modules shall ship wired and charged with refrigerant. All modules shall be factory run tested prior to shipment.

J. Compressors, heat exchangers, condenser fans, piping and controls sh on a heavy gauge steel frame. Electrical tors, and relays for each module shall be m hat module. Module shall be provided wi aluminum enclosure suitable for outdoor use aces shall be provided with a corrosion r nish.

including fan discharge silencer, upper frame acoustic intake louvers and acoustic compressor wraps

K. The maximum sound pressure level in dB re 20 µPa at a distance of 30 feet from the combination of all chiller modules shall be as follows:

Center Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Overall dBA
Band Designation	1	2	3	4	5	6	7	8	
Db	63	67	65	59	52	50	46	38	61

2.02 MODULAR CHILLER COMPONENTS

A. Chilled Water Mains: Each module shall include supply and return mains for chilled water. Grooved end connections shall be provided for interconnection to piping with Victaulic type couplings.

B. Evaporators: Each evaporator shall be a brazed plate heat exchangers constructed of 316 stainless steel; designed, tested, and stamped in accordance with ASME code for 360 psig water-side working pressure. Evaporator heat exchanger shall not be mounted above the compressor, to prevent the effect of migration of refrigerant to the cold evaporator with consequent liquid slugging on start-up.

C. Compressor: Each module shall contain two hermetic scroll compressors mounted to the module with rubber-in-shear

Each scroll compressor to be acoustically wrapped.

isolators. Each system shall also include high discharge pressure and low suction pressure safety cut-outs. Compressor motors shall not exceed 15 Hp.

D. Condenser Fans: Each module shall contain dual condenser fans for each refrigerant circuit. These fans shall be multi-blade vane-axial type made of plastic composite material for quiet operation. Fans shall be direct drive at maximum RPM of 1,150. Fan motors shall all be pressure controlled and suitable for outdoor use.

E. Low Ambient to 0°F: Chiller shall incorporate appropriate refrigerant specialties for operation to 0°F.

F. Single point power connection: Chiller shall be provided with a single point power connection. This will include pre-engineered wiring for field installation and connection to a factory mounted chiller junction box. Junction box shall include individual circuit protection for each Module Set and provide a single point of connection to building power.

G. Condenser Coils: Air cooled condenser coils shall have aluminum fins mechanically bonded to copper tubing. Condensers shall have integral sub-cooling circuitry and be factory leak tested.

H. Per Section MC 1101.12, refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps requiring a special tool or key to open.

I. Provide manufacturer recommended fan discharge silencers and acoustic intake louvers to achieve maximum permissible sound pressure levels at 30 feet according to section 2.01.K.

2.03

A. Each chiller module safety controls shall be provided (minimum) as follows:

1. Low evaporator refrigerant pressure
2. Loss of water flow through the evaporator
3. High condenser refrigerant pressure
4. High compressor motor temperature
5. Low suction gas temperature
6. Low leaving evaporator water temperature

Acoustical 100% review:

AKRF
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July 30, 2018

John Doherty, AIA
Mitchell | Giurgola Architects, LLP
630 Ninth Avenue, Suite 711
New York, NY 10036

Re: PS 347X Standalone Annex – Bronx, New York
100% Construction Documents Drawing Submission – Acoustical Review Report

Dear Mr. Doherty:

AKRF has completed a review of the PS 347X project 7/09/18 100% Construction Design architectural, structural and mechanical drawings package. Acoustical comments related to architectural, structural and MEP issues for the project are outlined below.

Action Item Ref	Description	Drawings / Ref	Issue	Action Required
ARCHITECTURAL				
A-1	Reading/Speech Resource Room (205) Partition Type K0.2	A102	Elevator Shaft Wall and Structure-borne Noise	Consider a free-standing stud (i.e., no bracing back to elevator shear wall) with a minimum 1/2-to-1-inch air gap separating the elevator shaft wall from the metal stud.
A-2	CSD Special Education (505) Partition Type K0.2	A105		Refer to Action Item A-1
A-3	Classroom Entry Doors Minimum STC-35 Rating Required	A910 and A911	Door Schedule/ STC Rating Coordination	Include *"Min. STC 35"* note in the Door Schedule "Remarks."
A-4	Classroom Entry Doors Head/Jamb/Door Bottom Sound Seals Required	A912 Detail 3	Door Details/ Acoustic Sound Seal Coordination	Details should include sound seals at the head, jamb, and door bottom locations.
A-5	Classroom Entry Doors Hollow Metal Frames	A912 Detail 3	Limit Noise Flanking from Corridor to Classrooms	Loosely pack hollow metal door frames with insulation (fiberglass or mineral wool) and fully seal to perimeter wall constructions with non-hardening acoustic caulk. Details should include insulation and caulking notes as appropriate.
A-6	Classroom Entry Door/Frame Side-lite Design	A912 Detail 2	DR 1.3.1.9 Glazing Minimum STC-35 Rating Required	Design to include minimum 1/4-inch thick laminated glass.
STRUCTURAL				
S-1	5th Floor Boiler Room Equipment Boilers, Pumps, Heat Exchangers, Hot Water	S105	Housekeeping Pads not Shown on Drawings	Structural drawings to include the location of housekeeping pads as coordinated with architectural and mechanical drawings.

Action Item Ref	Description	Drawings / Ref	Issue	Action Required
	Heaters, etc.			
MECHANICAL				
M-1	Classrooms 504 & 506 AHU-1 44"x24" Main Supply Air Duct Above ACT / Occupied Spaces	M105	Excessive Velocity Noise ASHRAE Noise & Vibration Control Guidelines	Calculations indicate velocities are approximately 1,600 feet / minute. Maximum duct airflow velocities should be no greater than 1,500 feet / min. for all classroom spaces with a NC 35 background design goal. DVL to explore if 44"x24" ducts can be enlarged to 48"x24".
M-2	Classrooms, Reading/Speech Room, Library, Exercise Room, Offices, and Cafeteria	M101-M105 Ref: M501	Flexible Ducts Diffusor Noise/Poor Air Distribution Profile	Flexible duct should be no greater than 5 feet length (preferably 3 feet) and should be specified as non-metallic type (e.g., Flexmaster USA Type 6B). Include **Sketch 170293-01** onto the appropriate mechanical details sheet or add a general note on Sheets M101-M105.

If you have any questions, please do not hesitate to contact me at mmanis@akrf.com or 646-388-9553.

Sincerely,

Matthew Manis

Matthew Manis
Technical Director – Acoustics, Noise & Vibration

cc: Wai Yin / Mitchell | Giurgola Architects, LLP
Yuriy Shiller, Arkady Kats, Jose Valencia / DVL Consulting Engineers
Andre Brzozowski, Marco Coco / Thornton Tomasetti
Lucas Johnson / AKRF, Inc.

Acoustical Compliance Memo:

AKRF
440 Park Avenue South
7th Floor
New York, NY 10016
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www.akrf.com

Memorandum

To: Wai-Yin Leung / Mitchell Giurgola Architects LLP
From: Lucas Johnson
Date: September 11, 2018
Re: SCA PS347X – Green School Guide (GSG) Compliance
cc: John Doherty / Mitchell Giurgola Architects LLP
Matthew Manis / AKRF, Inc.

ARKF has reviewed the Bid Documents set dated 8/24/18 with regard to NYC GSG Credits Q8.1p (Minimum Acoustical Performance), Q8.2 (Sound Isolation for Special Space), and Credit Q8.3 (Acoustic Windows).

The project has been designed to meet all acoustical goals with regards to reverberation times, interior/exterior sound isolation, background sound level goals (Q8.1p), sound isolation for special spaces (Q8.2) and acoustic windows (Q8.3). All previous acoustical comments/recommendations have been incorporated into the Bid Set submission.

Lucas Johnson

Lucas Johnson
Acoustical Consultant

Q8.3: Window Acoustical Laboratory Test Report

Architectural Testing

AAMA 1801 SOUND TRANSMISSION LOSS
TEST REPORT

Rendered to:

GRAHAM ARCHITECTURAL PRODUCTS INC.

SERIES/MODEL: 6800

TYPE: Fixed Over Hopper Window

Summary of Test Results					
Data File No.	**Glazing (Nominal Dimensions)**	***Operating Force**	****Air Infiltration**	**STC**	**OITC**
D6519.01A	Primary 1" IG (5/16" laminated, 3/8" air space, 5/16" laminated), Secondary 5/16" laminated, Glass temperature 75°F	Pass	Pass	48	37

**The maximum allowable operating force, according to AAMA/WDMA/CSA 101/I.S.2/A440, is 30.35 lbs for AW performance class, fixed over hopper windows.*

***The maximum allowable air leakage rate, according to AAMA/WDMA/CSA 101/I.S.2/A440-11, is 0.10 cfm/ft^2 when the test pressure is 6.27 psf for AW performance class, fixed over hopper windows.*

Reference should be made to Architectural Testing, Inc. Report No. D6519.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

ACCREDITED
TL-144

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

GRAHAM ARCHITECTURAL PRODUCTS INC.
1551 Mount Rose Avenue
York, Pennsylvania 17403

Report No:	D6519.01-113-11
Test Date:	03/27/14
Report Date:	04/09/14
Record Retention End Date:	03/27/18

Test Sample Identification:

Series/Model: 6800

Type: Fixed Over Hopper Window

Performance Class: AW

Overall Size: 48" by 72"

Glazing (Nominal Dimensions):

Primary: 1" IG (5/16" Laminated, 3/8" Air Space, 5/16" Laminated)

Secondary: 5/16" Laminated

Glass Temperature: 75°F

Project Scope: Architectural Testing, Inc. was contracted by Graham Architectural Products Inc. to conduct operating force, air leakage, and sound transmission loss tests on a Series/Model 6800, fixed over hopper window. A summary of the results is listed in the Test Results section, and the complete test data is included as Appendix B of this report. The sample was provided by the client.

Test Methods: The acoustical test was conducted in accordance with the following:

AAMA 1801-11, Voluntary Specification for the *Acoustical Rating of Windows, Doors, and Glazed Wall Sections.*
ASTM E 1425-07, *Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors.*
ASTM E 90-09, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.*
ASTM E 413-10, *Classification for Rating Sound Insulation.*

Test Methods: (Continued)

ASTM E 1332-10a, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation.*
ASTM E 283-04 (Reapproved 2012), *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.*
ASTM E 2235-04 (Reapproved 2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods.*
ASTM E 2068-00 (Reapproved 2008), *Standard Test Method for Determination of Operating Force of Sliding Windows and Doors.*

Test Equipment: The equipment used to conduct this test meets the requirements of ASTM E 90. The microphones were calibrated before conducting the sound transmission loss test. The test equipment and test chamber descriptions are listed in Appendix A.

Sample Installation: Sound transmission loss tests were initially performed on a filler wall that was designed to test window specimens. The filler wall achieved an STC rating of 69.

The specimen plug was removed from the filler wall assembly. The window was placed on an isolation pad in the test opening. Duct seal was used to seal the perimeter of the window to the test opening on both sides. The interior side of the window frame, when installed, was approximately 1/4" from being flush with the receiving room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing. The vent was opened and closed at least five times prior to testing.

Test Procedure:

Operating Force Test - The Type B method, which utilizes a force gauge, was used to determine the breakaway and operating forces required to open and close the vent.

Air Leakage Test - The window was closed and locked for this test. A negative pressure of 6.27 psf was applied inside the chamber that was placed around the interior side of the window. The total air leakage and extraneous air leakage measurements were used to calculate the specimen air leakage. Barometric pressure corrections were applied to the air leakage calculations.

Sound Transmission Loss Test - The window was also closed and locked for this test. The sound transmission loss test was conducted in accordance with the ASTM E 90 test method using a single direction of measurement. The sound transmission loss test consisted of the following measurements: one background noise sound pressure level and five sound absorption measurements were conducted at each of the five microphone positions. Two sound pressure level measurements were made simultaneously in both rooms at each of the five microphone positions. The air temperature and relative humidity conditions were monitored and recorded during the background, absorption, source, and receive room measurements.

Sample Descriptions:

Frame Construction:

	Frame
Size	48" by 72"
Thickness	3-1/2"
Corners	Coped
Fasteners	Screws
Seal Method	Sealant
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	Urethane
Daylight Opening Size	43-1/8" by 37-7/16"

Vent Construction:

	Vent
Size	48" by 72"
Thickness	3-1/2"
Corners	Mitered
Fasteners	Keyed and staked
Seal Method	Sealant
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	Urethane
Daylight Opening Size	40-5/16" by 24-3/16"

N/A-Non Applicable

Sample Descriptions: (Continued)

Secondary Access Panel Construction:

	Panel
Size	43-1/4" by 37-7/8"
Thickness	1/2"
Corners	Mitered
Fasteners	Screws
Seal Method	None
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	N/A
Daylight Opening Size	40-1/2" by 35-1/16"

Primary Fixed Glazing:

Measured Overall Insulation Glass Unit Thickness	0.931"
Spacer Type	Aluminum

	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.116", 0.058", 0.116"	0.352"	0.116", 0.057", 0.116"
Muntin Pattern	N/A	N/A	N/A
Material	Laminated	Air*	Laminated
Laminate Material	PVB	N/A	PVB

Glazing Method	Interior
Glazing Material	Silicone
Glazing Bead Material	Aluminum

**- Stated per Client/Manufacturer, N/A-Non Applicable*

Sample Descriptions: (Continued)

Primary Vent Glazing:

Measured Overall Insulation Glass Unit Thickness	1.014"
Spacer Type	Aluminum

	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.116", 0.059", 0.116"	0.432"	0.116", 0.059", 0.116"
Muntin Pattern	N/A	N/A	N/A
Material	Laminated	Air*	Laminated
Laminate Material	PVB	N/A	PVB

Glazing Method	Interior
Glazing Material	Silicone
Glazing Bead Material	Aluminum

Note: *Glass-to-glass air space was 1-9/16".*

Secondary Glazing:

	Exterior Sheet
Measured Thickness	0.116", 0.059", 0.116"
Muntin Pattern	N/A
Material	Laminated
Laminate Material	PVB
Glazing Method	Channel

**- Stated per Client/Manufacturer, N/A-Non Applicable*

Sample Descriptions: (Continued)

Components:

TYPE	QUANTITY	LOCATION
Weatherstrip		
1/8" Hollow bulb gasket	1 Row	Jambs at secondary panel
1/4" Hollow bulb gasket	1 Row	Primary frame: Head, sill and intermediate at secondary panel
1/4" Hollow bulb gasket	2 Rows	Vent perimeter (3" cut out at stiles top corner of exterior row)
Hardware		
Multi-point hinge	2	Jambs at vent
Sweep lock	2	Vent top rail
Keeper	2	Intermediate at vent
Sweep lever	2	Secondary access panel jambs
Drainage		
Weep slot with cover	3	Sill

Sample Weight:

Overall Sample Area:	m^2	ft^2
	2.23	24.00

Test Specimen	**Total Weight**		**Weight Per Unit Area**	
	kg	lbs	kg / m^2	lbs / ft^2
	118	260	52.91	10.84

**- Stated per Client/Manufacturer, N/A-Non Applicable*

Comments: The design drawings (included in Appendix C) supplied by the client, accurately describe the Series/Model 6800, fixed over hopper window. The dimensions on the drawings that are circled and/or checked were verified against the test specimen. The window was disassembled, and the components will be retained by Architectural Testing for four years. Photographs of the test specimen are included in Appendix D.

Test Results: The STC (Sound Transmission Class) rating was calculated in accordance with ASTM E 413. The OITC (Outdoor-Indoor Transmission Class) was calculated in accordance with ASTM E 1332. A summary of the operating force, air leakage, and sound transmission loss test results on the Series/Model 6800, fixed over hopper window is listed below.

Summary of Test Results					
Data File No.	**Glazing (Nominal Dimensions)**	***Operating Force**	****Air Infiltration**	**STC**	**OITC**
D6519.01A	Primary 1" IG (5/16" laminated, 3/8" air space, 5/16" laminated), Secondary 5/16" laminated, Glass temperature 75°F	Pass	Pass	48	37

**The maximum allowable operating force, according to AAMA/WDMA/CSA 101/I.S.2/A440, is 30.35 lbs for AW performance class, fixed over hopper windows.*

***The maximum allowable air leakage rate, according to AAMA/WDMA/CSA 101/I.S.2/A440-11, is 0.10 cfm/ft^2 when the test pressure is 6.27 psf for AW performance class, fixed over hopper windows.*

The complete test results are listed in Appendix B. Flanking limit tests and reference specimen tests are available upon request.

Architectural Testing will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC:

Kurt A. Golden
Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Senior Technician - Acoustical Testing

Todd D. Kister
Digitally Signed by: Todd D. Kister

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

KAG:jmcs
Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (4)
- Appendix-C: Design drawings (11)
- Appendix-D: Photographs (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	04/09/14	N/A	Original test report

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Analyzer	Hewlett Packard	HP35670A	Real time analyzer	004112	06/13 *
Data Acquisition Unit	Agilent	34970A	Data Acquisition Unit	62211	07/13
Receive Room Microphone	GRAS	40 AR	1/2" Microphone	Y003247	02/14
Source Room Microphone	GRAS	40 AR	1/2" Microphone	Y003239	02/14
Receive Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	63260	04/13
Source Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	005656	06/13
Microphone Calibrator	Bruel & Kjaer	Type 4228	Pistonphone Calibrator	Y002816	02/14
Noise Source	Delta Electronics	SNG-1	Noise Generator	Y002181	N/A
Equalizer	Rane	RPE 228	Programmable Equalizer	Y002180	N/A
Power Amplifiers	Crown	Xti 2000	Two, Amplifiers	005769 005770	N/A
Receive Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y001784 Y001785	N/A
Source Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y002649 Y002650	N/A
Receive Room Environmental Indicator	Vaisala	HMW92	Temperature and Humidity Sensor	064286	05/13
Source Room Environemental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	Y002653	05/13
Weather Station	Davis Instruments	VantagePRO 6150C	Weather Station	Y003257	06/13
Lab Pack	Architectural Testing, Inc.	NA	Lab Pack	Y001618	02/14
Force Gauge	Chatillon	LG-50	Force Gauge	063156	10/14

**- Note: The calibration frequency for this equipment is every two years per the manufacturer's recommendation.*

Test Chamber:

	Volume	Description
Receive Room	234 m^3 (8291.3 ft^3)	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	206.6 m^3 (7296.3 ft^3)	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m (14 ft) wide by 3.05 m (10 ft) high	Vibration break between source and receive rooms

N/A-Non Applicable

Appendix B

Complete Test Results

Architectural Testing

ACCREDITED
TL-144

SOUND TRANSMISSION LOSS
ASTM E 90

Test Date	03/27/14		
ATI No.	D6519.01A		
Client	Graham Architectural Products		
Specimen	Series/Model: 6800, fixed over hopper window with Primary 1" IG (5/16" laminated, 3/8" air space, 5/16" laminated), Secondary 5/16" laminated, Glass temperature 75°F		
Operator	Kurt Golden		
Sample Area	2.23 m^2		
Filler Area	10.77 m^2		
	Source	Receive	Specimen
Temp C	22	23	23
RH %	56	51	53

Freq (Hz)	**Bkgrd SPL** (dB)	**Absorp** (m^2)	**Source SPL** (dB)	**Receive SPL** (dB)	**Filler TL** (dB)	**Specimen TL** (dB)	**95% Conf Limit**	**No. of Defi-ciencies**	**Trans Coef Diff**
80	41	5.7	93	68	33	22	2.2	-	5.8
100	38	6.1	99	70	39	26	3.0	-	7.9
125	39	4.8	104	68	47	33	2.3	0	7.8
160	40	4.9	105	66	48	37	1.4	0	5.7
200	34	5.1	110	73	53	34	1.1	4	11.9
250	33	5.7	110	68	57	38	0.9	3	12.0
315	29	5.6	107	62	61	41	0.8	3	13.5
400	26	5.9	106	59	66	43	0.9	4	16.4
500	22	6.1	106	58	69	44	0.6	4	18.2
630	22	6.1	110	61	72	45	0.4	4	20.2
800	18	6.2	111	59	78	47	0.4	3	23.5
1000	14	6.2	110	56	83	49	0.8	2	26.7
1250	11	6.9	110	53	86	52	0.4	0	27.9
1600	8	7.1	115	58	89	52	0.4	0	29.3
2000	6	7.6	107	50	88	52	0.2	0	29.9
2500	6	8.4	104	45	86	53	0.4	0	25.7
3150	6	9.9	105	43	86	56	0.5	0	23.8
4000	7	11.8	103	38	83	57	0.3	0	19.3
5000	7	15.1	99	32	83	59	0.6	-	16.9

STC Rating	**48**	*(Sound Transmission Class)*
Deficiencies	27	*(Number of deficiencies versus contour curve)*
OITC Rating	**37**	*(Outdoor Indoor Transmission Class)*

Notes:

1) Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. These cells are highlighted red.

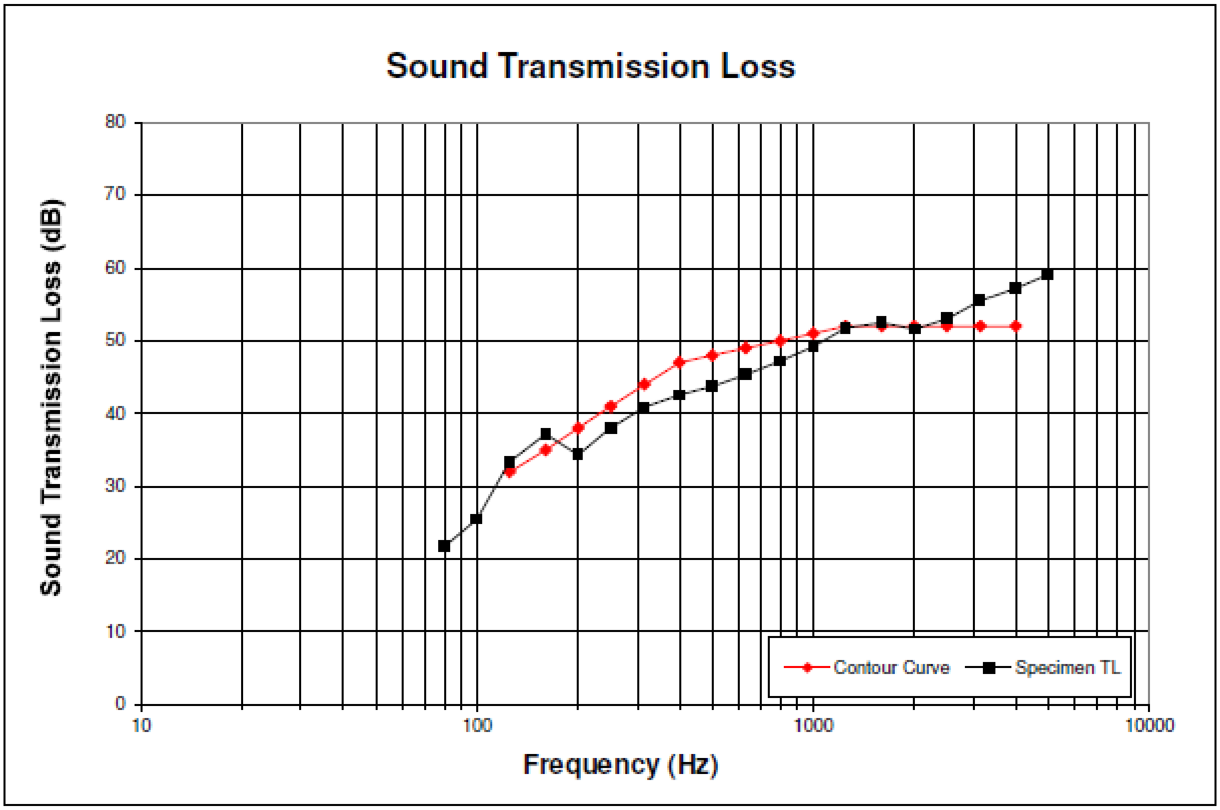
2) Transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. These cells are highlighted green.

3) Receive Room levels less than 5 dB above the background levels are highlighted in yellow.

ATI 00254 Revised 06/13/13

Test Date	03/27/14
ATI No.	D6519.01A
Client	Graham Architectural Products
Specimen	Series/Model: 6800, fixed over hopper window with Primary 1" IG (5/16" laminated, 3/8" air space, 5/16" laminated), Secondary 5/16" laminated, Glass temperature 75°F
Operator	Kurt Golden
Sample Area	2.23 m^2
Filler Area	10.77 m^2

	Source	Receive	Sample
Temp C	22	23	23
RH %	56	51	53



Note: To obtain the Sound Transmission Class (STC), read the Sound Transmission Loss of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve cannot exceed 32. The maximum deficiency at any one frequency cannot exceed 8.

AAMA 1801 Data Sheet

ATI Job Number	D6519.01
Client Name	Graham Architectural Products Inc.
Series/Model	6800
Specimen Type	Fixed Over Hopper Window
Test Date	03/27/14
Tests Performed by	KAG

Air Leakage (ASTM E 283)

Specimen Area (ft^2)	24
Test Pressure	300 pa (6.27 psf)

Temperature (°F)	72
Barometric Pressure (mb)	1027

Air Flow (cfm)	Measured	Corrected
Total	13.5	13.55
Extraneous	13.25	13.30
Net	0.3	0.25

Rate	0.01 cfm/ft^2	0.1 L/s·m^2
Allowable Rate	0.10 cfm/ft^2	
Result	Pass	

Comments:

ATI Job Number	D6519.01
Client Name	Graham Architectural Products Inc.
Series/Model	6800
Specimen Type	Fixed Over Hopper Window
Test Date	03/27/14
Tests Performed by	KAG

Operating Force per ASTM test method E 2068 Method B - Force Gauge

Vent

Trial No.	Opening Breakaway	Opening In-Motion	Closing Breakaway	Closing In-Motion
1	7	7	21	19
2	7	7	20	18
3	7	7	21	19

3 Trial Average	7.00	7.00	20.67	18.67
10% of 3 Trial Average	0.7	0.7	2.1	1.9

Left Lever

Trial No.	Opening Breakaway	Opening In-Motion	Closing Breakaway	Closing In-Motion
1	6	1	8	1
2	5	1	8	1
3	5	1	8	1

3 Trial Average	5.33	1.00	8.00	1.00
10% of 3 Trial Average	0.5	0.1	0.8	0.1

Right Lever

Trial No.	Opening Breakaway	Opening In-Motion	Closing Breakaway	Closing In-Motion
1	7	1	10	1
2	7	1	10	1
3	8	1	10	1

3 Trial Average	7.33	1.00	10.00	1.00
10% of 3 Trial Average	0.7	0.1	1.0	0.1

ATI 00010 Revised 12/17/12

Appendix C

Design Drawings

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

Date 4/8/14 Tech KG.

Bill of Materials Per Quote Item

Quote: -127860- Ver 2
Quote Title: 6800 F/H Acoustic
Customer: GRAHAM
Job No.: 5G8803

Quote Date: 1/23/2014

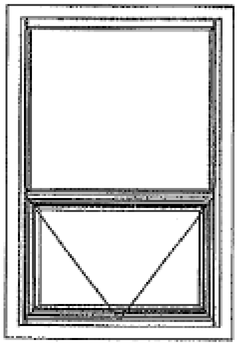
User.: MCOLEMAN

Item	Mark	Description	Quantity
2	B	B Hopper Inswing	1.00

Code: 68V18~16896490

Dimension: 48.0000 x 72.0000

Comments:



Width	48.0000
Height	72.0000
HEAD OPTION	Equal Leg 2.500
SILL OPTION	Equal Leg 2.500
LEFT JAMB OPTION	Universal Equal Leg 2.500
RIGHT JAMB OPTION	Universal Equal Leg 2.500
HEAD NOTCH TYPE	NONE
SILL NOTCH TYPE	NONE
LOCKS	CAM LOCK
POLE RING	False
LOCK TRI WINGS	False
HINGE CLOSURE	MAGNUM
HINGE TRI WINGS	False
MAGNUM LIMIT DEVICE	NONE
LIMITED OPENING	0.0000
LIMIT STOP TRI WINGS	True
FIXED GUARDIAN	LIFTIN
OPERABLE GUARDIAN	LIFTIN
FX BLIND KNOB LOCATION	0.0000
OP BLIND KNOB LOCATION	0.0000
HORZ ORIEL 1	(32.0000)
FRAME WEIGHT	133.34 lb

Extrusion	Color		Qty.	Length	Location
650082	BL	GUARDIAN RAIL	1.00	40.6520	guardian top
650082	BL	GUARDIAN RAIL	1.00	40.6520	guardian bottom
650082	BL	GUARDIAN RAIL	1.00	24.6520	guardian right
650082	BL	GUARDIAN RAIL	1.00	24.6520	guardian left
680008	BL	PROJECT IN SASH	1.00	46.2500	Vent Top
680008	BL	PROJECT IN SASH	1.00	46.2500	Vent Btm
680008	BL	PROJECT IN SASH	1.00	29.1240	Vent Right
680008	BL	PROJECT IN SASH	1.00	29.1240	Vent Left
680010	BL	FRAME FX 2.500	1.00	45.5000	HEAD
680011	BL	FRAME IS 2.500	1.00	45.5000	SILL
680012	BL	IS/FX INTERMEDIATE	1.00	45.5000	FX over IS
680014	BL	BEAD ADAPTER	1.00	38.7510	Right Adapter
680014	BL	BEAD ADAPTER	1.00	38.7510	Left Adapter
680033	BL	FRAME UNV 2.500	1.00	72.0000	RIGHT JAMB
680033	BL	FRAME UNV 2.500	1.00	72.0000	LEFT JAMB
680037	BL	GLAZING LEG ADAPTER - BEVELLED	1.00	38.3750	Right Adapter
680037	BL	GLAZING LEG ADAPTER - BEVELLED	1.00	38.3750	Left Adapter
680057	BL	VENT LEG ADAPTER	1.00	26.8740	Right Adapter
680057	BL	VENT LEG ADAPTER	1.00	26.8740	Left Adapter
680080	BL	1 INCH BEAD HORZ FOR LIFTIN GUARDIAN	1.00	41.8080	Top Bead
680080	BL	1 INCH BEAD HORZ FOR LIFTIN GUARDIAN	1.00	41.8080	Bottom Bead
680081	BL	1 INCH BEAD VERT FOR LIFTIN GUARDIAN	1.00	24.2320	Right Bead
680081	BL	1 INCH BEAD VERT FOR LIFTIN GUARDIAN	1.00	24.2320	Left Bead

Bill of Materials Per Quote Item

Quote: -127860- Ver 2
Quote Title: 6800 F/H Acoustic
Customer: GRAHAM
Job No.: 5G8803

Quote Date: 1/23/2014

User.: MCOLEMAN

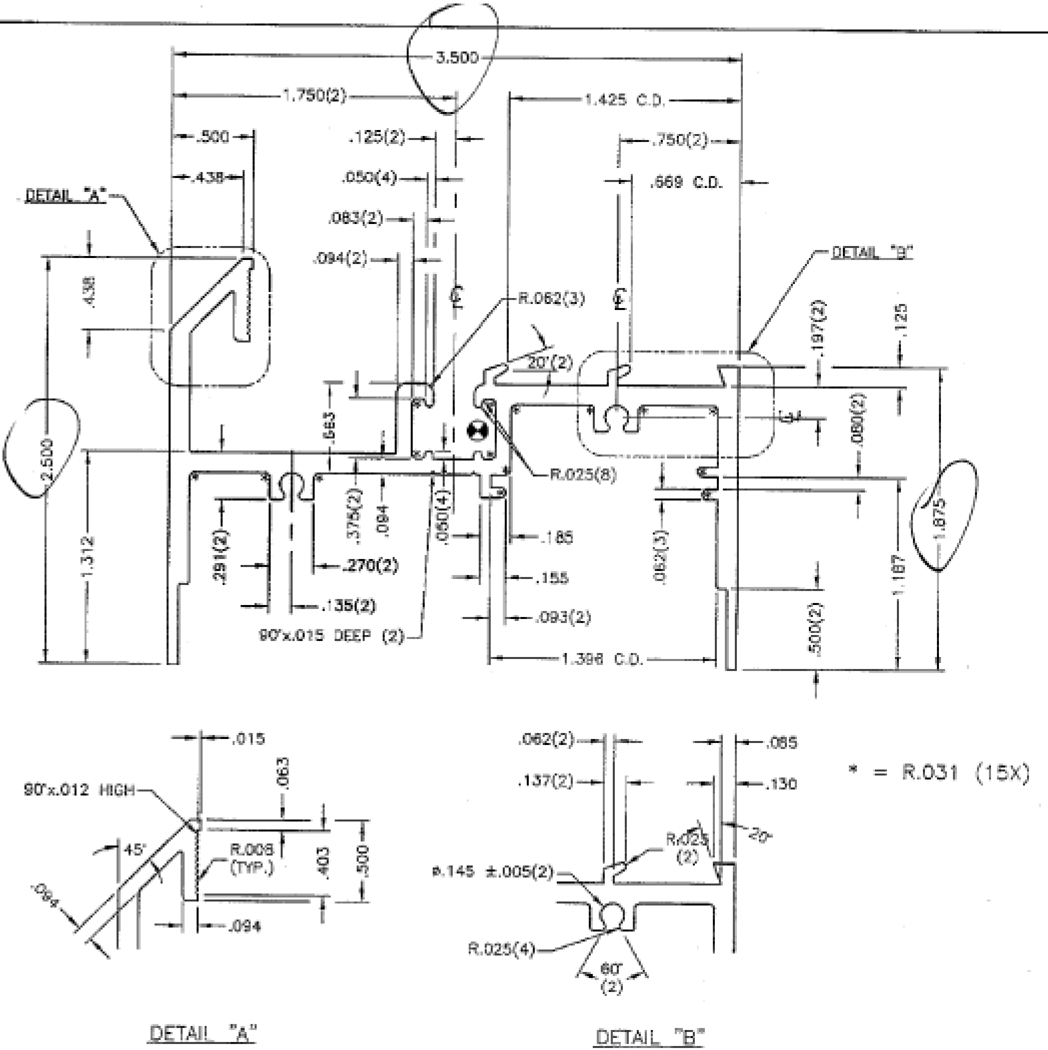
Item Mark	Description			Quantity
Fill				
940935	.317 LAM (1/8 clr 060 pvb 1/8 clr)			1.00 39.0900 x 23.0900
CG935-12-935	(Crd) 317 Lam 3/8 Sp 317 Lam (1/8 060 1/8)			1.00 41.3780 x 25.2520
Component				
925067	VINYL SETTING TUBE 4ins	2.00	EA	
926196	Magnum Hinge 12ins 6X00	2.00	EA	
926545	(Color) HOOD WEEP COVER	3.00	EA	
926552	KEEPER INSWING - BC#210-078	2.00	EA	
926579	INSWING LOCK GASKET	2.00	EA	
926600	STABILIZING ANGLE-PLASTIC	4.00	EA	
926621	HANDLE R HINGED IS - BC#156-001	1.00	EA	
926622	HANDLE L HINGED IS - BC#156-003	1.00	EA	
926842	CORNER KEY VENT (1.232 IN.)	4.00	EA	
926843	CORNER KEY VENT (.960 IN.)	4.00	EA	
929921	GUARDIAN LOCK PAWL	2.00	EA	
929922	GUARDIAN LOCK PIVOT SHAFT <650082>	2.00	EA	
930024	#10-24 X .375 PH PN TT 188	12.00	EA	4-Bar Hinges
930031	#8 X 1.000 TP BH TK 410	1.00	EA	Guardian Anti-lift Screw
931920	#6-32 X .125 HX Drive Oval Point	2.00	EA	929922 Guardian Lock
935033	#10-24 X .500 PH OV TT 188	4.00	EA	926552 Keeper
935033	#10-24 X .500 PH OV TT 188	4.00	EA	926621 926622 Cam Lock
939075	#8 X 1.250 PH PN LP AB 410 (WAXED)	12.00	EA	Assembly
939096	#6 X .750 PH PN AB 410	4.00	EA	Guardian Assembly
939163	#10-24 KEPS NUT W/STAR 188	4.00	EA	926621 926622 Cam Lock
939202	POP RIV 1/8D 1/4GR MF	6.00	EA	926545 Weeps
939380	#6-32 X .500 PH PN F 410	8.00	EA	926600 Stabilizer
939502	#10-24 X .625 SQ 8 PLN TK 3 ZP	22.00	EA	Adapter
960335	GL CHANNEL 11/32 (FT)	10.36	FT	Guardian Channel
960679	Rigid Back Vinyl W/ .270 Bk	28.51	FT	
962680	BULB RIGID BACK W/9-LOCK 0.187	25.24	FT	
963451	SBLK 3/8 X 3/8 X 4	2.00	EA	
970157	Glass Shim 1/8 x 1/8 x 1	14.00	EA	

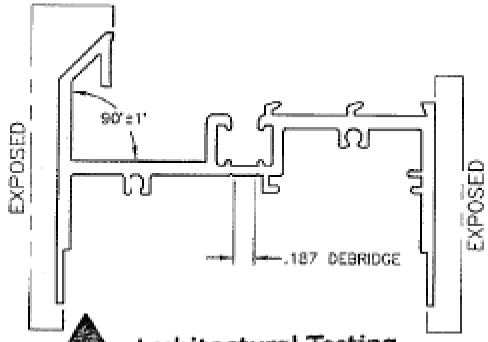
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11
Date 4/8/14 Tech KL.

PART NO. 680010
ALEXSYS # 0000





Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11
Date 4/8/14 Tech KG.

● VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADI 0.015 R
ANGULARITY TOLEBANCE 1/2 COMMERCIAL
DIMENSIONAL TOLIRANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	+.004 -.006
Hollow Wall	+.004 -.010

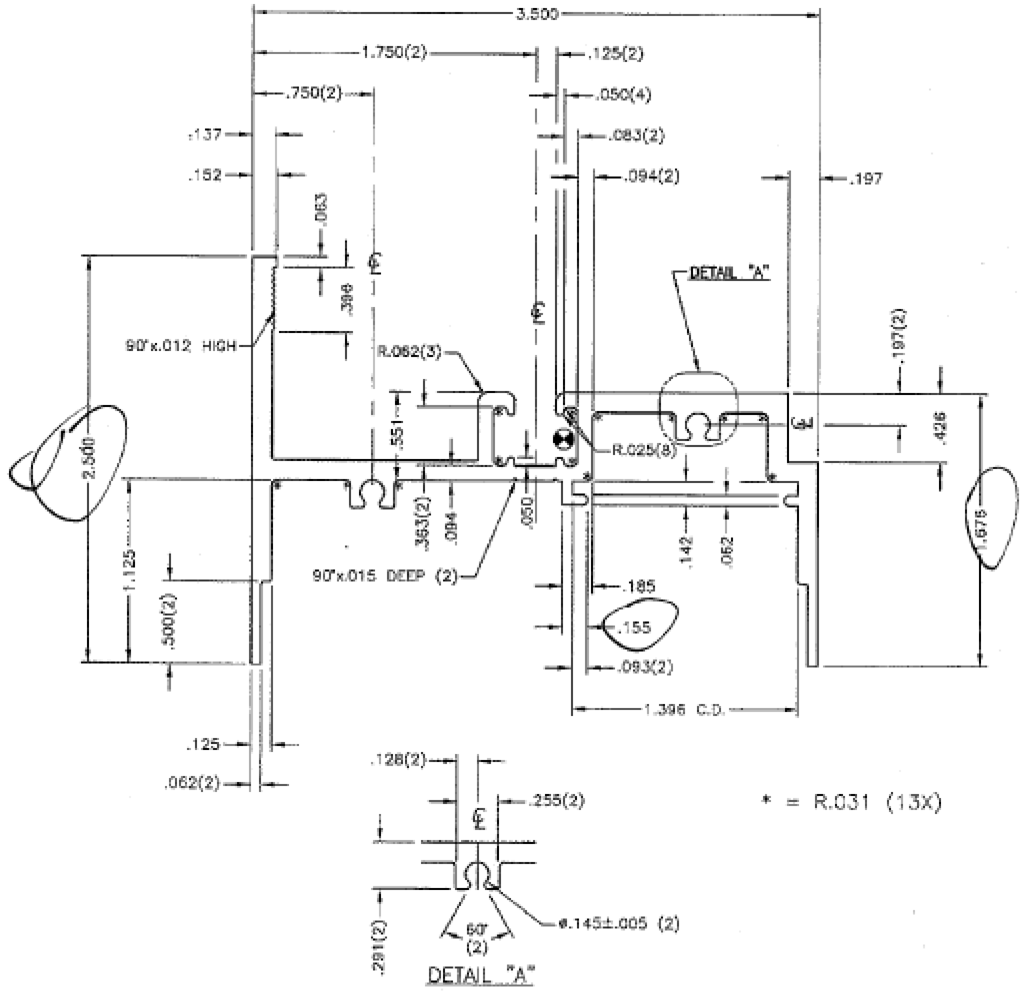
NO.	REVISIONS	BY	DATE

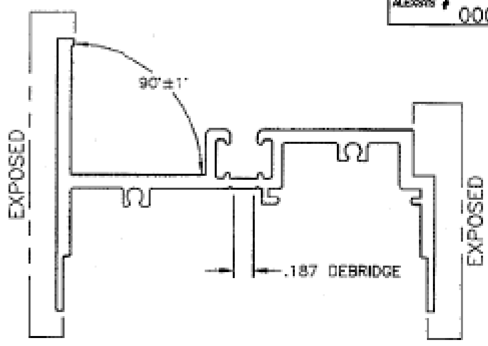
GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 5 To 6 in. Area: 1.119 Sq In Perimeter: 21.699 in. Interior: 21.699 in. Finish: 4.872 in. Wt/Ft: 1.343 Lb/Ft Factor: 17 in.	DRAWN: JCK	CHECKED: JLH	DATE: 07-09-01
	☒ SOLID ☐ DOUBLE-HOLLOW ☐ HOLLOW	SCALE: 1.5:1	MATERIAL: 6063-T5

TITLE: FIXED FRAME - EXTENDED LEG
DWG. NO.: 680010E

PART NO. 680011
ALEXSYS # 0000





Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

Date 4/8/14 Tech KL.

● VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADI 0.015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	[illegible]
Hollow Wall	[illegible]

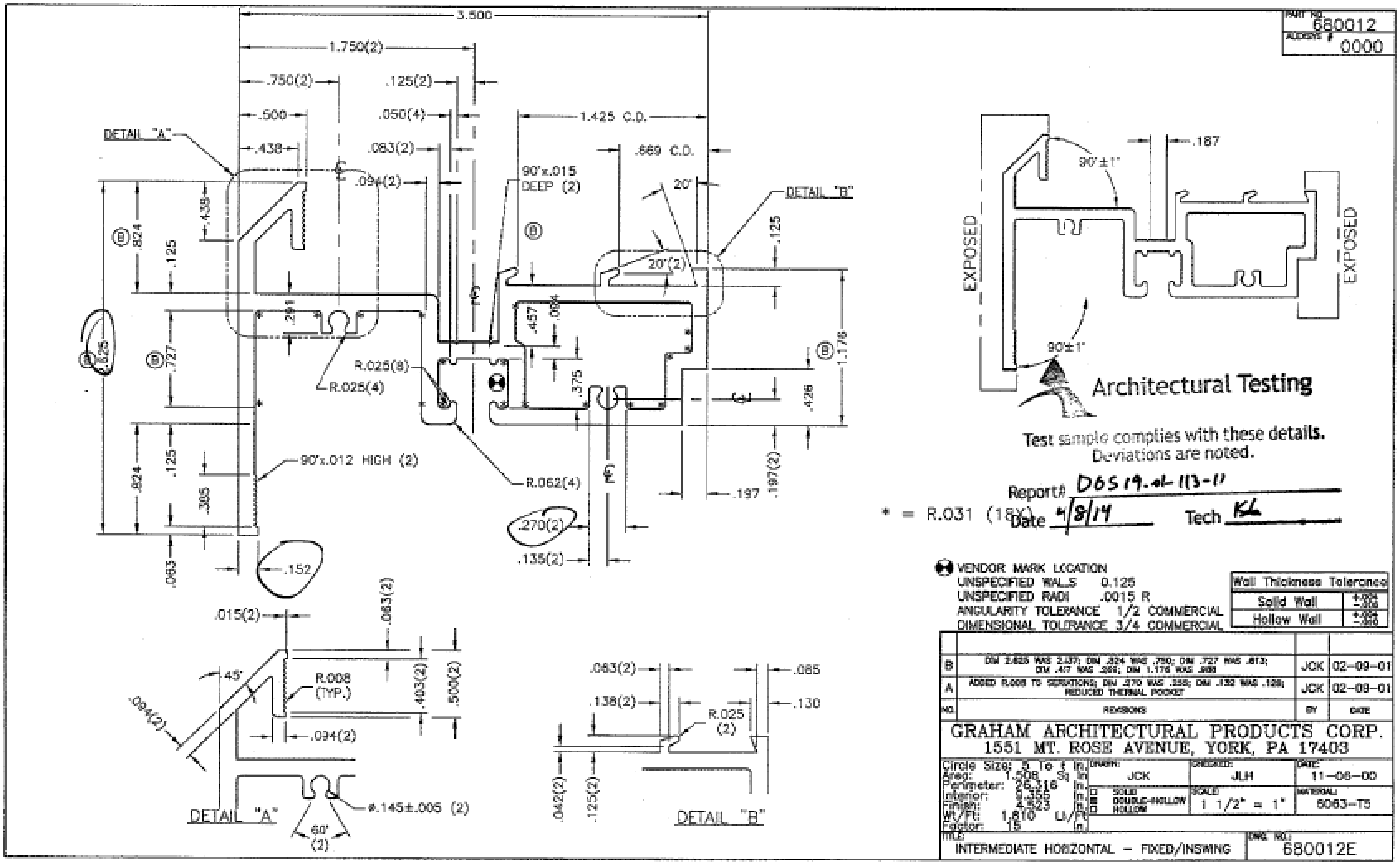
NO.	REVISIONS	BY	DATE

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 5 To 1 In.
Area: 1.038 Sq In
Perimeter: 19.429 In.
Interior: 19.429 In.
Finish: 4.649 In.
Wt/Ft: 1.245 Lb/Ft
Factor: 16 In.

DRAWN: JCK
CHECKED: JLH
DATE: 11-09-00
☒ SOLID ☐ DOUBLE-HOLLOW ☐ HOLLOW
SCALE: 1.5:1
MATERIAL: 6063-T5

TITLE: INSWING FRAME - EXTENDED LEG
DWG. NO.: 680011E



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

Date 4/8/14 Tech KL

* = R.031 (18X)

● VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADII .0015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	+.004 -.006
Hollow Wall	+.004 -.006

NO.	REVISIONS	BY	DATE
B	DIM 2.625 WAS 2.437; DIM .824 WAS .750; DIM .727 WAS .813; DIM .417 WAS .399; DIM 1.176 WAS .988	JCK	02-09-01
A	ADDED R.008 TO SERRATIONS; DIM .270 WAS .255; DIM .132 WAS .128; REDUCED THERMAL POCKET	JCK	02-09-01

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 5 To 6 In.
Area: 1.508 Sq In
Perimeter: 26.316 In.
Interior: 9.355 In.
Finish: 4.523 In.
Wt/Ft: 1.810 Lb/Ft
Factor: 15 In.

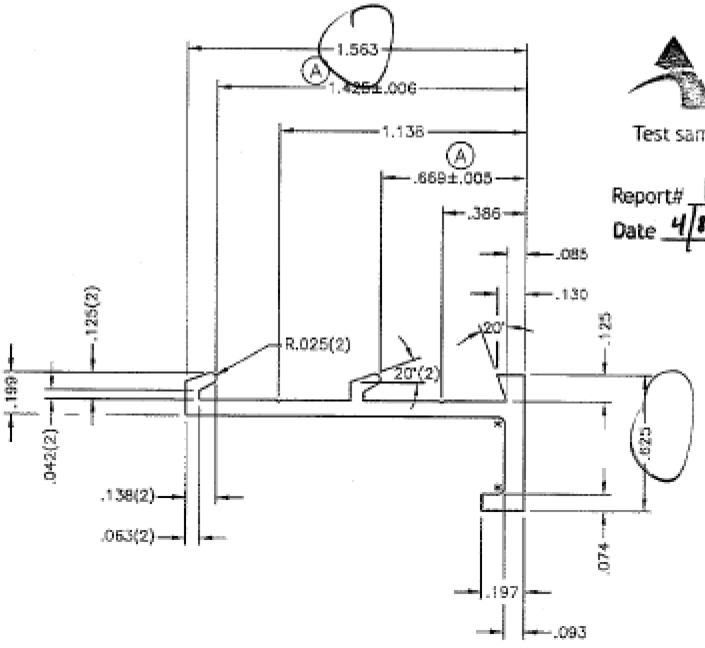
☐ SOLID
■ DOUBLE-HOLLOW
☐ HOLLOW

DRAWN: JCK
CHECKED: JLH
DATE: 11-06-00
SCALE: 1 1/2" = 1"
MATERIAL: 6063-T5

TITLE: INTERMEDIATE HORIZONTAL - FIXED/INSWING
DWG. NO.: 680012E

PART NO. 680012
ALLOY/# 0000

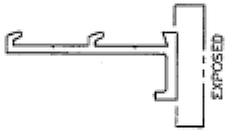
PART NO. 680014
ALLOYS # 0000



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11
Date 4/8/14 Tech KS.



* = R.031 (2X)

● VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.074
UNSPECIFIED RADI 0.015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness	Tolerance
Solid Wall	+.004 -.006
Hollow Wall	+.004 -.010

NO.	REVISIONS	BY	DATE
A	±.006 Tolerance Added – QC Request	JJM	11/30/07

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 2 To 3 In.
Area: 0.187 Sq In
Perimeter: 5.276 In.
Interior: 5.276 In.
Finish: .625 In.
Wt/Ft: 0.263 Lt/Ft
Factor: 21 In.

☐ SOLID
☐ DOUBLE-HOLLOW
☐ HOLLOW

DRAWN: JCK
CHECKED: JLH
DATE: 11-06-00
SCALE: 2:1
MATERIAL: 6063-T5

TITLE: BEAD ADAPTER – INSWING
DWG. NO.: 680014E

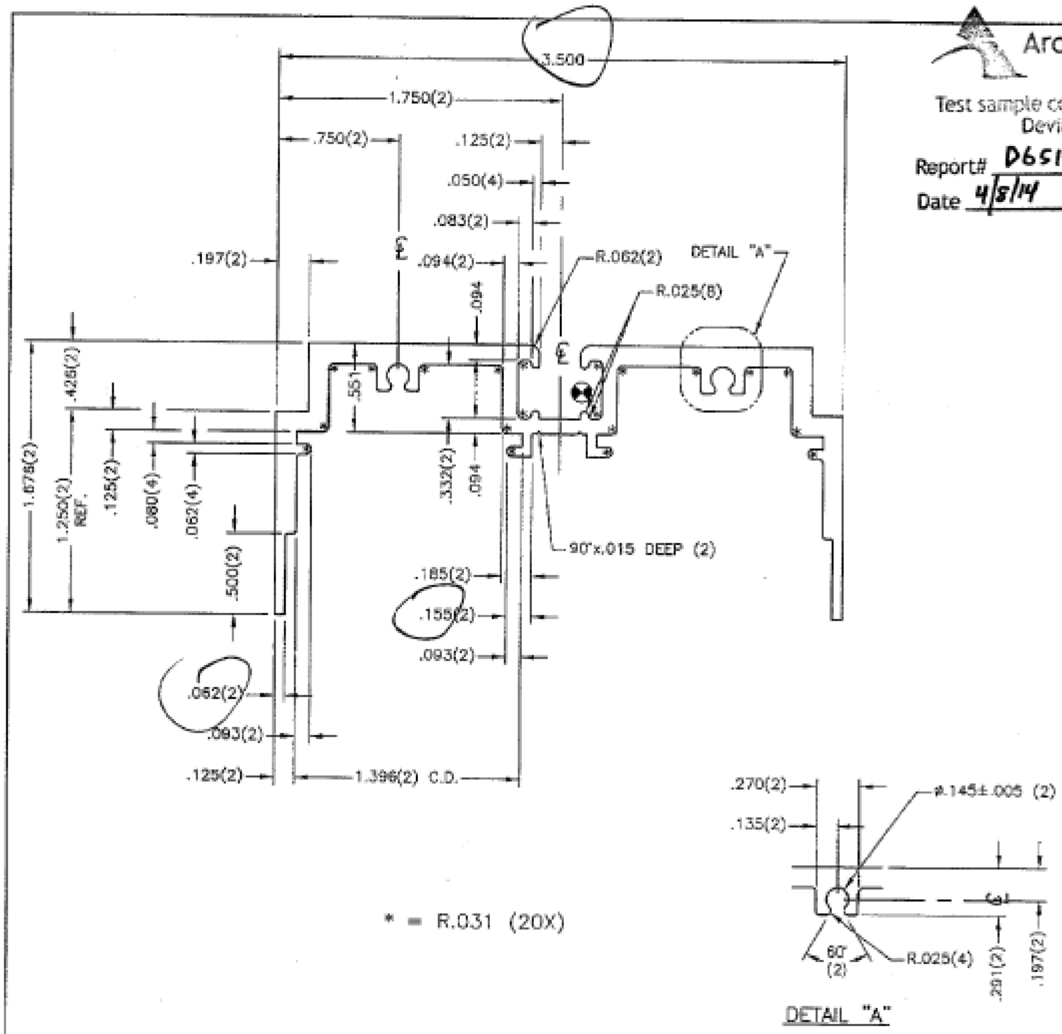
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

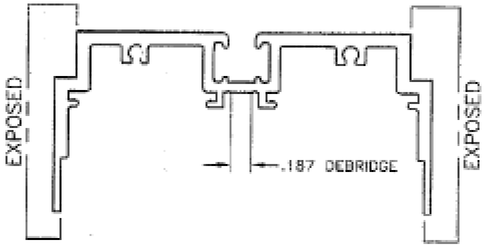
Date 4/8/14 Tech KG

PART NO. 680033
ALLOYS # 0000



* = R.031 (20X)

DETAIL "A"



VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADII 0.015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	+.004 -.004
Hollow Wall	+.004 -.010

NO.	REVISIONS	BY	DATE

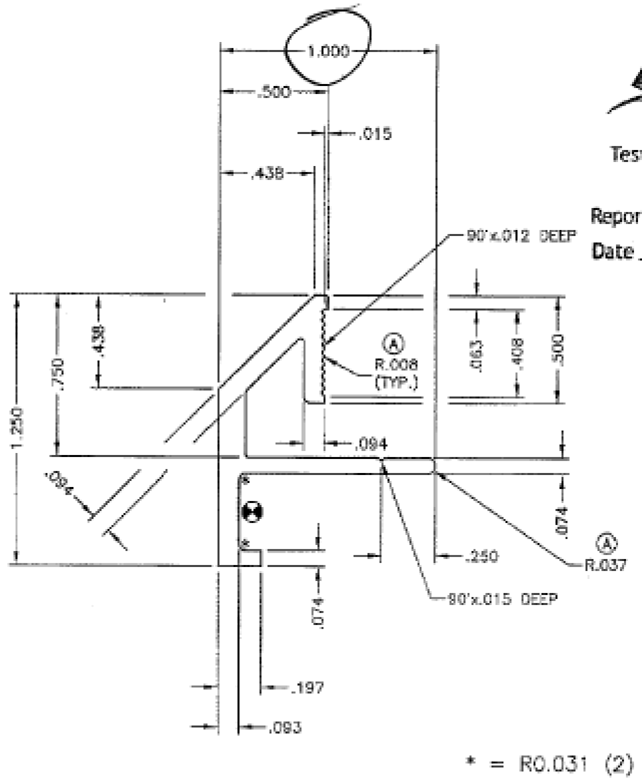
GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 4 To 5 in. Area: 0.952 Sq in Perimeter: 18.219 in. Interior: 18.219 in. Finish: 3.871 in. Wt/Ft: 1.154 Lb/Ft Factor: 16 in.	DRAWN: JCK	CHECKED: JLH	DATE: 08-07-01
	■ SOLID ☐ DOUBLE-HOLLOW ☐ HOLLOW	SCALE: 1.5:1	MATERIAL: 6063-T5

TITLE: UNIVERSAL FRAME - EXTENDED LEG

DWG. NO.: 680033E

PART NO.
680037
ALEXSYS # 0000

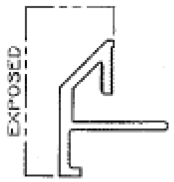


* = R0.031 (2)

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11
Date 4/8/14 Tech KG.



● VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADI 0.015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

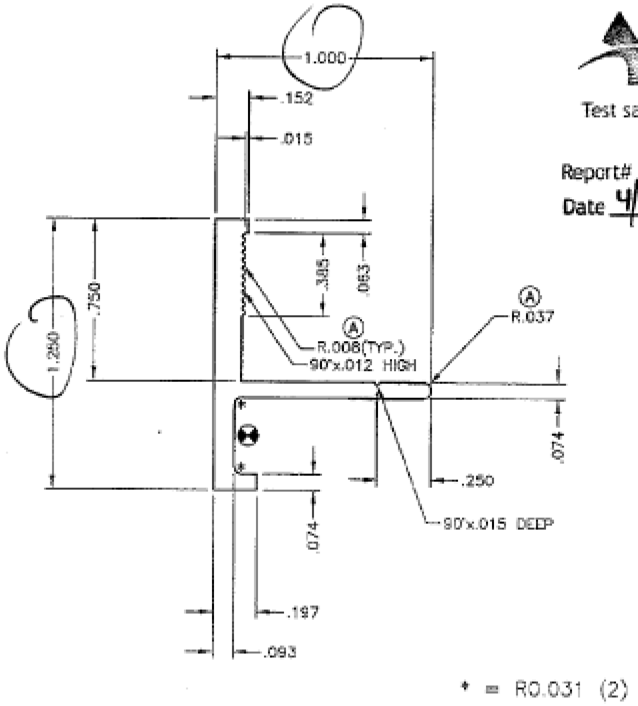
Wall Thickness Tolerance	
Solid Wall	+.004 -.008
Hollow Wall	+.004 -.010

NO.	REVISIONS	BY	DATE
A	ADDED R.008 TO SERRATIONS; ADDED R.037	JCK	02-09-01

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 2 To 3 In. Area: 0.248 Sq In Perimeter: 5.790 In. Interior: 5.790 In. Finish: 1.493 In. Wt/Ft: 0.298 Lt/Ft Factor: 20 In.	DRAWN: JCK ☒ SOLID ☐ DOUBLE-HOLLOW ☐ HOLLOW	CHECKED: JLH SCALE: 2:1	DATE: 12-15-00 MATERIAL: 6063-T5
TITLE: GLAZING LEG ADAPTOR – BEVELED		DWG. NO.: 680037E	

PART NO. 680057
ALEXSYS # 0000

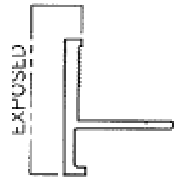


Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

Date 4/8/14 Tech KG.



VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.125
UNSPECIFIED RADII 0.015 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	[illegible]
Hollow Wall	[illegible]

NO.	REVISIONS	BY	DATE
A	ADDED R.008 TO SERRATIONS; ADDED R.037	JCK	02-09-01

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 2 To 1 In.
Area: 0.219 Sq In
Perimeter: 4.900 In.
Exterior: 4.900 In.
Finish: 1.402 In.
Wt/Ft: 0.263 Lb/Ft
Factor: 19 In.

DRAWN: JCK
CHECKED: JLH
DATE: 12-15-00
☒ SOLID
☐ DOUBLE-HOLLOW
☐ HOLLOW
SCALE: 2:1
MATERIAL: 6063-T5

TITLE: GLAZING LEG ADAPTOR
DWG. NO.: 680057E

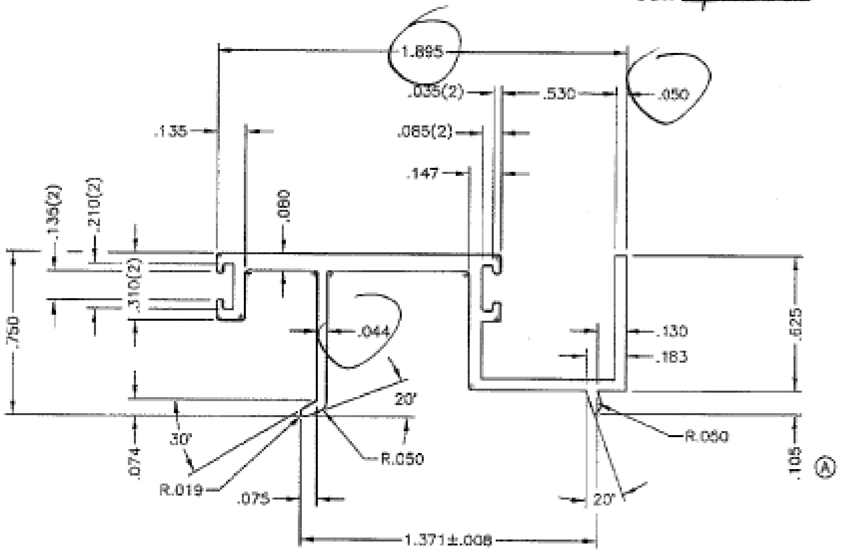
PART NO.	680080
ALEXSYS #	0000

Architectural Testing

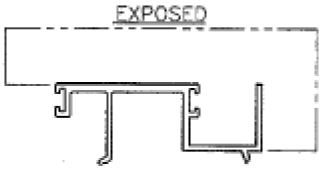
Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11

Date 4/8/14 Tech KL



+ = R.015 (10X)



FULL SCALE

VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.050
UNSPECIFIED RADI 0.010 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLIRANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	+.004 −.008
Hollow Wall	+.004 −.010

NO.	REVISIONS	BY	DATE
A	.105 was .084	RM	11/17/03

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

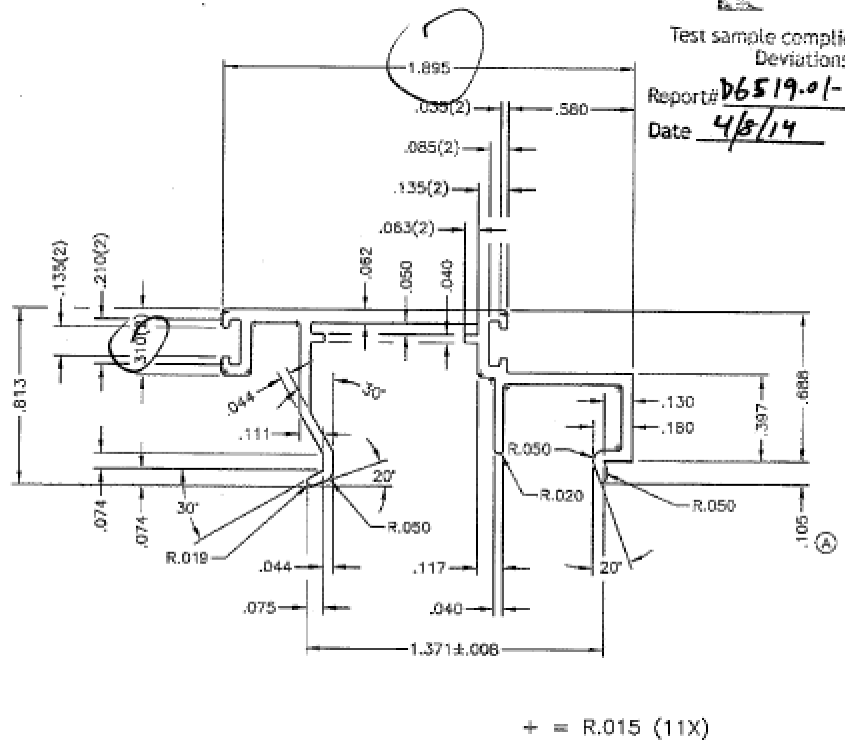
Circle Size: 3 To 4 in. Area: 0.256 Sq In Perimeter: 8.893 In. Interior: 8.893 In. Finish: 4.121 In. Wt/Ft: 0.308 Lt/Ft Factor: 29 In.	DRAWN: JCK	CHECKED: JLH	DATE: 02-20-01
	☒ SOLID ☐ DOUBLE-HOLLOW ☐ HOLLOW	SCALE: 2:1	MATERIAL: 6063-T5
TITLE: HORIZONTAL GUARDIAN BEAD - 1"		DWG. NO.: 680080E	

PART NO. 680081
ALLOYS # 0000

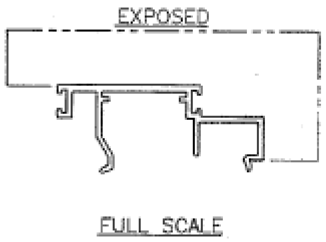
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# D6519.01-113-11
Date 4/8/14 Tech KG



+ = R.015 (11X)



VENDOR MARK LOCATION
UNSPECIFIED WALLS 0.050
UNSPECIFIED RADI 0.010 R
ANGULARITY TOLERANCE 1/2 COMMERCIAL
DIMENSIONAL TOLERANCE 3/4 COMMERCIAL

Wall Thickness Tolerance	
Solid Wall	+.004 -.006
Hollow Wall	+.004 -.010

NO.	REVISIONS	BY	DATE
A	.105 was .084	RW	11/17/09

GRAHAM ARCHITECTURAL PRODUCTS CORP.
1551 MT. ROSE AVENUE, YORK, PA 17403

Circle Size: 3 To 4 In.
Area: 0.232 Sq In
Perimeter: 8.984 In.
Interior: 8.984 In.
Finish: 2.860 In.
Wt/Ft: 0.278 Lt/Ft
Factor: 33 In.

SOLID / DOUBLE-HOLLOW / HOLLOW

DRAWN: JCK
CHECKED: JLH
DATE: 02-20-01
SCALE: 2:1
MATERIAL: 6063-T5
TITLE: VERTICAL GUARDIAN BEAD - 1"
DWG. NO.: 680081E

Appendix D

Photographs

Receive Room View of Installed Specimen

Source Room View of Installed Specimen