STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE:	**INVENERGY THERMAL DEVELOPMENT LLC**	**:**	
	APPLICATION TO CONSTRUCT AND	**:**	
	OPERATE THE CLEAR RIVER ENERGY	**:**	**SB-2015-06**
	CENTER, BURRILLVILLE, RHODE ISLAND	**:**	

CLEAR RIVER ENERGY LLC's SUPPLEMENTAL RESPONSES TO THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT'S THIRD SET OF DATA REQUESTS, NOS. 3-21, 3-22 & 3-57

3-21 Were light impacts to wildlife considered? Was light pollution considered in the calculation of a buffer distance into the forest from indirect impacts? Is lighting minimized to the greatest extent practicable?

RESPONSE 3-21 August 4, 2016: The CREC lighting plan is required to ensure the safety of the facility's operating staff. The CREC facility is an industrial facility that has many areas of high energy equipment that must be visually checked during operation and maintenance activities, both during the day and at night. As such nighttime lighting is a critical aspect of plant safety. The onsite lighting plans will be evaluated to minimize lighting impacts concerning wildlife.

The CREC lighting design will be the minimum necessary to ensure plant safety. The lighting will be designed to minimize un-needed off-site impacts to the extent practical. This will include selection of light fixtures that are designed to direct light down as long as that allows the plant equipment in that area to be fully lighted during operation to support visual inspections. Lighting will not be installed in areas that do not require it to the extent practical. Light impacts to the community and wildlife should be addressed by this approach.

SUPPLEMENTAL RESPONSE: **The following documents provide further details regarding Clear River Energy Center's lighting details and analysis:**

(1) Lighting Plans, prepared by HDR, Inc., dated March 2, 2017, revised April 21, 2017 (Exhibit A);
(2) Lighting Technical Memorandum, prepared by Trevor Hollins, of HDR, Inc., dated April 19, 2017 (Exhibit B); and
(3) A nighttime visual assessment report, entitled "Clear River Energy Center Visual Simulations – EDR Project No. 16110," prepared by Environmental Design & Research, dated January 9, 2017 (Exhibit C).

RESPONDENT: Trevor Hollins, HDR, Inc.
Michael Feinblatt, ESS Group, Inc.

DATE: June 19, 2017

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE:	**INVENERGY THERMAL DEVELOPMENT LLC**	**:**	
	APPLICATION TO CONSTRUCT AND	**:**	
	OPERATE THE CLEAR RIVER ENERGY	**:**	**SB-2015-06**
	CENTER, BURRILLVILLE, RHODE ISLAND	**:**	

CLEAR RIVER ENERGY LLC's SUPPLEMENTAL RESPONSES TO THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT'S THIRD SET OF DATA REQUESTS, NOS. 3-21, 3-22 & 3-57

3-22 Provide details of required site lighting, and describe what steps will be utilized to minimize lighting impacts or avoid light spillover into adjacent forested habitats from both the plant and the access road. Details should include, but not be limited to, lighting schedules, lumen output (based on need assessment); Correlated Color Temperature (CCT); fixture shields; and adaptive controls such as dimmers, timers, and/or motion sensors. Include all outdoor lighting, including any necessary on the stacks.

RESPONSE 3-22 August 4, 2016: The CREC lighting plan is required to ensure the safety of the facility's operating staff. The CREC facility is an industrial facility that has many areas of high energy equipment that must be visually checked during operation and maintenance activities, both during the day and at night. As such nighttime lighting is a critical aspect of plant safety. The onsite lighting plans will be evaluated to minimize lighting impacts concerning wildlife.

The CREC lighting design will be the minimum necessary to ensure plant safety. The lighting will be designed to minimize un-needed off-site impacts to the extent practical. This will include selection of light fixtures that are designed to direct light down as long as that allows the plant equipment in that area to be fully lighted during operation to support visual inspections. The final lighting design will address the extent that design features such as adaptive controls can be used. Lighting will not be installed in areas that do not require it to the extent practical. Light impacts to the community and wildlife should be addressed by this approach.

SUPPLEMENTAL RESPONSE: **The following documents provide further details regarding Clear River Energy Center's lighting details and analysis:**

(1) Lighting Plans, prepared by HDR, Inc., dated March 2, 2017, revised April 21, 2017 (Exhibit A);
(2) Lighting Technical Memorandum, prepared by Trevor Hollins, of HDR, Inc., dated April 19, 2017 (Exhibit B); and
(3) A nighttime visual assessment report, entitled "Clear River

Energy Center Visual Simulations – EDR Project No. 16110," prepared by Environmental Design & Research, dated January 9, 2017 (Exhibit C).

RESPONDENT: Trevor Hollins, HDR, Inc.
Michael Feinblatt, ESS Group, Inc.

DATE: June 19, 2017

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE:	**INVENERGY THERMAL DEVELOPMENT LLC**	**:**	
	APPLICATION TO CONSTRUCT AND	**:**	
	OPERATE THE CLEAR RIVER ENERGY	**:**	**SB-2015-06**
	CENTER, BURRILLVILLE, RHODE ISLAND	**:**	

CLEAR RIVER ENERGY LLC's SUPPLEMENTAL RESPONSES TO THE RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT'S THIRD SET OF DATA REQUESTS, NOS. 3-21, 3-22 & 3-57

3-57 Will on-site lighting (existing and proposed) be evaluated to make sure that lighting is minimized to the greatest extent possible and that necessary lighting will be as wildlife-friendly as possible (The International Dark Sky Association is one organization that provides guidance on this)?

RESPONSE 3-57 August 4, 2016: Yes

SUPPLEMENTAL RESPONSE: **The following documents provide further details regarding Clear River Energy Center's lighting details and analysis:**

(1) Lighting Plans, prepared by HDR, Inc., dated March 2, 2017, revised April 21, 2017 (Exhibit A);
(2) Lighting Technical Memorandum, prepared by Trevor Hollins, of HDR, Inc., dated April 19, 2017 (Exhibit B); and
(3) A nighttime visual assessment report, entitled "Clear River Energy Center Visual Simulations – EDR Project No. 16110," prepared by Environmental Design & Research, dated January 9, 2017 (Exhibit C).

RESPONDENT: Trevor Hollins, HDR, Inc.
Michael Feinblatt, ESS Group, Inc.

DATE: June 19, 2017

CLEAR RIVER ENERGY LLC
By its Attorneys,

/s/Alan M. Shoer

Alan M. Shoer, Esq. (#3248)
Richard R. Beretta, Jr. Esq. (#4313)
Nicole M. Verdi, Esq. (#9370)
ADLER POLLOCK & SHEEHAN, P.C.
One Citizens Plaza, 8th Floor
Providence, RI 02903-1345
Tel: 401-274-7200
Fax: 401-751-0604

Dated: June 19, 2017

CERTIFICATE OF SERVICE

I hereby certify that on June 19, 2017, I delivered a true copy of the foregoing responses to the Energy Facilities Siting Board via electronic mail to the parties on the **attached service list.**

/s/ Alan M. Shoer

405180\003\862884.v1

SB-2015-06 Invenergy CREC Service List as of 05/26/2017

Name/Address	E-mail	Phone/FAX
File an original and 10 copies with EFSB: Todd Bianco, Coordinator Energy Facility Siting Board 89 Jefferson Boulevard Warwick, RI 02888 Margaret Curran, Chairperson Janet Coit, Board Member Assoc. Dir., Div. of Planning Parag Agrawal Patti Lucarelli Esq., Board Counsel Susan Forcier Esq., Counsel Rayna Maguire, Asst. to the Director DEM Catherine Pitassi, Asst. to. Assoc. Dir. Plann. Margaret Hogan, Sr. Legal Counsel	Todd.Bianco@puc.ri.gov; Kathleen.Mignanelli@puc.ri.gov; Patricia.lucarelli@puc.ri.gov; Margaret.Curran@puc.ri.gov; janet.coit@dem.ri.gov; Catherine.Pitassi@doa.ri.gov; Margaret.hogan@puc.ri.gov; susan.forcier@dem.ri.gov; rayna.maguire@dem.ri.gov; Parag.Agrawal@doa.ri.gov;	401-780-2106
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	kags8943@gmail.com;	
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Suzanne Enser	svetromile@gmail.com;	
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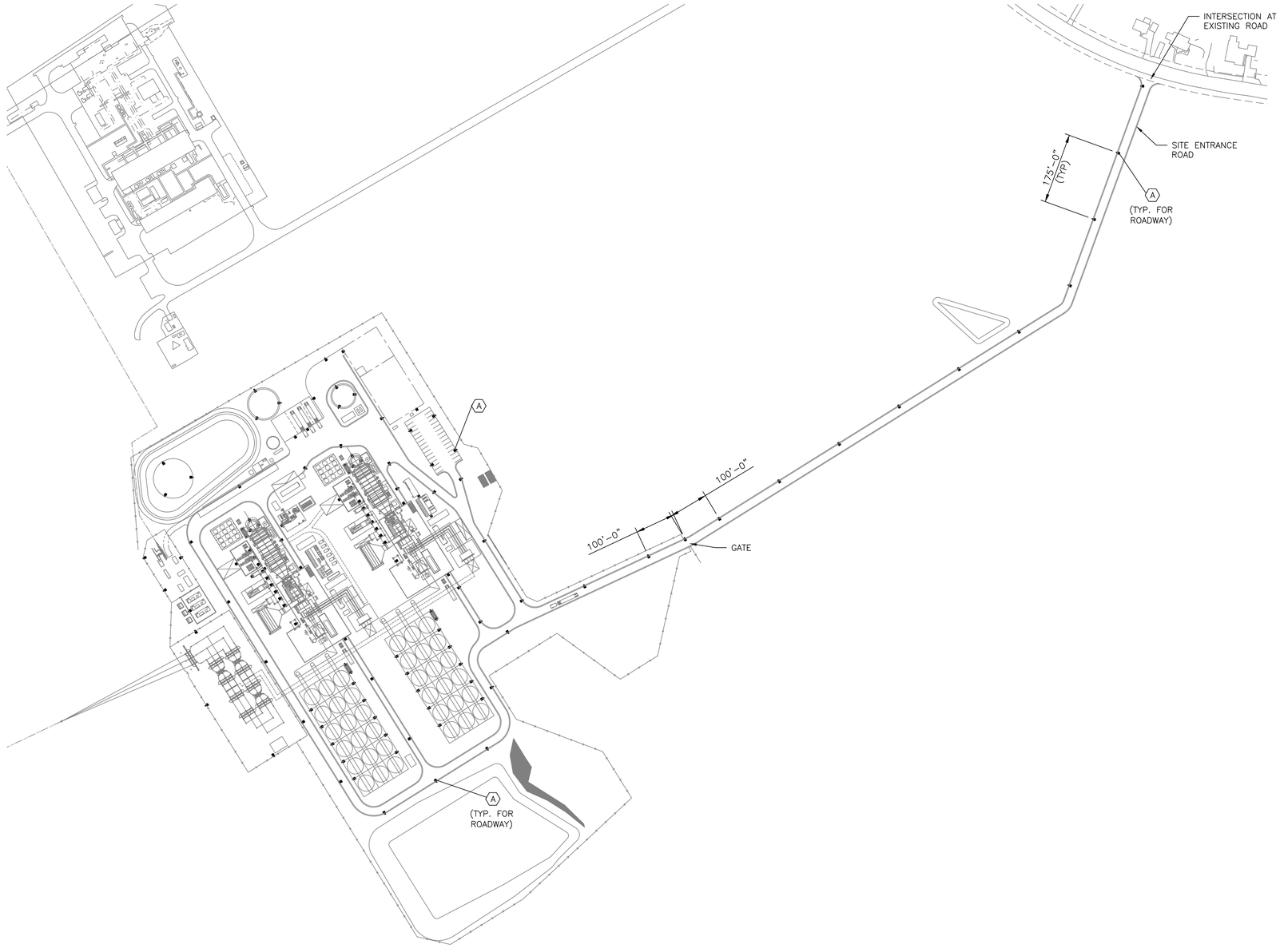
EXHIBIT A



NOTES:
1. SEE SHEET E2501 FOR POWER BLOCK AREA LIGHTING.

LEGEND

(A) PROFILED FROM PHILIPS LUMEC ROADVIEW LED SERIES FIXTURE w/TYPE II DISTRIBUTION ON 30' POLE.
FINAL FIXTURE SELECTION SHALL COMPLY WITH SPECIFICATION REQUIREMENTS FOR REDUCED WILDLIFE IMPACT (590–610 nm LIGHT LEVEL, CCT <3000k, & S/P RATIO <1.2)

NORTH

SITE LIGHTING PLAN

SCALE: 1" = 150'–0"

150 75 0 150 300 450

ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
B	04/21/17	REVISED FOR PERMIT	REB	–	–	–
A	03/02/17	FOR PERMIT	REB	–	–	–

HDR Engineering, Inc.

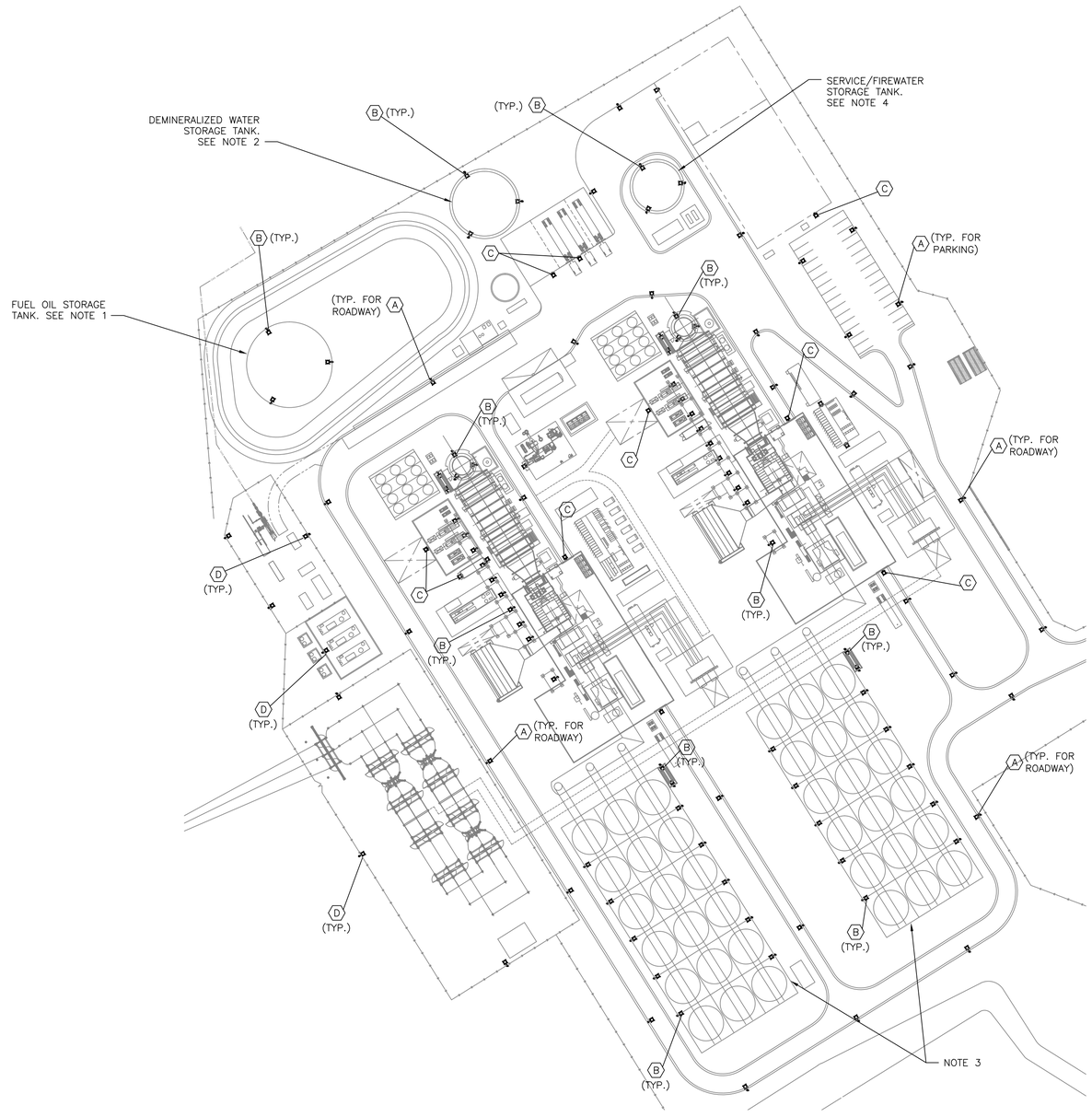
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

CLEAR RIVER ENERGY LLC
CLEAR RIVER ENERGY CENTER

SINGLE SHAFT
SITE LIGHTING LAYOUT

FILENAME	E2500–0LL–238926.dwg	SHEET
SCALE	AS NOTED	238926-0LL-E2500

4/24/2017 11:19:14 AM, ROBROWN



NOTES:

1. DEMINERALIZED WATER STORAGE TANK IS APPROXIMATELY 55 FT. HIGH AND WOULD HAVE A WRAP–AROUND STAIRWAY WITH LIGHTING.
2. FUEL OIL STORAGE TANK IS APPROXIMATELY 48 FT. HIGH AND WOULD HAVE A WRAP–AROUND STAIRWAY WITH LIGHTING.
3. AIR COOLED CONDENSER OVERALL HEIGHT IS APPROXIMATELY 100 FT. HIGH FROM GRADE. FAN DECK HEIGHT TO BE APPROX. 60 FT. HIGH FROM GRADE. EACH ELEVATION WILL REQUIRE LIGHTING AT PLATFORM DECK.
4. SERVICE/FIREWATER STORAGE TANK IS APPROXIMATELY 49 FT. HIGH AND WOULD HAVE A WRAP–AROUND STAIRWAY w/LIGHTING.
5. PIPE RACK PLATFORM HEIGHT IS APPROXIMATELY 55 FT. HIGH FROM GRADE.
6. FINAL FIXTURE SELECTION SHALL COMPLY WITH SPECIFICATION REQUIREMENTS FOR REDUCED WILDLIFE IMPACT (590–610 nm LIGHT LEVEL, CCT <3000k, & S/P RATIO <1.2)

LIGHTING FIXTURES		
LIGHTING FIXTURE	DESCRIPTION	APPROXIMATE QUANTITY
(A)	PROFILED FROM PHILIPS LUMEC ROADVIEW LED SERIES, ON 30' POLE. TYPE II DISTRIBUTION (NOTE 6)	46
(B)	PROFILED FROM PHILIPS AEROSCAPE MODEL, STANCHION–MOUNT WITH TYPE III DISTRIBUTION. MOUNTED AT 9'–0" ABOVE PLATFORM OR FINISHED FLOOR. (NOTE 6)	184
(C)	PROFILED FROM PHILIPS AEROSCAPE MODEL, WALL MOUNT WITH TYPE III DISTRIBUTION (NOTE 6).	14
(D)	PROFILED FROM PHILIPS AEROSCAPE MODEL, STANCHION OR POLE–MOUNT WITH TYPE IV DISTRIBUTION. MOUNTED AT APPROX. 10'–0" (NOTE 6).	7
(E)	PROFILED FROM PHILIPS AEROSCAPE SCONCE MODEL, WALL–MOUNT WITH TYPE III DISTRIBUTION (NOTE 6).	10

NORTH

LIGHTING PLAN – POWER BLOCK AREA

SCALE: 1" = 80'–0"

80 40 0 80 160 240

HDR Engineering, Inc.

ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
B	04/21/17	REVISED FOR PERMIT	REB	AJS	–	–
A	03/02/17	FOR PERMIT	REB	–	–	–

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

CLEAR RIVER ENERGY LLC
CLEAR RIVER ENERGY CENTER

SINGLE SHAFT LIGHTING LAYOUT POWER BLOCK AREA

FILENAME	E2501–0LL–238926.dwg	SHEET
SCALE	AS NOTED	238926-0LL-E2501

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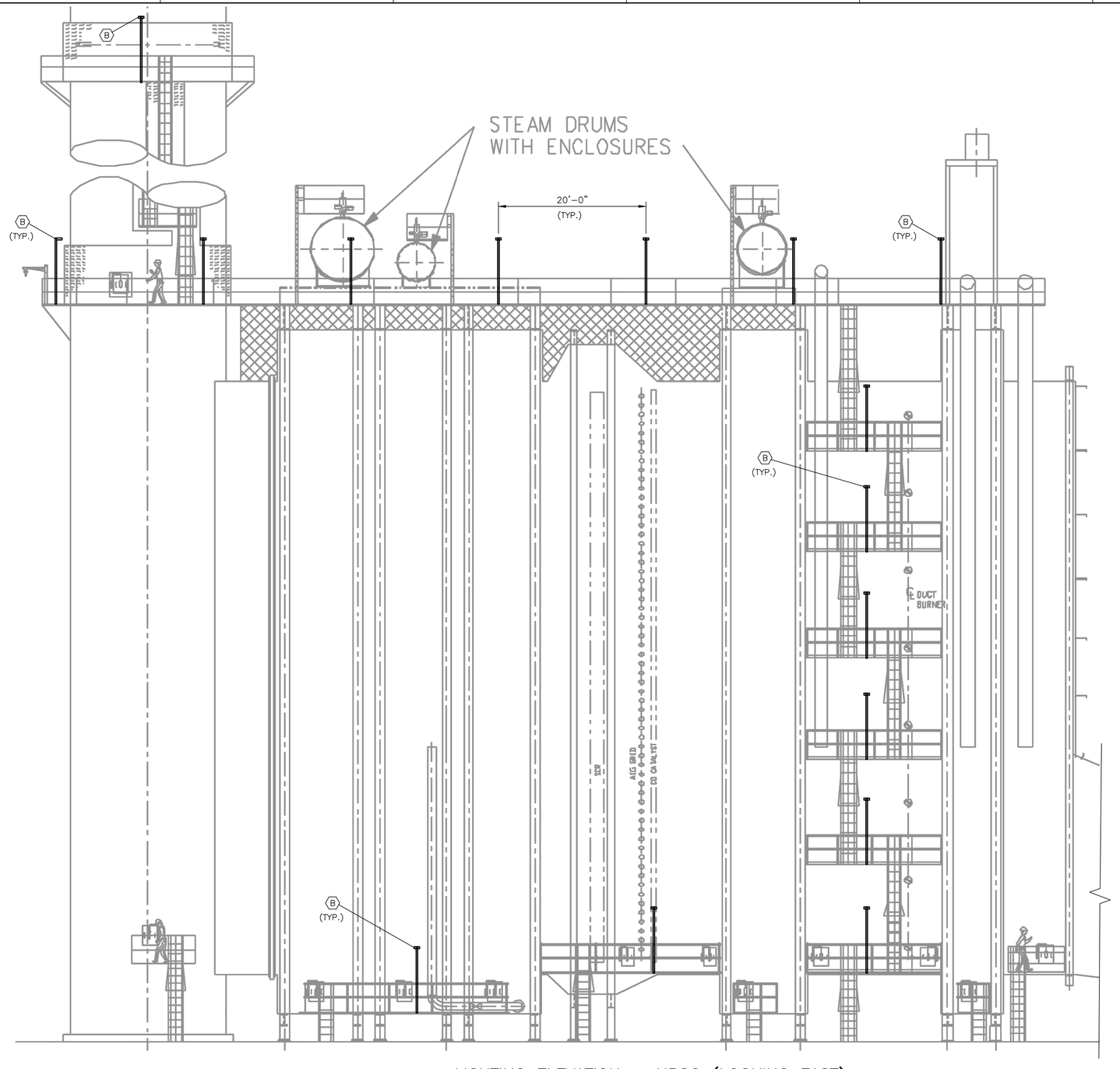


LEGEND

B PROFILED FROM PHILIPS AEROSCAPE MODEL, STANCHION-MOUNT WITH TYPE III DISTRIBUTION. MOUNTED AT 9'-0" ABOVE PLATFORM OR FINISHED FLOOR. FINAL FIXTURE SELECTION SHALL COMPLY WITH SPECIFICATION REQUIREMENTS FOR REDUCED WILDLIFE IMPACT (590-610 nm LIGHT LEVEL, CCT <3000k, & S/P RATIO <1.2)

LIGHTING ELEVATION – HRSG (LOOKING EAST)

HDR Engineering, Inc.

ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
B	04/21/17	REVISED FOR PERMIT	REB	AJS	–	–
A	03/02/17	FOR PERMIT	REB	–	–	–

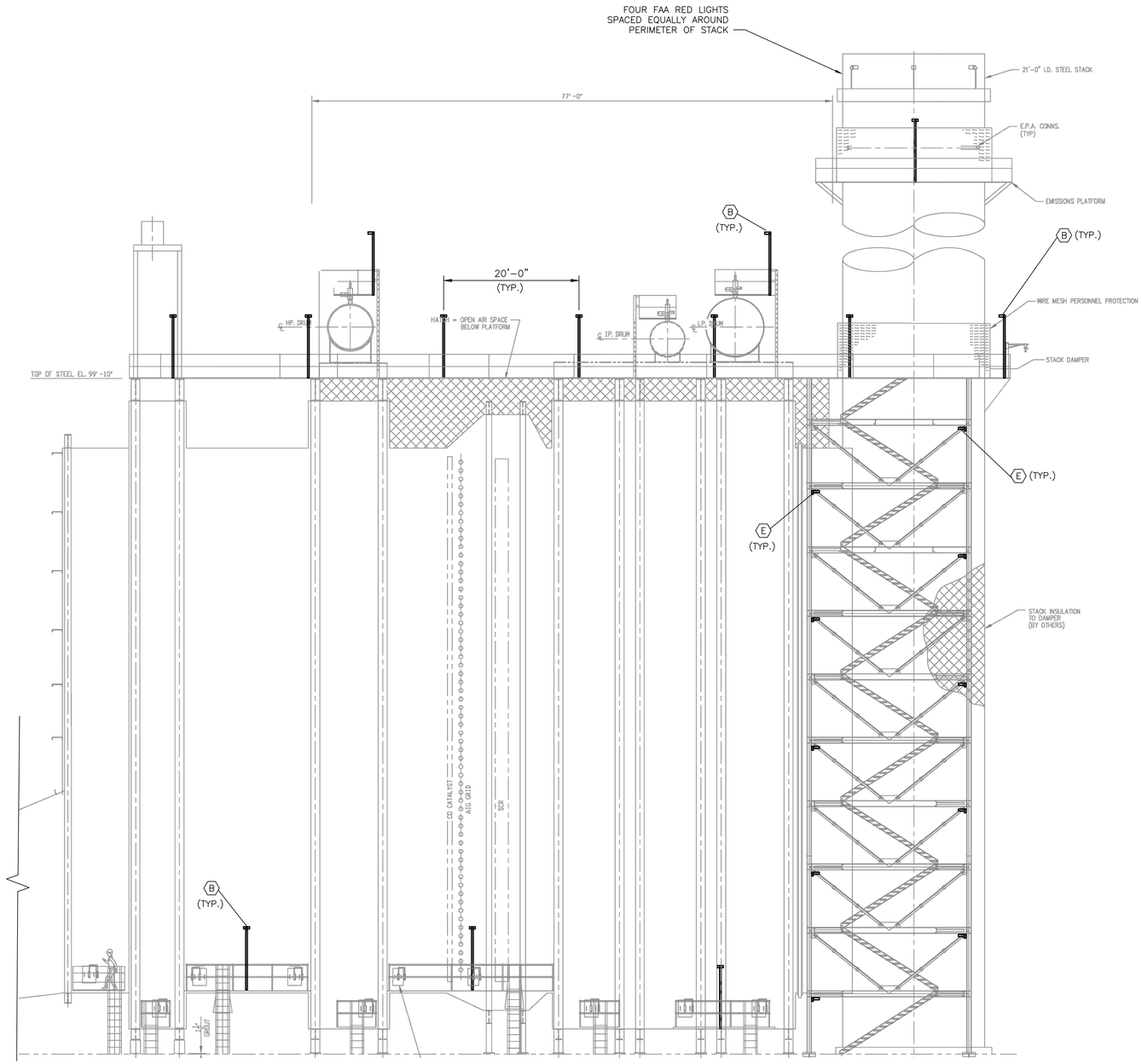
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

CLEAR RIVER ENERGY LLC
CLEAR RIVER ENERGY CENTER

SINGLE SHAFT
LIGHTING ELEVATION - WEST
HEAT RECOVERY STEAM GENERATOR

FILENAME	E2502-0LL-238926.dwg	SHEET
SCALE	1/16" = 1'-0"	238926-0LL-E2502

4/21/2017 3:19:57 PM, ROBROWN



LEGEND

(B) PROFILED FROM PHILIPS AEROSCAPE MODEL, STANCHION–MOUNT WITH TYPE III DISTRIBUTION. MOUNTED AT 9'–0" ABOVE PLATFORM OR FINISHED FLOOR. FINAL FIXTURE SELECTION SHALL COMPLY WITH SPECIFICATION REQUIREMENTS FOR REDUCED WILDLIFE IMPACT (590–610 nm LIGHT LEVEL, CCT <3000k, & S/P RATIO <1.2)

(E) PROFILED FROM PHILIPS AEROSCAPE SCONCE MODEL, WALL–MOUNT WITH TYPE III DISTRIBUTION. FINAL FIXTURE SELECTION SHALL COMPLY WITH SPECIFICATION REQUIREMENTS FOR REDUCED WILDLIFE IMPACT (590–610 nm LIGHT LEVEL, CCT <3000k, & S/P RATIO <1.2)

LIGHTING ELEVATION – HRSG (LOOKING WEST)

HDR Engineering, Inc.

ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
A	04/21/17	FOR PERMIT	REB	AJS	–	–

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

CLEAR RIVER ENERGY LLC
CLEAR RIVER ENERGY CENTER

SINGLE SHAFT
LIGHTING ELEVATION - EAST
HEAT RECOVERY STEAM GENERATOR

FILENAME	E2503–0LL–238926.dwg	SHEET
SCALE	1/16" = 1'–0"	238926-0LL-E2503

4/21/2017 4:11:43 PM, ROBROWN

EXHIBIT B

Date: April 19, 2017

To: Clear River Energy Center Project Team

From: Trevor Hollins, PE, LC, LEED AP

RE: CREC – RIDEM Opinion

1 Introduction

This technical memo has been prepared in response to Rhode Island Department of Environmental Management (RIDEM) request for a detailed light pollution mitigation plan for the Clear River Energy Center (CREC) and summarizes the steps taken to create a compliant specification.

2 Background

The Rhode Island Department of Environmental Management (RIDEM) issued an advisory opinion to the Energy Facility Sitting Board (EFSB) raising concerns of the level of light pollution that will be created by the Clear River Energy Center (CREC) and its impact on the environment surrounding the facility including the nearby George Washington Management Area. RIDEM requested information detailing the steps that Invenergy would take to mitigate light pollution at CREC stating that the CREC should be substantially less intrusive than the Algonquin Facility. Specifically RIDEM requested information on the following strategies:

- Specification of Adaptive Controls
- Specification of Light Shielding
- Specification of Light Correlated Color Temperature (CCT) and Wavelength to limit impact of lighting on nearby wildlife.
- Extent of light trespass from the facility

In order to clarify the lighting design strategy for the CREC and show compliance with RIDEM's requests the lighting specification has been provided to highlight the environmentally sensitive lighting design

3 Lighting and Impact on the Environment

Sensitivity of the lighting design to the surrounding environment is important due to the impact that lighting has on the nighttime environment. Excessive lighting can obscure views of the stars and have negative impacts on plants and animals in areas surrounding excessive lighting [7].

The three methods of minimizing the impact of light trespass are lowering intensity, controlling direction of illumination and minimizing the spectrum of emitted light [1].

- Lowering Intensity is a simple concept, when less light is emitted into the environment there is less potential for that light to become light pollution.

- Controlling direction is important because for light to become light pollution it must leave the confines of the project site. When all light is directed down, light must interact with a surface where its intensity is reduced before it goes into the sky and becomes light pollution. Directing illumination down also creates a more efficient design.

- Minimizing the spectrum of emitted light has positive impacts on plants and wildlife. The vast majority of common wildlife animals, including those that populate the Northeastern United States have spectral sensitivity up to about 580 nm on the color spectrum. This means that these animals cannot see wavelengths of light above 580 nm. Birds are an exception to this trend. Birds' vision is tetrachromatic which means that they have four types of photoreceptive cone cells, each with a distinct maximal absorption peak. For reference, humans only have three photoreceptor cone types, and other animals have three or less. Because of this, birds have a peak photo-sensitivity at around 630nm unlike other animals, therefore they can see some of the red-colored spectrum that humans can see. However, birds are less sensitive at approximately 590-610nm on the spectrum than they are anywhere else within human range of vision (400-700nm), excluding the very red region of 650-700nm [3].

4 Recommendations

It is recommended that the following solutions are implemented to address the three methods of reducing light trespass described above. Compliance with the solutions outlined below will be documented by the design engineer.

4.1 Lowering intensity

- Overall exterior illumination levels shall be reduced by requiring light levels to be within 10% of specified foot candle requirements. This is in contrast to typical light level requirements that specify a minimum light levels requirement with no maximum and will ensure that spaces are not over lit [4].

- There are areas where increased light levels will be required for maintenance or visual inspection. Exterior platforms and exterior equipment areas will require 5fc and 30fc of illumination, respectively, when maintenance is being performed. In order to minimize the impact of these increased light levels a second lower level of illumination has been specified when these areas are only being used for access, 2fc and 5fc.

- A networked lighting control system will be provided with dimmable luminaires that will further reduce lighting levels through the following control strategies [2].

- A high level trim control strategy will be implemented during system commissioning to ensure that installed exterior light levels do not exceed specified illumination levels.

- When areas where sensor coverage patterns are sufficient to cover area illuminated, IP65 rated exterior occupancy sensors will be used to reduce exterior lighting levels to a minimum of 1fc or 50% of designed illumination level whichever is lower when occupancy is not detected.

- In areas where maintenance/inspection activities will be performed dimmed lighting levels will be raised or additional luminaires may be provided to allow the normal lighting levels to be manually increased during periods of maintenance to provide a safe environment for workers of the facility. Manually increasing lighting levels for maintenance will override occupancy sensor operation. Emergency or security events shall override occupancy sensor operation and raise all exterior lighting to full on.

4.2 Controlling Direction

- Light trespass will be minimized by designing a lighting system that does not exceed the IES recommended light trespass illumination levels for lighting zone LZ0 at a point 5 feet beyond the project property line [6].

- Sky glow will be minimized by providing luminaires that carry the IES U0 or fully shielded designation to eliminate direct light above the horizontal plane and limit light emitted directly to the atmosphere [5].

4.3 Minimizing Spectrum

- All exterior lighting used for general area illumination will only emit light in the 590-610 nm range as this range is the least sensitive to most animal's vision [2].
- Areas where visual acuity is important such as areas used for maintenance or inspection will have a correlated color temperature (CCT) of less than 3000K and a scotopic to photopic (S/P) ratio of less than 1.2 [2].

5 References

[1] "Outdoor Lighting Basics." ida, 19 April. 2017, www.darksky.org/lighting/lighting-basics.

[2] "LED Practical Guide." Ida, 19 April. 2017, www.darksky.org/lighting/led-guide.

[3] Rijchard, J. "Ultraviolet (UV) Light Perception by Birds: A Review." Veterinarni Medicina 54 (2009): 351-59.

[4] UFC 3-350-01, Unified Facilities Criteria. Interior and Exterior Lighting Systems and Controls

[5] DiLaura, David L. The lighting handbook: reference and application. 10th ed. New York, NY: Illuminating Engineering Society of North America, 2011.

[6] Joint Task Force. Joint IDA-IESNA Model Outdoor Lighting Ordinance (MLO), 2011.

[7] “About Lighting Pollution.” Florida Fish and Wildlife Conservation Commission, 19 April. 2017, www.myfwc.com/conservation/you-conserve/lighting/pollution.

EXHIBIT C

Environmental Design & Research,
Landscape Architecture, Engineering & Environmental Services, D.P.C.

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January 9, 2017

Mr. Michael Feinblatt
Vice President, ESS Group, Inc.
100 Fifth Avenue,
5th Floor
Waltham, MA 02451

RE: Clear River Energy Center Visual Simulations
EDR Project No. 16110

Dear Mr. Feinblatt:

The following is a summary of the technical process associated with assessing the potential nighttime visual impacts of the Proposed Clear River Energy Center (CREC or Project) in Burrillville, Rhode Island. This memo is intended to serve as an addendum to Section 6.12 of the CREC State of Rhode Island Electric Facilities Siting Board (EFSB) application. Additional information on the proposed Project can be found in in Section 3.0 of the EFSB application. This summary outlines the process used to capture the nighttime photographs, model the facility lighting system, and produce the visual simulations.

The visual impact assessment, produced by ESS (Section 6.12 of the EFSB Application) concluded that the CREC would only be visible from a few locations throughout the five-mile visual study area. Specifically, a single simulation was produced from Wilson Reservoir, from which the facility stacks were visible above the tree line. In order to demonstrate the potential nighttime impacts from this location, Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR) visited the Wilson Reservoir viewpoint on December 14, 2016 and captured a series of photographs using a 30.4-megapixel full frame DSLR camera with a fixed 50-millimeter lens and mounted on a tripod. This camera setup is particularly well suited for low noise, high resolution nighttime imagery, like that being captured for the simulations. Images were captured and reviewed on a laptop screen to ensure that the photograph matched the actual ambient light conditions. Several adjustments were made to shutter speed, aperture, and ISO until the photographed conditions matched the field conditions as closely as possible.

To produce the nighttime simulations, EDR first obtained an Autodesk 3D Max, three dimensional ("3D") model and lighting plan for the proposed CREC facility from ESS Group, Inc. EDR then downloaded the appropriate Illuminating Engineering Society (IES) files from the lighting manufacturer's website. These files are prepared by the lighting manufacturers to the specifications of a given fixture and used in the 3D model to mimic the photometric profile and output of the chosen fixtures.

EDR used Autodesk 3ds Max ® to create a simulated perspective (camera view) to match the location, bearing, and focal length of each existing conditions photograph. Existing elements in the view (e.g., topography, buildings, roads) were modeled based on aerial photographs and LIDAR data in AutoCAD Civil 3D 2014®. A 3D topographic mesh of the landform (based on LIDAR data) was then brought into the 3D model space. At this point, minor adjustments were

made to camera and target location, focal length, and camera roll to align all modeled elements with the corresponding elements in the photograph. This assures that any elements introduced to the model space (i.e., the proposed CREC) will be shown in proportion, perspective, and proper relation to the existing landscape elements in the view. Consequently, the alignment, elevations, dimensions, and locations of the proposed Project will be accurate and true in their relationship to other landscape elements in the photograph.

Using the camera view as guidance, the visible portions of the modeled CREC were imported to the model space described above, and set at the proper coordinates. Location and layout of proposed CREC components were provided by ESS.

Once the proposed Project was accurately aligned within the camera view, a lighting system was created based on the actual time, date, and location of the photograph. Using specialized software (Mental Ray Rendering System® with Final Gather and Mental Ray Photographic Exposure System® within Autodesk 3ds Max®), light reflection, highlights, color casting, and shadows were accurately rendered on the modeled Project based on actual environmental conditions represented in the photograph. Additionally, EDR incorporated a dense particle system into the sky to mimic the potential effects of visible sky glow in the model. These physical 3D particles are too small to be seen with the naked eye, however the reflected light from the CREC facility, illuminated these particles within the sky above the facility, just as would occur with moisture present in the air. The rendered Project was then superimposed over the photograph in Adobe Photoshop® and portions of the facility that fall behind vegetation, structures or topography were masked out (removed). A higher exposure photograph was also overlaid onto the simulated image and the particle system was then used to define the estimated area of visible sky glow. The resulting image shows an area of slightly higher exposure representing the effects of sky glow or reflected light from the CREC.

A second view demonstrating the potential impacts of light on the proposed facility entrance was created using Autodesk 3ds Max®. No photographs were taken at this location on Wallum Lake Road due to the inherent danger of photographing without lights on a transportation corridor at night. In addition, the current view from this location includes a heavily forested lot abutting the road, so views beyond the road edge could not be captured in a photograph. Consequently, the existing condition was replicated in the model by tracing and re-modeling all the existing elements (roads, forest edge, etc.) in the 3D camera view. Itoo Forest Pack Pro® was used to represent the existing forest vegetation. The proposed condition was then modeled in 3ds Max® to reflect the clearing, access road, and lighting for the proposed facility.

The proposed view from Wilson Reservoir (Attachment 1, Sheet 2) demonstrates that the stacks, FAA aviation obstruction lights, and some minor sky glow would be visible from this location. However, the overall visual change is relatively minor. It should be noted that sky glow will likely only occur on dark nights (minimal moonlight) with relatively high humidity.

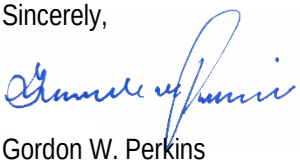
The proposed view from Wallum Lake Road demonstrates a substantial change resulting from the clearing of the trees and addition of the access road and road lighting. The facility itself is not visible in this view, but the removal of trees, addition of the road surface and street lights will change the character of the view for residents directly adjacent to the entrance. Since these impacts are localized to properties directly adjacent to the facility entrance, some level of offsite mitigation may be possible to minimize any potential light trespass onto those properties.

Based on the result of the visual simulations and the previously completed visual assessment, the CREC facility will have minimal nighttime visibility throughout the visual study area. Where localized impacts may occur, mitigation could be effective in reducing those impacts. This mitigation may include the use of full cut off lighting fixtures, planting of vegetative screens, landscaped gardens to soften the appearance of the access road, reduction in height of the light

fixtures, replace light fixtures with ornamental lights (similar to the Algonquin Gas entrance), and maintaining the maximum distance of the lights from the adjacent residences. Each of these options would need to be evaluated by Invenergy to determine their feasibility.

Please feel free to contact me if you have any questions or require additional information.

Sincerely,



Gordon W. Perkins
Senior Project Manager/Visual Assessment Specialist

Existing Conditions

Clear River Energy Center
Burrillville, Providence County, Rhode Island

Viewpoint 1: View West-Southwest from Jarox Site Fishing Area

January 2017

Attachment A

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Proposed Conditions

Clear River Energy Center
Burrillville, Providence County, Rhode Island

Viewpoint 1: View West-Southwest from Jarox Site Fishing Area

January 2017

Attachment A

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Clear River Energy Center
Burrillville, Providence County, Rhode Island

Viewpoint 1: View South-Southwest from Wallum Lake Road

January 2017

Attachment A

Existing view is completely blocked by trees. The image above is not a photograph but rather a 3D computer generated rendering.

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Clear River Energy Center
Burrillville, Providence County, Rhode Island

Viewpoint 1: View South-Southwest from Wallum Lake Road

January 2017

Attachment A

The image above is not a photograph but rather a 3D computer generated rendering of proposed conditions.

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