

May 26, 2016

**Via Fed Ex**

Attn: Robert Stein, Chairman  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

**RE: Supplemental Filing for Petition No. 1229 – Bloom Energy Corporation, as agent for Ikea, for a Declaratory Ruling for the Location and Construction of a 250 kW Fuel Cell Customer-Side Distributed Resource at 450 Sargent Drive – New Haven, CT.**

Dear Chairman Stein:

We are submitting an original and fifteen (15) copies of supplement to the above-captioned Petition. Within this submission we have included a revised table of contents, Exhibit 8, Sound Study completed by Mei Wu Acoustics, and Exhibit 9, Coastal Consistency Review.

Should you have any questions, concerns, or require additional information, please do not hesitate to contact me at 908-462-9939.

Sincerely,  
Core States Group



Michael D. Sousa  
[msousa@core-eng.com](mailto:msousa@core-eng.com)  
(908) 462-9939

## EXHIBITS

- Exhibit 1: Site Location Map
- Exhibit 2: Site Plan
- Exhibit 3: Final Decision, PURA Docket No. 12-02-09, *Petition of Bloom Energy Corporation for a Declaratory Ruling that Its Solid Oxide Fuel Cell Energy Server Will Qualify as a Class I Renewable Energy Source* (Sept. 12, 2012)
- Exhibit 4: Correspondence with the Town
- Exhibit 5: Bloom Energy Server Product Datasheet and General Installation Overview
- Exhibit 6: Notice Pursuant to Conn. Agencies Regs. § 16-50j-40(a)
- Exhibit 7: Abutters Map
- Exhibit 8: Sound Study
- Exhibit 9: Coastal Consistency Review

## Exhibit 8



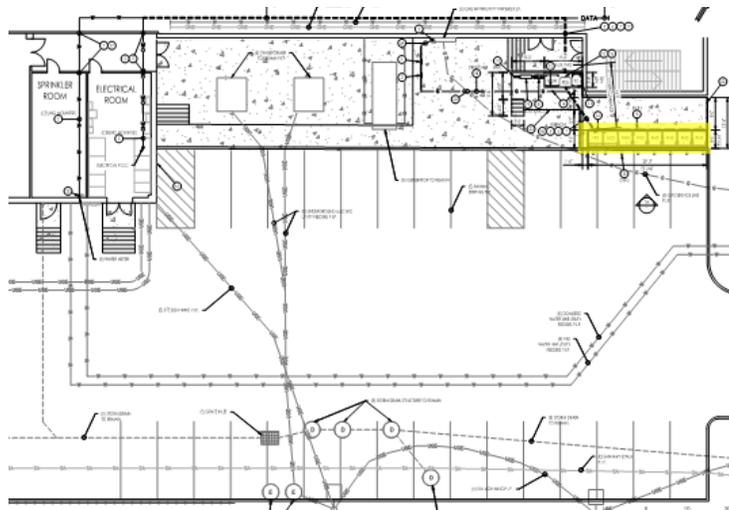
**To:** Erik Amrine, Bloom Energy  
Justin Adams, Bloom Energy  
**From:** Tyler Adams, Mei Wu Acoustics  
Mei Wu, Mei Wu Acoustics  
**Date:** May 17, 2016  
**Subject:** Bloom Energy – IKEA New Haven CT Acoustical Study  
MWA Project – 16045

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Mei Wu Acoustics (MWA) has predicted the sound levels produced by the proposed fuel cell energy server system at 450 Sargent Drive New Haven, CT. In addition, MWA conducted 24-hour sound level measurements at the site to establish the existing ambient environmental sound levels in order to compare predicted noise levels with existing conditions and demonstrate compliance with the code requirements.

**1. Project Overview**

The proposed equipment will consist of a single ES-5 energy servers (also known as ES-6XXXv1). The following figure provides a site plan showing the fuel cell at the south-east corner of the building, which is adjacent to the 95-Freeway and a hotel, which is the nearest noise-sensitive receptor.



**Figure 1:** Site plan showing location of fuel-cell

## 2. Noise Criteria

This section documents the environmental noise criteria and code requirements applicable the project site.

### 2.1. New Haven Municipal Code

An excerpt of relevant portions of this code is provided here for reference:

#### **Chapter 18 – Offenses and Miscellaneous Provisions**

#### **Article II – Noise Control**

#### **Sec. 18.73- Definitions**

*a. Ambient noise or background noise means a noise of a measurable intensity which exists at a point as a result of a combination of many distant individually indistinguishable sources. In statistical terms, it is the level which is exceeded ninety (90) percent of the time (L90) in which the measurement is taken.*

*c. Commercial zone means all commercial districts and business districts, including BA, BB, BC, BD, BD-1 and BE as defined in the zoning regulations of the City of New Haven, and all uses associated therewith permitted either as a right or as a special use.*

*g. Daytime hours means the hours between 7:00 a.m. and 10:00 p.m. Mondays through Saturdays, and the hours of 9:00 a.m. through 9:00 p.m. Sundays and federal and state holidays. Unless otherwise provided, all other hours shall be construed as nighttime hours.*

*t. Noise level means the sound-pressure level in decibels as measured with a sound-level meter using the A-weighting network. The level so read is designated dB(A) or dBA.*

*w. Property line means that real or imaginary line along the ground surface and its vertical extension which separates real property owned or controlled by any person from contiguous real property owned or controlled by another person, and separates real property from the public right-of-way.*

*aa. Residential zone means all city-owned property used for recreational or educational purposes, all residential districts (RS-1, RS-2, RM-1, RM-2, RH-1, RH-2 and RO), any commercial district when used for residential purposes, as defined in the zoning regulations of the City of New Haven as they are amended from time to time, and all uses permitted therewith either as a right or as a special use.*

#### **Sec. 18.75- Noise Level**

*a. It shall be unlawful for any person to emit or cause to be emitted any noise beyond the boundaries of his/her premises in excess of the noise levels established in these regulations as amended from time to time.*

#### *b. Noise Level Standards*

*2. No person in a commercial zone shall emit noise beyond the boundary of his/her premises that exceeds the levels stated herein, and applies to adjacent residential, commercial or industrial zones:*

*Emitter's zone: Commercial*

*Receptor's zone: Maximum level:*

*Industrial .....62 dBA*

*Commercial .....62 dBA*

*Residential/Day .....55 dBA*

*Residential/Night .....45 dBA*

#### **Sec. 18.76 - High background noise levels and impulse noise.**

*a. If background noise levels caused by sources not subject to these regulations exceed the standards contained herein as amended from time to time, a source shall be considered to cause excessive noise if its emission exceeds the background noise levels by five (5) decibels, provided that no source subject to this article shall emit noise in excess of eighty (80) decibels at any time, and provided that this section does not decrease the permissible levels of other sections of this chapter as amended from time to time.*

*b. No person shall cause or allow the emission of impulse noise in excess of eighty (80) decibels peak sound-pressure level during the nighttime to any residential noise zone.*

*c. No person shall cause or allow the emission of impulse noise in excess of one hundred (100) decibels peak sound-pressure level at any time in any zone.*

## 2.2. New Haven City Plan

MWA has reviewed the New Haven City Plan and was not able to locate a “Noise Element” portion of this general plan. The Noise Element typically provides goals and policies to guide compatible land uses and the incorporation of noise attenuation measures for new uses to protect people living and working in the City from an excessive noise environment.

## 2.3. New Haven Zoning Map

The following figure provides a zoning map of the areas surrounding the project site. As shown, the project site is zoned BA – General Business. The freeway is zoned PDD. While the hotel is in a “business” zoning, it is considered a residential use.



**BE** – Wholesale Distribution  
**BA** – General Business  
**PDD** – Planned Development District

**Figure 2:** New Haven Zoning Map – Approximate location of fuel cells indicated by red star.

**2.4. Connecticut Department of Energy and Environmental Protection (DEEP)**

The Connecticut Siting Council (Council) is an autonomous agency residing within the merged Department of Energy and Environmental Protection (DEEP). The following is an excerpt of their noise requirements:

**Sec.22a-69-1 Definitions**

*(h) daytime means 7:00 a.m. to 10:00 p.m. local time.  
(n) nighttime means 10:00 p.m. to 7:00 a.m. local time.*

**Sec.22a-69-1.2 Acoustic Terminology and definitions**

*(c) background noise means noise which exists at a point as a result of the combination of many distant sources, individually indistinguishable. In statistical terms, it is the level which is exceeded 90% of the time (L90) in which the measurement is taken.*

*(f) excessive noise means emitter Noise Zone levels from stationary noise sources exceeding the Standards set forth in Section 3 of these Regulations beyond the boundary of adjacent Noise Zones.*

**Sec.22a-69-2 Classification of land according to use**

*Sec. 22a-69-2.1. Basis Noisy Zone classifications shall be based on the actual use of any parcel or tract under single ownership as detailed by the Standard Land Use Classification Manual of Connecticut*

**Sec. 22a-69-2.2. Multiple uses**

*Where multiple uses exist within a given Noise Zone, the least restrictive land use category for the Emitter and Receptor shall apply regarding the noise standards specified in Section 3 of these Regulations.*

**Sec. 22a-69-2.3. Class A noise zone**

*Lands designated Class A shall generally be residential areas where human beings sleep or areas where serenity and tranquility are essential to the intended use of the land. Class A Land Use Category. The land uses in this category shall include, but not be limited to, single and multiple family homes, hotels, prisons, hospitals, religious facilities, cultural activities, forest preserves, and land intended for residential or special uses requiring such protection*

**Sec. 22a-69-2.4. Class B noise zone**

*Lands designated Class B shall generally be commercial in nature, areas where human beings converse and such conversation is essential to the intended use of the land.*

**Sec. 22a-69-3. Allowable Noise Levels**

**Sec. 22a-69-3.1. General prohibition**

*No person shall cause or allow the emission of excessive noise beyond the boundaries of his/her Noise Zone so as to violate any provisions of these Regulation*

**Sec. 22a-69-3.5. Noise zone standards**

*(b) No person in a Class B Noise Zone shall emit noise exceeding the levels stated herein and applicable to adjacent Noise Zones:*

	Class C Receiver	Class B Receiver	Class A Receiver Day	Class C Receiver Night
Class B Emitter	62 dBA	62 dBA	55 dBA	45 dBA

*Levels emitted in excess of the values listed above shall be considered excessive noise.*

**Sec. 22a-69-3.6. High background noise areas**

*In those individual cases where the background noise levels caused by sources not subject to these Regulations exceed the standards contained herein, a source shall be considered to cause excessive noise if the noise emitted by such source exceeds the background noise level by 5 dBA, provided that no source subject to the provisions of Section 3 shall emit noise in excess of 80 dBA at any time, and provided that this Section does not decrease the permissible levels of the other Sections of this Regulation*

## 2.5. Summary of Noise Criteria

- The fuel cells produce steady, broadband noise. Therefore tonal, fluctuating, or impulsive penalties will not be applied.
- The project site is zoned business/commercial and is a commercial use. The nearest neighboring property is zoned commercial but is a hotel, which is deemed by DEEP as residential use. Therefore, the residential noise standard may apply to this location.
- **DEEP Requirements**
  - According to the Noise Zone Standards, the neighboring Hotel property line should not exceed 45 dBA at nighttime; neighboring commercial properties should not exceed 62 dBA.
  - The code allows for an exception to the above standard for “high background noise areas”. In which case, the noise level should not exceed 5 dBA above the background noise level (L90).
- **New Haven City Requirements**
  - The New Haven municipal code requirements are similar to the DEEP requirements – refer to summary above.
  - New Haven does not have a Noise Element in their General Plan.

### 3. Environmental Ambient Sound Level Measurements

#### 3.1. Site visit details

MWA personnel: M. Cote  
Date and time: 5/16/2016 15:01 – 5/17/2016 17:33  
Equipment used: Rion NL-20, Type II sound level meter

#### 3.2. Measurement procedure

A sound level meter was installed to a light pole at the property line shared with the adjacent hotel (location identified in the figure below), which is the property that is the nearest noise-sensitive receptor. Ambient sounds were comprised primarily of traffic from the adjacent freeway. There is no soundwall between the freeway and project site, resulting in elevated sound levels.

The sound level meter recorded A-weighted  $L_{eq}$ ,  $L_1$ ,  $L_5$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ ,  $L_{95}$ , and  $L_{99}$  levels every one (1) minute for the time period described above. The meter was equipped with a windscreen.

#### 3.3. Measurement Period Weather Conditions

The following table provides the weather conditions during the measurement period.

Date	5/16/2016	5/17/2016
Mean Temp.	54° F	54° F
Max Temp.	64° F	63° F
Min Temp.	43° F	46° F
Avg. Humidity	45%	62%
Avg. Wind Speed	10 mph [WNW]	5 mph []
Precipitation	0.00 in	0.00 in

**Table 1:** Measurement weather conditions

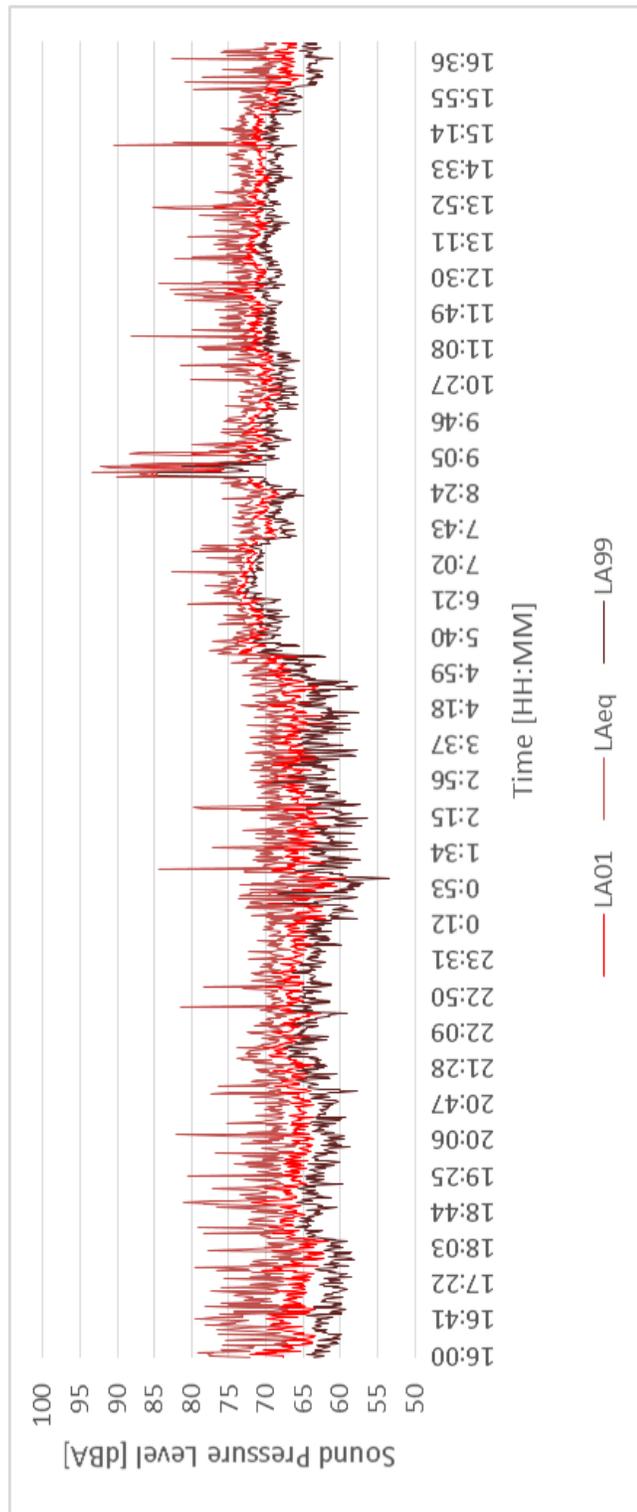
### 3.4. Measurement Results

The following table provides the hourly average sound level measurements. All measurements indicated are given in dBA (A-weighted). LAeq is the average measured level for the entire 1-hour measurement period. L1/L10/L90/L99 are statistical averages – for example, L10 indicates the level that was present for 10% of the time, whereas L90 indicates the level present for 90% of the measurement period. L99 & L90 are considered representative of the steady background sound levels, whereas L1 & L10 may suggest more infrequent and transient activities in the environment (door slams, car alarms, dog barking, etc.). The quietest 1-Hour L90 was **62.6 dBA**, measured from 1-2AM.

Hour	L1	L10	L90	L99	LAeq
16:00	74.3	70.4	63.4	62.3	67.5
17:00	72.1	68.6	62.1	61.0	66.0
18:00	72.7	69.4	64.2	63.4	67.1
19:00	71.3	69.0	64.0	63.1	66.6
20:00	70.7	68.1	62.8	62.1	65.7
21:00	71.1	69.0	64.9	64.3	67.1
22:00	70.4	68.3	64.9	64.3	66.7
23:00	69.9	68.4	64.3	63.6	66.5
0:00	69.5	67.9	63.1	62.3	65.8
1:00	71.4	68.1	62.6	61.6	66.0
2:00	70.2	68.1	63.1	62.2	65.9
3:00	69.7	68.6	64.1	63.2	66.7
4:00	70.0	68.8	63.9	63.0	66.8
5:00	73.4	72.3	69.0	68.4	70.8
6:00	75.0	73.6	71.4	71.0	72.5
7:00	73.8	72.4	70.1	69.8	71.3
8:00	82.7	81.2	75.7	75.1	78.7
9:00	76.9	75.4	70.5	70.0	72.7
10:00	73.3	71.4	68.4	67.8	70.0
11:00	75.7	73.1	70.0	69.5	71.7
12:00	76.4	74.0	70.1	69.5	72.1
13:00	75.4	73.4	70.0	69.6	71.7
14:00	73.2	72.1	69.6	69.0	70.9
15:00	76.1	71.9	69.1	68.5	70.8
<b>CNEL:</b>					<b>75.5</b>

**Table 2:** Hourly environmental sound level measurements – 5/16 – 5/17/2016 (dBA)

The following figure plots the 1-minute average measurements for a period of 24-hours, showing the difference between the L01/L99 percentiles and the LAeq average. The L99 only dropped below 55 dBA once.



**Figure 3:** 1-minute average measurements plotted over the 24-hour measurement period.

**4. Calculation and Prediction of Energy Server Noise Impacts to Adjacent Properties**

Sound power levels for the energy server were used to calculate sound transmission to adjacent properties. As we understand it, the ES-5 (also referred to as ES-6xxxv1) system will be installed. Sound power levels for the ES-6xxxv1 were provided in a MWA report dated December 18, 2015. The following table provides the total sound power for a single fuel cell.

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	LwA
ES-6XXXv1	87.0 dB	85.6 dB	86.8 dB	83.9 dB	80.8 dB	78.7 dB	70.6 dB	86.3 dB

**Table 3:** Sound power levels (dB re 10<sup>-12</sup> W) for a single ES-6XXXv1.

Our calculations considered the sound power of the unit (above), reflections from surrounding buildings and structures, and distance attenuation. The following figure provides the predicted sound pressure level at the nearest adjacent properties.



**Figure 4:** Satellite view of the project site identifying the measurement location (pink); the proposed location of the fuel cell (red). Numbers indicate the predicted sound pressure level due to the fuel cell.

**5. Summary & Conclusion**

Due to the adjacency of the project site to the freeway and the lack of a freeway soundwall, the project site is a high noise environment. Therefore, noise from the fuel cell can be shown to be compliant with the code requirements by the demonstrating the sound levels are no more than 5 dBA above the L90 background noise level (*DEEP Sec. 22a-69-3.6. /New Haven Municipal Sec. 18.76*)

The quietest L90 measured was 62.6 dBA L90, measured from 1AM – 2AM. According to our calculations, the transmitted sound levels from the fuel cells will be at most 53 dBA at the nearest property line shared with the hotel. This level is 10 dBA below the quietest measured background noise level. The proposed fuel cell is therefore compliant with the code requirement. No additional mitigation measures are recommended.

This concludes our report. Please contact Mei Wu Acoustics if there are any questions or comments regarding this document.

\* \* \*

**Coastal Consistency Review**  
**PE: 1229 - Ikea Fuel Cell Installation**  
**New Haven, CT**

**To:** Connecticut Siting Council  
**FROM:**  
**SUBJECT:** Coastal Consistency Review  
**DATE:** May 23, 2016

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**Introduction**

Bloom Energy as an agent for Ikea is proposing to install a 250-kilowatt Bloom solid oxide fuel cell Energy Server and associated equipment located on the 19.99 acre site of Ikea at 450 Sargent Drive, New Haven Connecticut. The proposed fuel cell and associated equipment would be required to be placed on an elevated platform, located at the rear of the building near the existing loading dock area, at a height of one (1) foot above the known flood elevation.

The property is located within the Coastal Management District as delineated on the Official Zoning Map of the City of New Haven. The property is also within the CTDEEP coastal boundary of Connecticut as defined in the Connecticut Coastal Management Act. Although the property is located within these Coastal management areas, no coastal resources are located on or adjacent to the property.

The following narrative demonstrates that the proposed project meets the requirements of the Connecticut Coastal Management Act (CGS Section 22a-90 through 22a-112) and is adequately protective of the interests of these regulations and the City of New Haven's coastal resources.

**Existing Site Condition**

The property is an existing Ikea store whose use will remain unchanged. The property is referred to by the City of New Haven Tax Assessor as Map 205, Block 1304, Lot 1800 and is within the Planned Development District 100. The site is located within the 100 year flood plain with a known elevation of 11 feet and also in the area of moderate wave action as shown on Flood Insurance Rate Map 09009C0441J dated July 8, 2013. The proposed project will be placed on an existing sidewalk in the rear of the building. The building's existing transformers and diesel generator are located adjacent to the location of the proposed installation.

## Project Summary

The proposed project include the installation of a fuel cell placed on a platform elevated 1 foot above the flood elevation within an existing concrete sidewalk along the rear of the building. The proposed area will be adjacent to the existing transformer and generator platform. No change in existing drainage patterns or additional impervious area will be created with the proposed installation.

## Coastal Consistency Review

The proposed project will not result in adverse impacts to coastal resources as defined in the Connecticut Coastal Management Act . The Connecticut Coastal Management Act identifies eight potential adverse impacts to coastal resources. This section provides a definition of the potential adverse impacts associated with each resource area and why the proposed project would not adversely affect the resources.

1. *Degrading **water quality** of coastal waters by introducing significant amounts of suspended solids, nutrients, toxics, heavy metals or pathogens, or through the significant alteration of temperature, pH, dissolved oxygen or salinity.*

The proposed project will not affect water quality within the New Haven Harbor or other nearby coastal resources. As no changes to the existing drainage areas will occur, the existing stormwater management facilities will continue to operate as designed. Erosion and sedimentation controls will be installed during construction and maintained in accordance with the CTDEP 2002 Connecticut Guidelines for Soil Erosion and Sediment Control to avoid unauthorized discharges to coastal resources.

2. *Degrading **existing circulation patterns of coastal waters** by impacting tidal exchange or flushing rates, freshwater input, or existing basin characteristics and channel contours.*

The proposed project is located within a developed site adjacent to a building. No tidally influenced coastal water areas, drainage, or circulation patterns will be impacted.

3. *Degrading **natural erosion patterns** by significantly altering littoral transport of sediments in terms of deposition or source reduction.*

The proposed project would not affect littoral transport of sediments since it is not located on a shoreline.

4. *Degrading **natural or existing drainage patterns** by significantly altering groundwater flow and recharge and volume of runoff.*

Existing drainage patterns, groundwater flow and recharge, and stormwater runoff will not be adversely affected by the proposed project. The existing stormwater management system will be utilized for the proposed project.

5. *Increasing the hazard of **coastal flooding** by significantly altering shoreline configurations or bathymetry, particularly within high velocity flood zones.*

The proposed project will not significantly alter shoreline configurations or bathymetry and will not increase coastal flooding. The proposed project area is within an existing developed site alongside an existing building.

6. Degrading **visual quality** by significantly altering the natural features of vistas and viewpoints.

The project includes construction of an elevated platform adjacent to an existing building. The site currently contains a landscaped area with trees and shrubs along the property lines separating the site from Interstate-95. No natural features are located in the vicinity of the proposed project site. Therefore, the project will not degrade visual quality by significantly altering the natural features of vistas and viewpoints.

7. Degrading or destroying **essential wildlife, finfish, or shellfish habitat** by significantly altering the composition, migration patterns, distribution, breeding or other population characteristics of the natural species or significantly altering the natural components of the habitat.

The proposed project is located over 1,000 feet from the nearest coastal resource. Therefore, the proposed project will not degrade or destroy essential coastal wildlife, finfish or shellfish habitat.

8. Degrading **tidal wetlands, beaches and dunes, rocky shorefronts, and bluffs and escarpments** by significantly altering their natural characteristics or function.

The proposed project is located within a developed area of New Haven. There are no tidal or inland wetlands located nearby. Therefore, the proposed project will not degrade tidal wetlands, beaches and dunes, rocky shorefronts, and bluffs and escarpments.

## Conclusion

In summary, a review of the proposed Bloom Energy Fuel Cell project relative to the Connecticut Coastal Management Act indicates that the project will not adversely affect the coastal resource. The eight potential adverse impacts to coastal resources were reviewed relative to the scope of the project and determined that no adverse impacts will result from the project.