RESOLUTION OF THE NEW JERSEY PINELANDS COMMISSION

NO. PC4-14-37

TITLE: Authorizing the Executive Director to Execute a Permit Streamlining Memorandum of Agreement between The Richard Stockton College of New Jersey and the New Jersey Pinelands Commission

Commissioner Galletta **moves and Commissioner** Ficken **seconds the motion that:**

WHEREAS, the New Jersey Pinelands Commission (the Commission) is a public body, corporate and politic which was established to prepare and administer the Pinelands Comprehensive Management Plan (the "CMP") to protect the resources of the Pinelands Area of the State of New Jersey; and

WHEREAS, Section 6 of the Pinelands Protection Act authorizes the Commission "to enter into any and all agreements or contracts, execute any and all instruments, and do and perform any and all acts or things necessary, convenient, or desirable for the purposes of the Commission to carry out any power expressly given in this act"; and

WHEREAS, the Richard Stockton College of New Jersey is a New Jersey State institution of higher education, organized pursuant to N.J.S.A. 18A-64-1 et seq., and is located within the Pinelands Area of Galloway Township, Atlantic County; and

WHEREAS, N.J.A.C. 7:50-4.52(c)1 authorizes the Commission to enter into intergovernmental memoranda of agreement (MOA) with any agency of the Federal, State or local government which authorizes such agency to carry out specified development activities without securing individual development approvals from the Commission, provided the specified development activities are consistent with the provisions of N.J.A.C. 7:50-5 and 6; and

WHEREAS, on December 9, 2009, the Board of Trustees of the Richard Stockton College of New Jersey approved a new master plan for the College (the April 2010 Master Plan); and

WHEREAS, the April 2010 Master Plan sets forth a comprehensive plan for the future development and expansion of the college campus in recognition of increased enrollment and projections of future growth; and

WHEREAS, the Commission certified the College's April 2010 Master Plan on September 10, 2010 by adoption of Resolution #PC4-10-48; and

WHEREAS, approval of the 2010 Master Plan indicated the Commission's acceptance of the land use and threatened and endangered species plans set forth therein for the College but in no way relieved the College of its obligation to submit applications for development to the Commission for review and approval pursuant to N.J.A.C. 7:50-4.51 et seq.; and

WHEREAS, the College requested that the Pinelands Commission consider authorizing an alternate permitting process MOA for the approval of development activities to be conducted within the Designated Development Areas set forth within the certified April 2010 Master Plan; and

WHEREAS, the alternate permitting process established by the proposed MOA does not eliminate Commission review of any development proposed to be located within a Designated Development Area, but rather expedites such review by eliminating the submission of individual formal public development applications for such development; and

WHEREAS, the MOA requires the Executive Director to determine that any proposed development project that is submitted pursuant to the MOA's alternate permit process is consistent with the requirements of the MOA, the 2010 Master Plan, the 2010 Stormwater Plan and the provisions of Subchapters 5and 6 of the Pinelands CMP, in order to issue a written authorization allowing construction of such development project to proceed; and

WHEREAS, the MOA prohibits any development project within any Designated Development Area to commence absent receipt of written authorization from the Commission staff that the proposed development is consistent with the requirements of this MOA, the 2010 Master Plan, the 2010 Stormwater Plan, and the provisions of Subchapter 5 and 6 of the Pinelands CMP; and

WHEREAS, the MOA requires Stockton to perform all development activities within a Designated Development Area in accordance with the terms of this MOA; the 2010 Master Plan; the 2010 Stormwater Plan; the Commission's written authorization and the provisions of N.J.A.C. 7:50-5 and 6; and

WHEREAS, the MOA contains a suspension provision, which triggers if the Executive Director determines that a violation of either the Pinelands CMP or of a written development authorization issued by the Executive Director pursuant to this MOA has occurred at the College; and

WHEREAS, during a period of suspension, although the College is permitted to complete development projects for which the Executive Director has issued written authorization, all other development will require submission of a formal public development application to the Commission for its approval and such development may not commence until it has been approved by the Commission; and

WHEREAS, in order to seek reinstatement of the MOA once suspended, the College must provide the Commission with a written agreement itemizing the steps that the College will take to remedy the violation and a timeline for completion of such steps; and

WHEREAS, the MOA would require Stockton to submit a formal development application for any development to be located outside of a Designated Development Area or that is inconsistent with the terms of this MOA, the 2010 Master Plan or the 2010 Stormwater Plan; and

WHEREAS, the MOA does not release Stockton from its responsibility to obtain all other required local, State, and/or Federal approvals; and

WHEREAS, the College also submitted a copy of the 2010 Stormwater Management Master Plan for Commission review; and

WHEREAS, Commission staff has reviewed the 2010 Stormwater Management Master Plan and has found this initial plan to be consistent with the stormwater requirements of the Pinelands CMP, N.J.A.C. 7:50-6.84(a)6; and

WHEREAS, the MOA requires the College to submit specified information for each proposed development project to be located within any Designated Development Area; and

WHEREAS, this submittal must include information to demonstrate the consistency of each proposed development with the 2010 Stormwater Plan and the requirements of N.J.A.C. 7:50-6.84(a)6; and

WHEREAS, in accordance with the requirements of N.J.A.C. 7:50-4.52(c)3, a public hearing to receive testimony concerning the MOA was duly advertised and noticed on September 21, 2010 and subsequently conducted on October 2, 2010 at the Galloway Township Municipal Building in Galloway, New Jersey; and

WHEREAS, following the public hearing, the Commission became aware of a number violations that had occurred on the College's campus and decided to not to move forward with the administrative process required for its consideration of the MOA in order to permit Stockton to resolve these violations; and

WHEREAS, given the length of time between the close of the public comment period for the MOA and Stockton's resolution of the identified violations, the Commission decided to provide an additional written public comment period on the proposed MOA; and

WHEREAS, the Commission posted notice of this additional written public comment period on its website on September 10, 2014 and also posted a copy of the proposed MOA, dated September 9, 2014 and including attachments, on that date; and

WHEREAS, notice of the additional written public comment period was also published in the Press of Atlantic City on September 15, 2014; and

WHEREAS, this additional written public comment period closed on the close of business on October 15, 2014; and

WHEREAS, no written comments were received during the additional public comment period; and

WHEREAS, the Executive Director has concluded that the MOA meets the requirements of the Pinelands CMP; and

WHEREAS, the Executive Director has submitted a report to the Commission recommending that the Commission approve the Memorandum of Agreement Between The Richard Stockton College of New Jersey And The New Jersey Pinelands Commission; and

WHEREAS, the Commission's Policy & Implementation Committee reviewed the proposed MOA at its October 31, 2014 meeting and, with minor revisions related to the process for reinstatement of the MOA following a suspension, recommended its approval by the full Commission; and

WHEREAS, the Pinelands Commission has duly considered all public testimony submitted to the Commission concerning the MOA and has reviewed the Executive Director's report and the MOA, revised as of November 5, 2014; and

WHEREAS, the Pinelands Commission finds that the MOA, dated November 5, 2014, satisfies the standards of N.J.A.C. 7:50-4.52(c)1 which authorizes the Commission to enter into such an agreement; and

WHEREAS, pursuant to N.J.S.A. 13A-5h, no action authorized by the Commission shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Commission has been delivered to the Governor for review, unless prior to expiration of the review period and Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE BE IT RESOLVED that the Pinelands Commission agrees to enter into the November 5, 2014 Memorandum of Agreement between The Richard Stockton College of New Jersey and the New Jersey Pinelands Commission, attached hereto.

BE IT FURTHER RESOLVED that the Pinelands Commission authorizes its Executive Director to execute the November 5, 2014 Memorandum of Agreement between The Richard Stockton College of New Jersey and the New Jersey Pinelands Commission.

Record of Commission Votes

	AYE	NAY	NP	ABS		AYE	NAY	NP	ABS		AYE	NAY	NP	ABS
Ashmun	X				Galletta	X				Prickett	X			
Avery	X				Jackson	X				Quinn	X			
Brown	X				Jannarone	X				Rohan Green			X	
DiBello	X				Lloyd	X				Witt	X			
Earlen	X				McGlinchey	X				Lohbauer	X			

Adopted at a meeting of the Pinelands Commission

Date: Nov. 14, 2014

Nancy Wittenberg
Executive Director

Mark S. Lohbauer
Chairman

MEMORANDUM OF AGREEMENT
BETWEEN
THE RICHARD STOCKTON COLLEGE OF NEW JERSEY
AND
THE NEW JERSEY PINELANDS COMMISSION

I. PURPOSE

This Memorandum of Agreement ("MOA") is entered into between the New Jersey Pinelands Commission ("Commission") and the Richard Stockton College of New Jersey ("College"), a state-owned undergraduate and graduate college located within Galloway Township ("Township"), Atlantic County. The Commission is an independent political subdivision of the State of New Jersey created pursuant to Section 4 of the Pinelands Protection Act, N.J.S.A. 13:18A-1, *et seq.*, and charged with the implementation thereof and of the Pinelands Comprehensive Management Plan ("CMP"), N.J.A.C. 7:50-1 *et seq*.

In April 2010, the College completed a Master Plan for its 1,560-acre campus, all of which is located within the Pinelands Area. In August 2010, the Commission certified the "April 2010 Master Plan of the Richard Stockton College of New Jersey" ("2010 Master Plan"). The 2010 Master Plan is intended to guide all on-campus development for, at a minimum, the next 20 years. This MOA is intended to facilitate, consistent with the requirements of the CMP, the implementation of the development areas delineated in the 2010 Master Plan.

II. BACKGROUND

The College's campus consists of over 1,500 acres located partially within the Township's Regional Growth Area and partially within the Township's Rural Development Area. Since September 1971, the College has served as one of the region's institutions of higher education. As a result of, among other things, regional population growth since the time of the College's last master plan, the College is now educating many more students than previously anticipated. While the College's current facilities were designed to support a Full Time Equivalent Enrollment of approximately 5,000 students, the College's Fall 2013 Full Time Equivalent Enrollment exceeds 7,500 students. Today, the College educates more than 50% more students than originally anticipated. Thus, the College's facilities are inadequate to accommodate its current enrollment. The projected growth of student enrollment at the College over the next 20 years will only exacerbate the current situation. This MOA will facilitate and expedite the development of appropriate areas of the College's campus consistent with the standards of the CMP, while, at the same time, the 2010 Master Plan protects other environmentally sensitive on- and off-campus buffer areas.

A. <u>The 2010 Master Plan</u>

The 2010 Master Plan identifies the College's anticipated on-campus development projects over the course of the next 20 years based on projected student enrollment. The College's possible development projects include nearly 2.4 million gross square feet of new development, nearly

11,000 new parking spaces, and more than 3,100 new dwelling units (mostly dormitory units). The approximate locations and configurations of these anticipated development projects are illustrated on page 39 of the 2010 Master Plan, entitled "Exhibit 15: 2010 Development Areas" ("Development Areas") (Exhibit 15 of the 2010 Master Plan is attached hereto as Attachment 1 and is incorporated herein by reference). The development projects anticipated to occur within these Development Areas are described on page 40 of the 2010 Master Plan, "entitled Exhibit 16: Description of Development Areas." (Exhibit 16 of the 2010 Master Plan is attached hereto as Attachment 2 and is incorporated herein by reference). Supplemental Background Details from the April 2010 Master Plan are attached hereto as Attachment 5 and incorporated herein by reference.

B. 2010 Stormwater Management Master Plan:

The 2010 Stormwater Management Master Plan ("Stormwater Plan") includes conceptual layouts for the development projects that are anticipated within these Development Areas. (The Stormwater Plan is attached hereto as Attachment 3 and incorporated herein by reference). This MOA, in addition to establishing an alternative permitting process for development to be constructed within the Development Areas, also approves the Stormwater Plan. The conceptual layouts in the Stormwater Plan are only intended to illustrate the types of development anticipated within each Development Area. More importantly, the Stormwater Plan delineates the proposed limits of disturbance and the maximum impervious coverage permitted within each Development Area. This MOA establishes an alternative permitting process for those development projects that may occur within the Development Areas listed below (the "Designated Development Areas") provided that such development is both contained within the total area of disturbance initially identified within the Master Plan, and further refined in the Stormwater Plan, and does not exceed the maximum impervious coverage limits established in the Stormwater Plan, as reiterated below:

1. Designated Development Area 1 (Core Campus Development): a 56.55-acre area wherein:
   a. existing overall impervious coverage of 35.34 acres will be reduced to a maximum impervious coverage of 34.02 acres,
   b. no more than 16.26 acres of additional land is cleared, and
   c. a minimum of 6.27 acres shall remain wooded.

2. Designated Development Area 2 (Pomona Community of Learning) & Designated Development Area 3 (Athletic Complex/Barlow Site): a 106.30-acre area wherein:
   a. a maximum impervious coverage of 11.95 acres is permitted,
   b. no more than 84.07 acres of additional land is cleared, and
   c. a minimum of 10.28 acres shall remain wooded.

3. Designated Development Area 4 (Stockton Towers): a developed area where no increase in impervious coverage is either required or permitted and no increase in clearing is either required or permitted. Re-development with new low-rise dormitory units will replace the existing dormitory units within the footprint of the existing buildings and the adjacent courtyard.

4. Designated Development Area 5 (Health & Science Complex, Jimmie Leeds Road Commercial) & Designated Development Area 8 (Administrative Buildings - Jimmie Leeds Road): these areas total 79.36 acres wherein:
    a. a maximum impervious coverage of 35.42 acres is permitted,
    b. no more than 43.94 acres of additional land is cleared, and
    c. there is no minimum area that shall remain wooded. The stormwater design was conservatively calculated as though the entire development area was to be disturbed.

5. Designated Development Area 6 (Research Park): a 48.20-acre area wherein:
    a. a maximum impervious coverage of 21.92 acres is permitted,
    b. no more than 14.21 acres of additional land is cleared, and
    c. a minimum of 12.07 acres shall remain wooded.

6. Designated Development Area 7 (Administrative Buildings - Pomona Road): a 36.49-acre area wherein:
    a. a maximum impervious coverage of 11.97 acres is permitted,
    b. no more than 10.00 acres of additional land is cleared, and
    c. a minimum of 14.52 acres shall remain wooded.

7. Designated Development Area 9 (Plant Operations Storage Upgrade): a developed area where no increase in impervious coverage is either required or permitted and no increase in clearing is either required or permitted. Re-development with new storage buildings will replace the existing storage building within the footprint of the existing building and the surrounding compacted gravel surface.

8. Designated Development Area 10 (Research Park Administrative Annex): a 24.35-acre area wherein:
    a. a maximum impervious coverage of 6.54 acres is permitted,
    b. no more than 3.52 acres of additional cleared land is permitted, and
    c. a minimum of 14.29 acres shall remain wooded.

As is indicated later in Paragraph III.A.1.d., details of the final stormwater plan for each structure will be submitted when the College moves forward with each individual development.

C. <u>The Basis of the MOA</u>

The CMP, at N.J.A.C. 7:50-4.52(c)1, authorizes the Commission to enter into an intergovernmental memorandum with any agency of the Federal, State or local government that authorizes such agency to carry out specified development activities without securing individual development approvals from the Commission, provided that the specified development activities are consistent with the provisions of N.J.A.C. 7:50-5 and 6.

Prior Master Plan Approval: As part of the 2010 Master Plan, the College has identified the uses, types, intensities, and locations of its anticipated development. Provided that sufficient sewer capacity and/or septic dilution is available, at the time of proposed development, to

accommodate the wastewater flows generated by such uses and development, the Commission has determined that such uses and development are consistent with the minimum requirements of the CMP.

- First, the Commission has reviewed all of the College's Designated Development Areas and these Designated Development Areas do not involve any resources, structures, or areas found significant pursuant to N.J.A.C. 7:50-6.155.

- Second, the College has conducted, and the Commission has approved, campus-wide studies to identify threatened and endangered plant species as well as critical habitat for threatened and endangered animal species. The College has taken protective measures by delineating those areas where threatened or endangered plant species are known to exist; by delineating those areas determined to be critical habitat for threatened or endangered animal species; and by establishing appropriate buffers for both of the above-described areas. Specifically:

    a) The College has agreed to cluster its proposed development to the greatest extent practicable so as to avoid and minimize disturbance adjacent to wetlands, wetland buffers, threatened and endangered plant species, critical habitat for threatened and endangered animal species, and other deed-restricted lands found to be necessary for the protection of either threatened and endangered plant species or critical habitat of threatened and endangered animal species.

    b) More specifically, the College has also agreed to especially ensure that all development pursuant to this MOA will be clustered to minimize disturbance of these above-described environmentally sensitive areas along Delaware and Louisville Avenues, the Core Academic Area, and behind the Plant Management Building at the northern end of the campus.

    c) The College has also deed-restricted over 1,200 acres of high-integrity habitat, including an extensive wetlands ecosystem and areas known to be critical habitat for threatened and endangered species. These deed-restricted lands are depicted in green and blue on Exhibit C of the Executive Director's Report on the Richard Stockton College April 2010 Master Plan (which exhibit is attached hereto as Attachment 4 and incorporated herein). In accordance with the Deed of Conservation Restriction, dated October 7, 2010, other than forestry, the College's use of these deed-restricted lands is extremely limited.

- Third, the College has field-delineated wetlands throughout its campus and established appropriate buffers of either 175 or 300 feet (See Attachment 4).

- Fourth, as discussed above, the College has prepared a Stormwater Plan for those portions of the campus to be developed. The Stormwater Plan delineates Development Areas as well as total areas of disturbance for each of the Development Areas. It also specifies total impervious surface coverage limits for each of the Development Areas on the College's campus.

Attached Stormwater Plan: the attached plan has been found to be adequate to handle the maximum impervious surfaces listed above for each development area. However, because this plan does not contain all information necessary for a complete stormwater review, final review of stormwater will be conducted at the time each proposed development is submitted to the Commission staff in accordance with Paragraph III.A.1.d.

III. AGREEMENTS

A. The College agrees that:

1. At least thirty (30) days prior to commencing any development within any Designated Development Area, the College shall provide the following information, to the Commission's staff:

   a. A narrative description of each proposed development project;

   b. A detailed site plan for each proposed development project, depicting all proposed buildings, structures, improvements of any kind, all land disturbances of any kind and denoting the following:

      i. The extent of any wooded area to be cleared within the Designated Development Area demonstrating to the staff's satisfaction that the extent of the clearing has been minimized to that which is necessary to accommodate the College's proposed development project;

      ii. That all development within a Designated Development Area has been clustered away from wetlands and deed-restricted areas in accordance with the requirements of the 2010 Master Plan;

      iii. That the use of lawn or turf will be minimized, in accordance with the 2010 Master Plan and with N.J.A.C. 7:50-6.24;

      iv. That any temporary clearing will be revegetated in accordance with N.J.A.C. 7:50-6.23, after construction is complete; and

      v. An accounting of the total area of disturbance for each proposed development project undertaken within a given Designated Development Area that includes the cumulative disturbance from the proposed and previous projects relative to the maximum disturbance permitted within the given Designated Development Area.

   c. An AutoCAD file, shapefile, or personal geodatabase file depicting the proposed development project, including, all proposed buildings, structures, improvements of any kind, and all land disturbances of any kind;

d. Such information as is necessary to demonstrate that each proposed development project is consistent with the Stormwater Plan. Such information shall include an accounting of the total impervious surface coverage proposed for each proposed development project within each Designated Development Area. It shall also show the cumulative impervious coverage from the proposed and previous projects relative to the maximum impervious surface coverage that the Stormwater Plan permits within the given Designated Development Area. Such information shall also include stormwater conveyance and other construction details, as appropriate;

e. A signed certification of a licensed New Jersey Professional Engineer certifying that the proposed development is consistent with the 2010 Master Plan, the Stormwater Plan, the terms of this MOA, or the requirements of N.J.A.C. 7:50-5 and 6;

f. As applicable, a detailed analysis demonstrating compliance with the standards set forth in N.J.A.C. 7:50-6.94 (air quality standards);

g. As applicable, information sufficient to demonstrate compliance with the standards set forth in N.J.A.C. 7:50-6.107 (sign standards);

h. As applicable, information sufficient to demonstrate compliance with the standards set forth in N.J.A.C. 7:50-6.124 (fire hazard mitigation standards); and

i. Notwithstanding the provisions of N.J.A.C. 7:50-1.6(a).2, a fee for Commission staff's review of development projects calculated in accordance with N.J.A.C. 7:50-1.6. For the purpose of the fee calculation, projects shall be considered public development by a public agency and based on estimated construction costs. The maximum fee for any single development project shall not exceed $25,000.

2. If the Executive Director determines that any proposed development project submitted in accordance with Paragraph III.A.1 above is inconsistent with the requirements of this MOA, the 2010 Master Plan, the Stormwater Plan or the provisions of N.J.A.C. 7:50-5 and 6 not addressed by this MOA, the College agrees that it will modify the proposed development project until the Commission's staff determines that the proposed development project is consistent with such requirements. If the College disagrees with the staff's determination, it may file a complete application and seek formal Commission approval of a Public Development Application for the proposed development project.

3. The College shall not commence any development project within any Designated Development Area until it has submitted the information required by Paragraph III.A.1 above and has received written authorization from the Commission's staff

indicating that the proposed development project is consistent with the requirements of this MOA, the 2010 Master Plan, the Stormwater Plan, and the provisions of N.J.A.C. 7:50-5 and 6. If the Commission fails to respond within thirty (30) days of its receipt of information submitted pursuant to Paragraph III.A.1, the provisions of Paragraph III.B.7 shall apply. However, should the College subsequently receive a letter stating that the certification submitted by the Professional Engineer is in error and that the proposed development is inconsistent with the 2010 Master Plan, the Stormwater Plan, the terms of this MOA or provisions of N.J.A.C. 7:50-5 and 6 not addressed by this MOA, the College shall immediately cease all development activities and shall work with Commissions staff in accordance with Paragraph III.A.2 above to modify the proposed development project to render it consistent with such requirements. The Commission shall use its best efforts to complete its review within thirty (30) calendar days of receipt of a complete submission of all of the information required by Paragraph III.A.1 above and shall keep the College apprised as to the status of its review.

4. The College shall perform all development projects within the Designated Development Areas and such work shall be performed in accordance with the following:

    a. The terms of this MOA;
    b. The 2010 Master Plan;
    c. The Stormwater Plan;
    d. The Commission's written authorization issued in accordance with Paragraph III.B.7. or III.B.10.; and
    e. The provisions of N.J.A.C. 7:50-5 and -6 not addressed by this MOA.

5. The College shall submit a formal development application to the Pinelands Commission, in accordance with the requirements of N.J.A.C. 7:50-4.53(b), for any proposed development to be located outside of a Designated Development Area or that is not consistent with the terms of this MOA, the 2010 Master Plan or the Stormwater Plan and shall not commence such development activities until a complete Public Development Application has been submitted to and approved by the Commission.

6. If new information becomes available concerning, or changes are made to: 1) the number and/or type of residential units; 2) the extent of clearing, the amount of impervious coverage, or any other material aspect of any development project proposed within any Designated Development Area and for which the Commission staff has previously issued a written authorization in accordance with Paragraph III.B.7 or III.B.10, or 3) a Designate Development Area itself, the College shall:

    a. submit such new information to the Commission's staff for review so that the Executive Director may determine whether the proposed development remains consistent with the terms of this MOA, the requirements of N.J.A.C. 7:50-5 or 6 not addressed by this MOA, the Master Plan, the Stormwater Plan and the

October 7, 2010 Deed of Conservation Restriction and issue a consistency determination in accordance with Paragraph III.B.7 or III.B.10; or

b. if such new information or changes involve substantive variances or waivers of CMP regulations or of the Master Plan, the College shall either seek an amendment of the Master Plan and of this MOA, or submit a formal public development application in accordance with N.J.A.C. 7:50-4.53(b) for such development.

7. No part of this MOA shall release the College from its responsibility to obtain all other required local, State, and/or Federal approvals.

8. The terms of this MOA shall immediately be suspended in the event that the Executive Director determines that an outstanding, unresolved violation of the CMP or of a written authorization issued by him/her in accordance with Paragraph III.B.7 or III.B.10 exists on-campus. The College shall have sixty (60) days to seek reinstatement of this MOA by providing the Commission with a written agreement itemizing the steps the College will take to remedy the violation and a timeline for completion of such steps. If the measures and timeline for completion proposed by the College are acceptable to the Executive Director, s/he, following the Commission's concurrence, shall issue a letter to the College reinstating the terms of this MOA. Failure of the College to complete the measures required to cure the violation or make noted changes to its submissions after Commission staff comments within the specified timeline may result in reinstatement of the suspension.

9. During a period of suspension in accordance with Paragraph III.A.8 above, the College shall be permitted to complete development projects for which a written authorization from the Executive Director in accordance with Paragraphs III.B.7 and III.B.10 has been received. All other development shall require submission of a formal Public Development Application to the Commission in accordance with N.J.A.C. 7:50-4.52(b), and said development shall not commence until such application has been approved by the Commission.

10. Upon execution of this MOA, the College shall reimburse the Commission for the Commission's staff time expended in the development of this MOA. Additionally. fees for Commission staff's review of each development project shall be paid as described in Paragraph III.A.1.i above.

11. The College shall attend a meeting of the Commission's Policy and Implementation Committee on a biennial basis, around the anniversary date of the execution of this MOA by the last signatory, to provide the Committee with an synopsis of the development that has occurred at The Richard Stockton College of New Jersey in accordance with the terms of this MOA and any proposed development anticipated to be conducted by the College in the upcoming two year period.

B. The Pinelands Commission agrees that:

1. Any development project located within any Designated Development Area that is consistent with the terms of this MOA, the 2010 Master Plan, the Stormwater Plan, and the provisions of N.J.A.C. 7:50- 5 and 6 not already addressed by this MOA, shall not require the filing of a Public Development Application in accordance with N.J.A.C. 7:50-4.52(b).

2. Based on its review of the 2010 Master Plan, the Stormwater Plan, and the provisions of N.J.A.C. 7:50-5 and 6, the uses, types, intensities, and locations of development, as well as the number of non-student residential units and any commercial development and their associated Pinelands Development Credits, if any, proposed by the College within the Designated Development Areas, are consistent with the minimum requirements of the CMP, provided such development is served by public sanitary sewer, or septic dilution, as applicable, and, if served by sewer, that sufficient sewer capacity is available at the time of proposed development to accommodate the wastewater flows generated by such development.

3. No additional information concerning Parts VIII (Water Quality) or XV (Historic, Archaeological, and Cultural Preservation) of Subchapter 6 of the CMP, see N.J.A.C. 7:50-6.81 to -6.87; 7:50-6.151 to -6.158, other than that information which is required to be submitted pursuant to Paragraphs III.A.1, III.A.2, or III.A.7 above, shall be required for any proposed development projects for which a Public Development Application is not required to be submitted to the Commission in accordance with Paragraph III.B.1 above.

4. For the ten (10) year period running from September 10, 2010 (i.e., the date of the Commission's certification of the 2010 Master Plan) up to and including September 9, 2020, no additional information concerning Part I (Wetlands) of Subchapter 6 of the CMP, see N.J.A.C. 7:50-6.1 to -6.14, shall be required for development within the Designated Development Areas that is consistent with the terms of this MOA, the Master Plan, and the Stormwater Plan, other than that information which is required to be submitted pursuant to Paragraphs III.A.1, III.A.2, or III.A.7 above. At the conclusion of this ten-year period, the College may request that the Commission reevaluate the adequacy of the wetlands buffers established by the 2010 Master Plan. Nothing in this paragraph shall apply to any project that is not proposed to be constructed in a Designated Development Area, any project located within a Designated Development Area that is not consistent with the terms of this MOA, the Master Plan, or the Stormwater Plan.

5. As provided by the approved 2010 Master Plan:

   (a) For the ten (10) year period running from September 10, 2010 (i.e., the date of the Commission's certification of the 2010 Master Plan) up to and including September 9, 2020, the College shall not be required to submit

under Part II (Vegetation) or Part III (Fish and Wildlife) of Subchapter 6 of the CMP, see N.J.A.C. 7:50-6.21 to -6.27; N.J.A.C. 7:50-6.31 to 6.34, any additional information concerning threatened or endangered species that were investigated in the 2010 Master Plan, other than that information required by Paragraphs III.A.1, III.A.2, or III.A.7 above.

(b) If, by the conclusion of this ten-year period, neither the College, the Commission, NJDEP, the United States Fish and Wildlife Service ("USFWS"), or any other source determined to be credible by the Commission has discovered any new information concerning the presence or absence of threatened or endangered species that were investigated in the 2010 Master Plan, the College will not be required for a second ten (10) year period running from September 10, 2020 up to and including September 9, 2030 to submit under Part II (Vegetation) or Part III (Fish and Wildlife) of Subchapter 6 of the CMP, see N.J.A.C. 7:50-6.21 to -6.27; N.J.A.C. 7:50-6.31 to -6.34, any additional information concerning these threatened or endangered species, other than that information required by Paragraphs III.A.1, III.A.2, or III.A.7 above.

(c) If, at any time, the College, the Commission, the NJDEP, the USFWS, or any other source determined to be credible by the Commission discovers information concerning the presence of threatened or endangered species that were not investigated in the 2010 Master Plan, the College shall, with respect to these species, be subject to the requirements of Part II (Vegetation) and Part III (Fish and Wildlife) of Subchapter 6 of the CMP, see N.J.A.C. 7:50-6.21 *et seq.* and N.J.A.C. 7:50-6.31 *et seq.*, until such time as the College obtains the Commission's approval of an appropriately amended Master Plan which addresses such threatened or endangered species.

6. Within thirty (30) days of receipt of information submitted pursuant to Paragraphs III.A.1, III.A.2, or III.A.7 above, the Commission's staff shall provide written authorization in accordance with Paragraph III.B.10 or a written explanation of all known inconsistencies in accordance with Paragraph III.B.9 below.

7. Failure of the Commission to respond, within thirty (30) day of its receipt of information submitted by the College pursuant to Paragraphs III.A.1, if such information is accompanied by a licensed Professional Engineer's signature certifying that the proposed development is consistent with the 2010 Master Plan, the Stormwater Plan, the terms of this MOA and the requirements of N.J.A.C. 7:50-5 and 6 not addressed by this MOA, shall constitute approval of such development. However, should the Commission subsequently determine that that the certification submitted by the Professional Engineer is in error and that the proposed development is inconsistent with the 2010 Master Plan, the Stormwater Plan, the terms of this MOA or provisions of N.J.A.C. 7:50-5 and 6 not addressed by this MOA, such approval shall be suspended pending the College's fulfillment of its obligations under Paragraph III.A.3 above to work with the Commission's staff to

modify the proposed development project to render it consistent with such requirements.

8. If the Executive Director determines that any portion of any development project proposed within any Designated Development Area is inconsistent with this MOA, the 2010 Master Plan, the Stormwater Plan, or any provisions of N.J.A.C. 7:50-5 or 6 not already addressed by this MOA, the Commission's staff shall provide a written explanation of said deficiencies and identify specific actions that the College must take in order to remedy such deficiencies.

9. If the Commission's staff determines, after review of information submitted in accordance with Paragraphs III.A.1, III.A.2, or III.A.7 above and/or in response to any deficiency letter issued by the Commission pursuant to Paragraph III.B.9, that any development project proposed within any Designated Development Area is consistent with this MOA, the 2010 Master Plan, the Stormwater Plan, and the provisions of N.J.A.C. 7:50-5 and 6 not already addressed by this MOA, the Commission staff shall issue a written authorization to the College setting forth this determination. This written authorization shall constitute a public development approval and no further action by the Commission shall be required.

10. In the event of a suspension of the terms of the MOA in accordance with Paragraph III.A.8 above, the Executive Director shall, following the Commission's concurrence, issue a letter to the College reinstating the terms of this MOA following the College's submission of a written agreement in accordance with Paragraph III.A.9 and the acceptance of same by the Executive Director and the Commission. The Executive Director retains the right to deem a violation unresolved until such time as the College has actually implemented all measures set forth within its written agreement.

IV. PRIOR MOAs

The 1990 Memorandum of Agreement between the Pinelands Commission and Stockton State College and the 1996 Memorandum of Agreement between the New Jersey Pinelands Commission and The Richard Stockton College of New Jersey are superseded by the terms of this MOA and are rescinded in their entirety and are null and void and without any further force or effect at law or equity.

V. EFFECTIVE DATE, DURATION, AND SIGNATURES

1. In accordance with N.J.S.A. 13:18A-5(h), this MOA, and any subsequent amendments hereto, shall take effect following the conclusion of the Governor's review period and/or approval of the Pinelands Commission's meeting minutes authorizing entry of this MOA and then upon approval and signature by the authorized representative of both parties. The date of execution of the last signatory shall constitute the effective date.

2. This MOA shall remain in effect unless amended by written consent of both parties or otherwise terminated by either party upon sixty (60) days written notice or suspended by the Commission in accordance with Paragraph III.A.9.

3. This MOA, along with any exhibits, appendices, addendums, schedules, and amendments, constitutes the entire agreement of the parties, and supersedes all previous understandings and agreements between the parties, whether oral or written. The parties hereby acknowledge and represent that said parties have not relied on any representation, assertion, guarantee, warranty, collateral contract, or other assurance, except those set out in this MOA, made by or on behalf of any other party or any other person or entity whatsoever, prior to the execution of this MOA.

4. This MOA may be executed in counterparts. All such counterparts shall constitute an original and all of which together shall constitute one and the same agreement, binding upon the parties. Faxed and electronic signatures shall constitute original signatures.

IN WITNESS WHEREOF, the parties have caused their duly authorized representatives to execute this MOA on and as of the day and year written below. This MOA shall be executed in at least three original copies of which one is to be delivered to The Richard Stockton College of New Jersey, and two of which are to be delivered to the New Jersey Pinelands Commission.

The Richard Stockton College of New Jersey **Witnessed:**

By: _____
Herman J. Saatkamp, Jr., Ph.D., President

Date: _____

By: _____

Name: _____

Title: _____

New Jersey Pinelands Commission **Witnessed:**

By: _____
Nancy Wittenberg, Executive Director

Date: _____

By: _____

Name: _____

Title: _____

Approved as to form by:

By: _____
Kristen Heinzerling, Deputy Attorney General

Date:_____

RESOLUTION OF THE NEW JERSEY PINELANDS COMMISSION

NO. PC4-14- 38

TITLE: Issuing an Order to Certify Ordinance 17-2014, Amending Chapter 115 (Development Regulations) of the Code of the Township of Buena Vista

Commissioner Galletta **moves and Commissioner** Brown **seconds the motion that:**

WHEREAS, on July 12, 1991, the Pinelands Commission fully certified the Master Plan and codified Land Use Ordinances of Buena Vista Township; and

WHEREAS, Resolution #PC4-91-97 of the Pinelands Commission specified that any amendment to the Township's certified Master Plan and codified Land Use Ordinances be submitted to the Executive Director in accordance with N.J.A.C. 7:50-3.45 (Submission and Review of Amendments to Certified Master Plans and Land Use Ordinances) of the Comprehensive Management Plan to determine if said amendment raises a substantial issue with respect to conformance with the Pinelands Comprehensive Management Plan; and

WHEREAS, Resolution #PC4-91-97 further specified that any such amendment shall only become effective as provided in N.J.A.C. 7:50-3.45 of the Comprehensive Management Plan; and

WHEREAS, on September 8, 2014, Buena Vista Township adopted Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of the Township of Buena Vista by revising various standards related to signs, including establishing new standards applicable to changeable copy and electronic message center signs; and

WHEREAS, the Pinelands Commission received an adopted copy of Ordinance 17-2014 on September 12, 2014; and

WHEREAS, by letter dated September 19, 2014, the Executive Director notified the Township that Ordinance 17-2014 would require formal review and approval by the Pinelands Commission; and

WHEREAS, a public hearing to receive testimony on Ordinance 17-2014 was duly advertised, noticed and held on October 8, 2014 at the Richard J. Sullivan Center, 15C Springfield Road, New Lisbon at 9:30 a.m.; and

WHEREAS, the Executive Director has found that Ordinance 17-2014 is consistent with the standards and provisions of the Pinelands Comprehensive Management Plan; and

WHEREAS, the Executive Director has submitted a report to the Commission recommending the issuance of an order to certify that Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of the Township of Buena Vista, is in conformance with the Pinelands Comprehensive Management Plan; and

WHEREAS, the Commission's CMP Policy and Implementation Committee has reviewed the Executive Director's report and has recommended that Ordinance 17-2014 be certified; and

WHEREAS, the Pinelands Commission has duly considered all public testimony submitted to the Commission concerning Ordinance 17-2014 and has reviewed the Executive Director's report; and

WHEREAS, the Pinelands Commission accepts the recommendation of the Executive Director; and

WHEREAS, pursuant to N.J.S.A. 13:18A-5h, no action authorized by the Commission shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Commission has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become

effective upon such approval.

NOW, THEREFORE BE IT RESOLVED that

1. An Order is hereby issued to certify that Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of the Township of Buena Vista, is in conformance with the Pinelands Comprehensive Management Plan.

2. Any additional amendments to the Township's certified Master Plan and Land Use Ordinances shall be submitted to the Executive Director in accordance with N.J.A.C. 7:50-3.45 to determine if said amendments raise a substantial issue with respect to the Comprehensive Management Plan. Any such amendment shall become effective only as provided in N.J.A.C. 7:50-3.45.

Record of Commission Votes

	AYE	NAY	NP	ABS		AYE	NAY	NP	ABS		AYE	NAY	NP	ABS
Ashmun	X				Galletta	X				Prickett	X			
Avery	X				Jackson	X				Quinn	X			
Brown	X				Jannarone	X				Rohan Green			X	
DiBello	X				Lloyd	X				Witt	X			
Earlen	X				McGlinchey	X				Lohbauer	X			

Adopted at a meeting of the Pinelands Commission

Date: Nov. 14, 2014

Nancy Wittenberg
Executive Director

Mark S. Lohbauer
Chairman

State of New Jersey
THE PINELANDS COMMISSION
PO BOX 359
NEW LISBON, NJ 08064
(609) 894-7300
www.nj.gov/pinelands

General Information: Info@njpines.state.nj.us
Application Specific Information: AppInfo@njpines.state.nj.us

Chris Christie
Governor

Kim Guadagno
Lt. Governor

Mark S. Lohbauer
Chairman

Nancy Wittenberg
Executive Director

REPORT ON ORDINANCE 17-2014, AMENDING CHAPTER 115 (DEVELOPMENT REGULATIONS) OF THE CODE OF BUENA VISTA TOWNSHIP

October 31, 2014

Buena Vista Township
Municipal Building
P.O. Box 605
890 Harding Highway
Buena, NJ 08310

FINDINGS OF FACT

I. Background

The Township of Buena Vista is located in the southern Pinelands in Atlantic County. Pinelands municipalities adjacent to Buena Vista Township include the Townships of Hamilton and Weymouth, and the Boroughs of Buena and Folsom in Atlantic County; Maurice River Township and the City of Vineland in Cumberland County; and, Franklin and Monroe Townships in Gloucester County.

On July 11, 1991, the Pinelands Commission fully certified the Master Plan and Land Use Ordinances of Buena Vista Township.

On September 8, 2014, Buena Vista Township adopted Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Township's Code by revising various standards related to signs, including establishing new standards applicable to changeable copy and electronic message center signs. More specifically, Ordinance 17-2014 permits changeable copy and electronic message center signs in certain portions of the Township's Pinelands Villages and Pinelands Town. The Pinelands Commission received a certified copy of Ordinance 17-2014 on September 12, 2014.

By letter dated September 19, 2014, the Executive Director notified the Township that Ordinance 17-2014 would require formal review and approval by the Pinelands Commission.

II. Master Plans and Land Use Ordinances

The following ordinance has been submitted to the Pinelands Commission for certification:

* Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of Buena Vista Township, introduced on August 25, 2014 and adopted on September 8, 2014.

This ordinance has been reviewed to determine whether it conforms with the standards for certification of municipal master plans and land use ordinances as set out in N.J.A.C. 7:50-3.39 of the Pinelands Comprehensive Management Plan. The findings from this review are presented below. The numbers used to designate the respective items correspond to the numbers used to identify the standards in N.J.A.C. 7:50-3.39.

1. Natural Resource Inventory

Not applicable.

2. Required Provisions of Land Use Ordinance Relating to Development Standards

Ordinance 17-2014 amends Chapter 115 (Development Regulations) of the Code of Buena Vista Township by revising various standards related to signs. Ordinance 17-2014 establishes what kinds of signs are permitted within the Township's various zoning districts as well as the number and size of signs permitted at each use. It further establishes various prohibitions related to signs. Ordinance 17-2014 also adopts standards for changeable copy and electronic message center (EMC) signs, including restrictions on their location. Changeable copy signs are defined as signs with the capability of content change by means of manned or remote input. An EMC sign, as defined by Ordinance 17-2014, is a type of electronically activated changeable copy sign, one whose variable messages and graphic presentation capability can be electronically programmed from a remote location. EMC signs typically use light emitting diodes (LED) as a lighting source, rather than relying on a more traditional means of external illumination.

The standards adopted by Ordinance 17-2014 for changeable copy and EMC signs include maximum luminance levels and a requirement that all EMC signs be equipped with automatic dimming controls to adjust the light emitted during ambient low light conditions and night. Each message on a changeable copy or EMC sign must be fixed for at least eight seconds before changing to the next message. Continuous scrolling, flashing, blinking, spinning, rotating and similar moving effects are prohibited. Similarly, off-site advertising is not permitted on changeable copy or electronic message center signs, other than public service information approved by Buena Vista Township.

Notably, Ordinance 17-2014 permits EMC signs only within the PT, PVRC, PVI, RA, B-1, and OC Districts. Only the PVRC (Pinelands Village Residence/Commerce), PVI (Pinelands Village Exclusive Industry), and PT (Pinelands Town – Commerce) Districts are within the Pinelands Area. The PVRC District occurs in three different Pinelands Villages. In the Pinelands Village of Richland, the PVRC District extends eastwardly along Harding Highway (Route 40) from near its intersection with Aspen Avenue to near its intersection with Llewellyn Avenue; and it extends northwardly from near where Pancoast Mill Road intersects with a railroad right-of-way to Sewell Avenue. The PVRC District occurs in the Pinelands Village of Newtonville as well, where it begins at the intersection of Jackson Road and Tenth Street and ends near where Jackson Road intersects with a railroad right-of-way. The PVRC District also occurs in the Pinelands Village of Milmay, where it begins near the intersection of Tuckahoe Road with Broad Street (Route 552) and ends at the intersection of Tuckahoe Road with McDonald Avenue. The

PVI District is located within the Pinelands Village of Milmay. The PVI District begins at the intersection of Tuckahoe Road and McDonald Avenue and extends southeasterly to near the intersection of Tuckahoe Road and Line Street.

The scenic management standards of the CMP include a prohibition on signs that are designed to attract attention by physical or lighting change in the Pinelands Area. However, by their very nature, changeable copy and EMC signs involve scrolling messages or advertisements that move or change on a regular basis. This presents a potential conflict with the CMP, which also requires that the character and composition of signs in the Pinelands Area be harmonious with the scenic values of the Pinelands, to the maximum extent practical. It is important to note that the sign standards set forth in the CMP were written in 1980, prior to the use of digital or LED technology in association with on-site or off-site advertising signs. Also noteworthy is the fact that the CMP does not dictate the type of lighting (internal or external) that signs in the Pinelands Area must use. Therefore, it is not the use of LED technology (internal illumination) that raises an issue. Rather, it is the fact that digital or LED signs often involve the changing of one static image to another, or even the use of video, to attract attention.

Ordinance 17-2014 incorporates numerous standards to control the location, size and appearance of changeable copy and EMC signs, including a restriction on the frequency with which the advertisements on such signs may change. As noted above, Ordinance 17-2014 also limits changeable copy and EMC signs to nonresidential and mixed-use zones within Pinelands Town and Village management areas. Within said zones, virtually all types of residential and nonresidential development are permitted by the CMP and the Township's ordinances. Accordingly, the standards adopted by Ordinance 17-2014 adequately address concerns with scenic management.

Ordinance 17-2014 is consistent with the land use and development standards of the Comprehensive Management Plan. This standard for certification is met.

3. Requirement for Certificate of Filing and Content of Development Applications

Not applicable.

4. Requirement for Municipal Review and Action on All Development

Not applicable.

5. Review and Action on Forestry Applications

Not applicable.

6. Review of Local Permits

Not applicable.

7. Requirement for Capital Improvement Program

Not applicable.

8. Accommodation of Pinelands Development Credits

Not applicable.

9. Referral of Development Applications to Environmental Commission

Not applicable.

10. General Conformance Requirements

Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of Buena Vista Township, is consistent with the standards and provisions of the Pinelands Comprehensive Management Plan.

This standard for certification is met.

11. Conformance with Energy Conservation

Not applicable.

12. Conformance with the Federal Act

Ordinance 17-2014, amending Chapter 115 (Development Regulations) of the Code of Buena Vista Township, is consistent with the standards and provisions of the Pinelands Comprehensive Management Plan. No special issues exist relative to the Federal Act.

This standard for certification is met.

13. Procedure to Resolve Intermunicipal Conflicts

Not applicable.

PUBLIC HEARING

A public hearing to receive testimony concerning Buena Vista Township's application for certification of Ordinance 17-2014 was duly advertised, noticed and held on October 8, 2014 at the Richard J. Sullivan Center, 15C Springfield Road, New Lisbon, New Jersey at 9:30 a.m. Ms. Grogan conducted the hearing, at which no testimony was received.

Written comments were accepted through October 10, 2014 and were received from the following:

October 8, 2014 letter from Theresa Lettman, Director of Monitoring Programs, Pinelands Preservation Alliance (see Exhibit #1)

October 8, 2014 email from Temma Fishman (see Exhibit #2)

October 10, 2014 email from Fran Brooks (see Exhibit #3)

October 10, 2014 letter from Fred Akers, Administrator, The Great Egg Harbor Watershed Association (see Exhibit #4)

EXECUTIVE DIRECTOR'S RESPONSE

Theresa Lettman's letter (submitted on behalf of the Pinelands Preservation Alliance), Temma Fishman's email, and Fran Brooks' email all express the belief that EMC signs constitute "light" or "visual" pollution. As such, they argue that EMC signs will have a detrimental effect on the viewsheds of the Pinelands Area. To a greater or lesser extent, all illuminated signs, and, for that matter, all illumination of any kind, constitutes a source of "light" or "visual" pollution. As a result, all illuminated objects, in varying degrees, detrimentally affect the viewsheds of the Pinelands Area. However, there is no reason to believe that internally illuminated signs (like EMC signs) would produce a more detrimental effect on Pinelands' viewsheds, or constitute a greater source of "light" or "visual" pollution, than externally illuminated signs, which are, and always have been, permitted throughout the Pinelands Area. In fact, given that Ordinance 17-2014 imposes a maximum luminance level on such signs and that it imposes a requirement that all EMC signs be equipped with automatic dimming controls to adjust the light emitted during ambient low-light conditions and night, it is quite possible that such (internally) illuminated signs will have a less detrimental impact than traditional, externally illuminated signs. Ms. Lettman and Ms. Fishman both express concern that EMC signs will negatively affect wildlife. Again, while all artificial illumination will have some impact upon nearby wildlife, there is no reason to believe that EMC signs would produce a more detrimental impact upon Pinelands' wildlife than more traditional, externally illuminated signs.

Ms. Lettman's letter also expresses her concern that Buena Vista Township lacks the ability to enforce the standards established by Ordinance 17-2014. While Ms. Lettman's concerns may be sound, the ability of a municipality to implement and enforce its own ordinances is not one of the certification standards set forth at N.J.A.C. 7:50-3.39, with the exception of ordinances that adopt alternate permitting programs pursuant to N.J.A.C. 7:50-3, Part VIII. The Commission cannot decline to certify a municipal land use ordinance for that reason. The Commission's sole concern when determining whether to certify a municipal ordinance is whether said ordinance is in conformance with the minimum standards of the CMP. The standards adopted by Ordinance 17-2014 address such varied aspects of EMC signs as the location, size, and appearance of such signs; the frequency with which the advertisements on such signs may change; and, the maximum luminance levels of such signs. Accordingly, the standards adopted by Ordinance 17-2014 are consistent with the CMP and adequately address concerns with scenic management.

Ms. Lettman's letter expresses the belief that EMC signs violate N.J.A.C. 7:50-6.107(a). The scenic management standards of the CMP do indeed prohibit signs that are designed to attract attention by

physical or lighting change. Since EMC signs involve messages or advertisements that move or change on a regular basis, this presents a potential conflict with CMP provisions that require that the character and composition of signs in the Pinelands Area be harmonious with the scenic values of the Pinelands, to the maximum extent practical. However, it is important to note that the CMP's sign standards were written in 1980, prior to the use of digital or LED technology in association with advertising signs. Also noteworthy is the fact that the CMP does not dictate the type of lighting (internal or external) that signs must use within the Pinelands Area. Thus, it isn't the use of LED technology (internal illumination) that raises an issue. Rather, it's that EMC signs often involve the changing of one static image to another, or even the use of video, to attract attention. Ordinance 17-2014 incorporates numerous standards that address scenic management. For example, the provisions of Ordinance 17-2014 control the location, size and appearance of changeable copy and EMC signs, including a restriction on the frequency with which the advertisements on such signs may change. Ordinance 17-2014 also imposes a maximum luminance level on EMC signs and imposes a requirement that all EMC signs be equipped with automatic dimming controls to adjust the light emitted during ambient low-light conditions and night. Moreover, Ordinance 17-2014 would permit changeable copy and EMC signs only within nonresidential and mixed-use zones within Pinelands Town and Village management areas. Within said zones, virtually all types of residential and nonresidential development are permitted by the CMP and the Township's ordinances. Therefore, Ordinance 17-2014 adequately addresses EMC signs vis-á-vis scenic management and there is no violation of N.J.A.C. 7:50-6.107(a).

Fran Brooks' email expresses her belief that EMC signs are incompatible with the character of Pinelands Villages and Towns. However, within the development-oriented management areas of the Pinelands (Pinelands Regional Growth Areas, Pinelands Towns, and Pinelands Villages), where virtually all types of residential and nonresidential development are permitted by the CMP, it is entirely consistent with the CMP for a municipality to permit the use of EMC signs. Within the Pinelands Village Residence/Commerce (PVRC) Zone, the Pinelands Village Exclusive Industry (PVI) Zone, and the Pinelands Town – Commerce (PT) Zone, for example, single-family detached houses, banks, hotels, motels, hospitals, warehouses, and, even, correctional facilities are permitted. It is difficult to see how EMC signs could be inconsistent with such a broad array of permitted uses that are fully authorized by the CMP.

Ms. Brooks' email also expresses her belief that EMC signs are incompatible with the Buena Vista Township's Richland Village Redevelopment Plan. Whether or not that is the case, it is beyond the Commission's authority to decline to certify a municipal ordinance on such grounds. It is for the Township to decide whether the Richland Village Redevelopment Plan should be revised to address the fact that EMC signs will now be permitted in the PVRC District, a portion of which is located in the Redevelopment Area. The Commission is simply reviewing the comprehensive sign ordinance (17-2014) adopted by the Township to determine whether it is in conformance with the minimum standards of the CMP. The relationship of Ordinance 17-2014 to the Township's Richland Village Redevelopment Plan is irrelevant to the present inquiry.

Fred Akers' letter, submitted on behalf of The Great Egg Harbor Watershed Association, notes that it has been years, or even decades, since Buena Vista Township last updated its sign ordinance and, as a result, all updates should conform strictly to the CMP. While the Commission agrees with Mr. Akers' contention that all updates to the Township's sign ordinance should conform to the CMP, the fact that the Township hasn't updated its sign ordinance in many years is irrelevant.

Mr. Akers' letter notes that Buena Vista Township is a "serial violator" of not only the CMP but of its own codes as well. As a result, the Commission shouldn't make any exceptions for it by allowing it to

permit EMC signs in Pinelands Villages. Whether Buena Vista Township is, or is not, a "serial violator" of its own codes as well as the CMP is irrelevant to the present inquiry. As noted above, the Commission's sole concern when determining whether to certify a municipal ordinance is whether said ordinance is in conformance with the minimum standards of the CMP. Buena Vista Township's alleged prior violations simply are not germane to whether the standards established by Ordinance 17-2014 are consistent with the CMP.

Mr. Akers' letter goes on to note that, thus far, the Commission's approval of other ordinances permitting EMC signs has restricted the use of such signs to "growth areas only." Mr. Akers encourages the Commission to be consistent with its prior decisions on this issue. As noted above, it is, indeed, the Commission's position that, within development-oriented management areas (Pinelands Regional Growth Areas, Pinelands Towns, and Pinelands Villages), where virtually all types of residential and nonresidential development are permitted by the CMP, it is entirely consistent with the CMP for a municipality to permit the use of EMC signs. The Pinelands Village Residence/Commerce (PVRC) Zone, the Pinelands Village Exclusive Industry (PVI) Zone, and the Pinelands Town – Commerce (PT) Zone, permit a wide variety of principal uses, including single-family detached houses, hotels, hospitals, warehouses, and, correctional facilities. The use of EMC signs is not inconsistent with such a broad array of permitted uses.

CONCLUSION

Based on the Findings of Fact cited above, the Executive Director has concluded that Ordinance 17-2014 complies with Comprehensive Management Plan standards for the certification of municipal master plans and land use ordinances. Accordingly, the Executive Director recommends that the Commission issue an order to certify Ordinance 17-2014 of Buena Vista Township.

PWT/SRG/CBV
Attachments

PINELANDS PRESERVATION ALLIANCE

Bishop Farmstead • 17 Pemberton Road • Southampton, NJ 08088
Phone: 609-859-8860 • ppa@pinelandsalliance.org • www.pinelandsalliance.org

Executive Director's Report on
Buena Vista Township Ord. 17-2014
October 31, 2014
Exhibit #1

October 8, 2014

Susan Grogan
Pinelands Commission
15 Springfield Road
P.O. Box 359
New Lisbon, NJ 08064

Re: Buena Vista Ordinance 17-2014

Dear Ms. Grogan:

Buena Vista Township has passed Ordinance 17-2014 which allows for electronic message signs in the Pinelands Town and Village Management areas of the township. PPA believes this ordinance should not be certified because it is not in conformance with the CMP. Section 7:50-3.1 (d) states:

> *A local authority* ***that incorporates all of the elements of this Plan*** *in its local plan and ordinances will be assured of certification. In contrast, municipal plans and ordinances that deviate from the essential nature of this Plan are unlikely to be certified. However, it is a policy of this Plan to allow municipalities the greatest degree of flexibility and discretion in the preparation of local plans and ordinances so* ***long as the plans and ordinances do not conflict with the ultimate objectives and minimum requirements of this Plan****.*

Buena Vista's ordinance conflicts with the minimum requirements of Section 7:50-6.106 on signs which requires each municipality to adopt provisions in its ordinances that contain section 7:50-6.107 (a). This section states:

> ***No sign****, other than warning or safety signs, which is designed or intended to attract attention by sudden, intermittent or rhythmic movement, or physical or lighting change, shall be permitted in any area.*

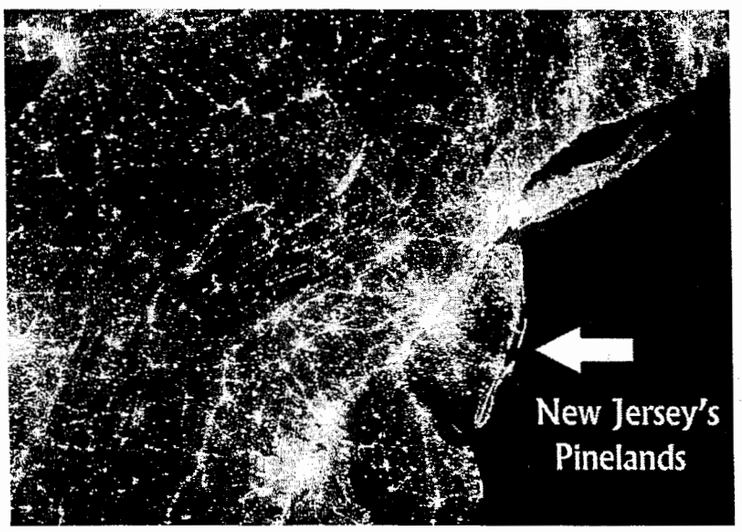
Buena's ordinance permits changeable copy and electronic message center signs which allow the message to change every 8 seconds. Lighting with changes that are this frequent will be very dramatic at night time.

Buena Vista wants these electronic message center signs to be permitted in the Pinelands Town and Village Management areas within the township. The PRVC and PVI zones include portions of the villages of Newtonville, Milmay and Richland.

Applying the Pinelands Commission's EIA scores to Newtonville and Mimay's PVRC and PVI zones reveal that the area is largely made up of areas with an 80% combined score. These zoning areas are also surrounded by areas with a 80% and 90% combined score. If you apply the DEP Landscape mapping to these zones both within the zone and the surrounding areas are rank 3 (state threatened) and 4 (state endangered). These rankings indicate the present of many bird species such as the barred owl, whip-poor-will and warblers. The attached papers point out the impacts changing light patterns have on bird species and their habitats.

The Village of Richland has less nodes with high EIA scores but the small PVRC zone is surrounded by a Pinelands Forest Management Area, along with the landscape rankings of 3 and 4.

Lastly, the ordinance gives a display time of eight seconds but I find it hard to believe any Township officials will be able to regulate and enforce this provisions of the ordinance.



The dark rural areas of the New Jersey Pinelands will change quickly if these types of signs are allowed. The Comprehensive Management Plan got it right in 1980 when it wrote the sign section. The proof is the night sky of New Jersey. Allowing electronic messaging signs in the rural areas will not only allow for ecological light pollution but take away the view shed residents have of the sky.

Respectfully submitted,

Theresa Lettman
Director of Monitoring Programs

Ecological light pollution

Travis Longcore and Catherine Rich

Ecologists have long studied the critical role of natural light in regulating species interactions, but, with limited exceptions, have not investigated the consequences of artificial night lighting. In the past century, the extent and intensity of artificial night lighting has increased such that it has substantial effects on the biology and ecology of species in the wild. We distinguish "astronomical light pollution", which obscures the view of the night sky, from "ecological light pollution", which alters natural light regimes in terrestrial and aquatic ecosystems. Some of the catastrophic consequences of light for certain taxonomic groups are well known, such as the deaths of migratory birds around tall lighted structures, and those of hatchling sea turtles disoriented by lights on their natal beaches. The more subtle influences of artificial night lighting on the behavior and community ecology of species are less well recognized, and constitute a new focus for research in ecology and a pressing conservation challenge.

Front Ecol Environ 2004; 2(4): 191–198

As diurnal creatures, humans have long sought methods to illuminate the night. In pre-industrial times, artificial light was generated by burning various materials, including wood, oil, and even dried fish. While these methods of lighting certainly influenced animal behavior and ecology locally, such effects were limited. The relatively recent invention and rapid proliferation of electric lights, however, have transformed the nighttime environment over substantial portions of the Earth's surface.

Ecologists have not entirely ignored the potential disruption of ecological systems by artificial night lighting. Several authors have written reviews of the potential effects on ecosystems or taxonomic groups, published in the "gray" literature (Health Council of the Netherlands 2000; Hill 1990), conference proceedings (Outen 2002; Schmiedel 2001), and journal articles (Frank 1988; Verheijen 1985; Salmon 2003). This review attempts to integrate the literature on the topic, and draws on a conference organized by the authors in 2002 titled *Ecological Consequences of Artificial Night Lighting*. We identify the roles that artificial night lighting plays in changing ecological interactions across taxa, as opposed to reviewing these effects by taxonomic group. We first discuss the scale and extent of ecological light pollution and its relationship to astronomical light pollution, as well as the measurement of light for ecological research. We then address the recorded and potential influences of artificial night lighting within the nested hierarchy of behavioral and population ecology, community ecology, and ecosystem ecology. While this hierarchy is somewhat artificial and certainly mutable, it illustrates the breadth of potential consequences of ecological light pollution. The important effects of light on the physiology of organisms (see Health Council of the Netherlands 2000) are not discussed here.

In a nutshell:

- Ecological light pollution includes chronic or periodically increased illumination, unexpected changes in illumination, and direct glare
- Animals can experience increased orientation or disorientation from additional illumination and are attracted to or repulsed by glare, which affects foraging, reproduction, communication, and other critical behaviors
- Artificial light disrupts interspecific interactions evolved in natural patterns of light and dark, with serious implications for community ecology

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Astronomical and ecological light pollution: scale and extent

The term "light pollution" has been in use for a number of years, but in most circumstances refers to the degradation of human views of the night sky. We want to clarify that this is "astronomical light pollution", where stars and other celestial bodies are washed out by light that is either directed or reflected upward. This is a broad-scale phenomenon, with hundreds of thousands of light sources cumulatively contributing to increased nighttime illumination of the sky; the light reflected back from the sky is called "sky glow" (Figure 1). We describe artificial light that alters the natural patterns of light and dark in ecosystems as "ecological light pollution". Verheijen (1985) proposed the term "photopollution" to mean "artificial light having adverse effects on wildlife". Because photopollution literally means "light pollution" and because light pollution is so widely understood today to describe the degradation of the view of the night sky and the human experience of the night, we believe that a more descriptive term is now necessary. Ecological light pollution includes direct glare, chronically increased illumina-

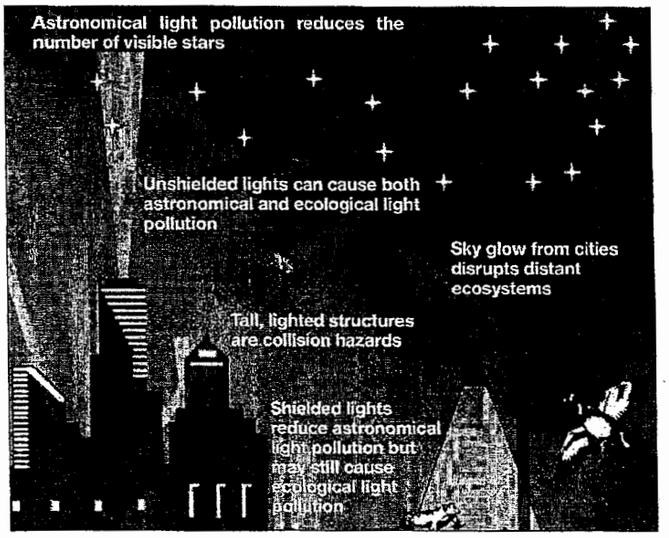

Figure 1. Diagram of ecological and astronomical light pollution.

tion, and temporary, unexpected fluctuations in lighting. Sources of ecological light pollution include sky glow, lighted buildings and towers, streetlights, fishing boats, security lights, lights on vehicles, flares on offshore oil platforms, and even lights on undersea research vessels, all of which can disrupt ecosystems to varying degrees. The phenomenon therefore involves potential effects across a range of spatial and temporal scales.

The extent of ecological light pollution is global (Elvidge *et al.* 1997; Figure 2). The first atlas of artificial night sky brightness illustrates that astronomical light pollution extends to every inhabited continent (Cinzano *et al.* 2001). Cinzano *et al.* (2001) calculate that only 40% of Americans live where it becomes sufficiently dark at night for the human eye to make a complete transition from cone to rod vision and that 18.7% of the terrestrial surface of the Earth is exposed to night sky brightness that is polluted by astronomical standards. Ecosystems may be affected by these levels of illumination and lights that do not contribute to sky glow may still have ecological consequences, ensuring that ecological light pollution afflicts an even greater proportion of the Earth. Lighted fishing fleets, offshore oil platforms, and cruise ships bring the disruption of artificial night lighting to the world's oceans.

The tropics may be especially sensitive to alterations in natural diel (ie over a 24-hour period) patterns of light and dark because of the year-round constancy of daily cycles (Gliwicz 1999). A shortened or brighter night is more likely to affect tropical species adapted to diel patterns with minimal seasonal variation than extratropical species adapted to substantial seasonal variation. Of course, temperate and polar zone species active only during a portion of the year would be excluded from this generalization. Species in temperate zones will also be susceptible to disruptions if they depend on seasonal day length cues to trigger critical behaviors.

■ Measurements and units

Measurement of ecological light pollution often involves determination of illumination at a given place. Illumination is the amount of light incident per unit area – not the only measurement relevant to ecological light pollution, but the most common. Light varies in intensity (the number of photons per unit area) and spectral content (expressed by wavelength). Ideally, ecologists should measure illumination in photons per square meter per second with associated measurements of the wavelengths of light present. More often, illumination is measured in lux (or footcandles, the non-SI unit), which expresses the brightness of light as perceived by the human eye. The lux measurement places more emphasis on wavelengths of light that the human eye detects best and less on those that humans perceive poorly. Because other organisms perceive light differently – including wavelengths not visible to humans – future research on ecological light pollution should identify these responses and measure light accordingly. For example, Gal *et al.* (1999) calculated the response curve of mysid shrimp to light and reported illumination in lux adjusted for the spectral sensitivity of the species.

Ecologists are faced with a practical difficulty when communicating information about light conditions. Lux is the standard used by nearly all lighting designers, lighting engineers, and environmental regulators; communication with them requires reporting in this unit. Yet the use of lux ignores biologically relevant information. High-pressure sodium lights, for instance, will attract moths because of the presence of ultraviolet wavelengths, while low-pressure sodium lights of the same intensity, but not producing ultraviolet light, will not (Rydell 1992). Nevertheless, we use lux here, both because of the need to communicate with applied professionals, and because of its current and past widespread usage. As this research field develops, however, measurements of radiation and spectrum relevant to the organisms in question should be used, even though lux will probably continue to be the preferred unit for communication with professionals in other disciplines.

Ecologists also measure aspects of the light environment other than absolute illumination levels. A sudden change in illumination is disruptive for some species (Buchanan 1993), so percent change in illumination, rate, or similar measures may be relevant. Ecologists may also measure luminance (ie brightness) of light sources that are visible to organisms.

Figure 2. Distribution of artificial lights visible from space. Produced using cloud-free portions of low-light imaging data acquired by the US Air Force Defense Meteorological Satellite Program Operational Linescan System. Four types of lights are identified: (1) human settlements – cities, towns, and villages (white), (2) fires – defined as ephemeral lights on land (red), (3) gas flares (green), and (4) heavily lit fishing boats (blue). See Elvidge et al. *(2001) for details. Image, data processing, and descriptive text by the National Oceanic and Atmospheric Administration's National Geophysical Data Center.*

■ Behavioral and population ecology

Ecological light pollution has demonstrable effects on the behavioral and population ecology of organisms in natural settings. As a whole, these effects derive from changes in orientation, disorientation, or misorientation, and attraction or repulsion from the altered light environment, which in turn may affect foraging, reproduction, migration, and communication.

Orientation/disorientation and attraction/repulsion

Orientation and disorientation are responses to ambient illumination (ie the amount of light incident on objects in an environment). In contrast, attraction and repulsion occur in response to the light sources themselves and are therefore responses to luminance or the brightness of the source of light (Health Council of the Netherlands 2000).

Increased illumination may extend diurnal or crepuscular behaviors into the nighttime environment by improving an animal's ability to orient itself. Many usually diurnal birds (Hill 1990) and reptiles (Schwartz and Henderson 1991), for example, forage under artificial lights. This has been termed the "night light niche" for reptiles and seems beneficial for those species that can exploit it, but not for their prey (Schwartz and Henderson 1991).

In addition to foraging, orientation under artificial illumination may induce other behaviors, such as territorial singing in birds (Bergen and Abs 1997). For the northern mockingbird (*Mimus polyglottos*), males sing at night before mating, but once mated only sing at night in artificially lighted areas (Derrickson 1988) or during the full moon. The effect of these light-induced behaviors on fitness is unknown.

Constant artificial night lighting may also disorient organisms accustomed to navigating in a dark environment. The best-known example of this is the disorientation of hatchling sea turtles emerging from nests on sandy beaches. Under normal circumstances, hatchlings move away from low, dark silhouettes (historically, those of dune vegetation), allowing them to crawl quickly to the ocean. With beachfront lighting, the silhouettes that would have cued movement are no longer perceived, resulting in disorientation (Salmon *et al.* 1995). Lighting also affects the egg-laying behavior of female sea turtles. (For reviews of effects on sea turtles, see Salmon 2003 and Witherington 1997).

Changes in light level may disrupt orientation in nocturnal animals. The range of anatomical adaptations to allow night vision is broad (Park 1940), and rapid increases in light can blind animals. For frogs, a quick increase in illumination causes a reduction in visual capability from which the recovery time may be minutes to hours (Buchanan 1993). After becoming adjusted to a light, frogs may be attracted to it as well (Jaeger and Hailman 1973; Figure 3).

Birds can be disoriented and entrapped by lights at night (Ogden 1996). Once a bird is within a lighted zone at night, it may become "trapped" and will not leave the lighted area. Large numbers of nocturnally migrating birds are therefore affected when meteorological conditions bring them close to lights, for instance, during inclement weather or late at night when they tend to fly lower.

Figure 3. *Attraction of frogs to a candle set out on a small raft. Illustration by Charles Copeland of an experiment in northern Maine or Canada described by William J Long (1901). Twelve or fifteen bullfrogs* (Rana catesbeiana) *climbed on to the small raft before it flipped over.*

Within the sphere of lights, birds may collide with each other or a structure, become exhausted, or be taken by predators. Birds that are waylaid by buildings in urban areas at night often die in collisions with windows as they try to escape during the day. Artificial lighting has attracted birds to smokestacks, lighthouses (Squires and Hanson 1918), broadcast towers (Ogden 1996), boats (Dick and Donaldson 1978), greenhouses, oil platforms (Wiese *et al.* 2001), and other structures at night, resulting in direct mortality, and thus interfering with migration routes.

Many groups of insects, of which moths are one well-known example (Frank 1988), are attracted to lights. Other taxa showing the same attraction include lacewings, beetles, bugs, caddisflies, crane flies, midges, hoverflies, wasps, and bush crickets (Eisenbeis and Hassel 2000; Kolligs 2000; Figure 4). Attraction depends on the spectrum of light – insect collectors use ultraviolet light because of its attractive qualities – and the characteristics of other lights in the vicinity.

Nonflying arthropods vary in their reaction to lights. Some nocturnal spiders are negatively phototactic (ie repelled by light), whereas others will exploit light if available (Nakamura and Yamashita 1997). Some insects are always positively phototactic as an adaptive behavior and others always photonegative (Summers 1997). In arthropods, these responses may also be influenced by the frequent correlations between light, humidity, and temperature.

Natural resource managers can exploit the responses of animals to lights. Lights are sometimes used to attract fish to ladders, allowing them to bypass dams and power plants (Haymes *et al.* 1984). Similarly, lights can attract larval fish to coral reefs (Munday *et al.* 1998). In the terrestrial realm, dispersing mountain lions avoid lighted areas to such a degree that Beier (1995) suggests installing lights to deter them from entering habitats dead-ending in areas where humans live.

Reproduction

Reproductive behaviors may be altered by artificial night lighting. Female *Physalaemus pustulosus* frogs, for example, are less selective about mate choice when light levels are increased, presumably preferring to mate quickly and avoid the increased predation risk of mating activity (Rand *et al.* 1997). Night lighting may also inhibit amphibian movement to and from breeding areas by stimulating phototactic behavior. Bryant Buchanan (pers comm) reports that frogs in an experimental enclosure stopped mating activity during night football games, when lights from a nearby stadium increased sky glow. Mating choruses resumed only when the enclosure was covered to shield the frogs from the light.

In birds, some evidence suggests that artificial night lighting affects the choice of nest site. De Molenaar *et al.*

Courtesy of PJ DeVries

Figure 4. *Thousands of mayflies carpet the ground around a security light at Millecoquins Point in Naubinway on the Upper Peninsula of Michigan.*

(2000) investigated the effects of roadway lighting on black-tailed godwits (*Limosa l. limosa*) in wet grassland habitats. Breeding densities of godwits were recorded over 2 years, comparing lighted and unlighted conditions near a roadway and near light poles installed in a wet grassland away from the road influence. When all other habitat factors were taken into account, the density of nests was slightly but statistically lower up to 300 m away from the lighting at roadway and control sites. The researchers also noted that birds nesting earlier in the year chose sites farther away from the lighting, while those nesting later filled in sites closer to the lights.

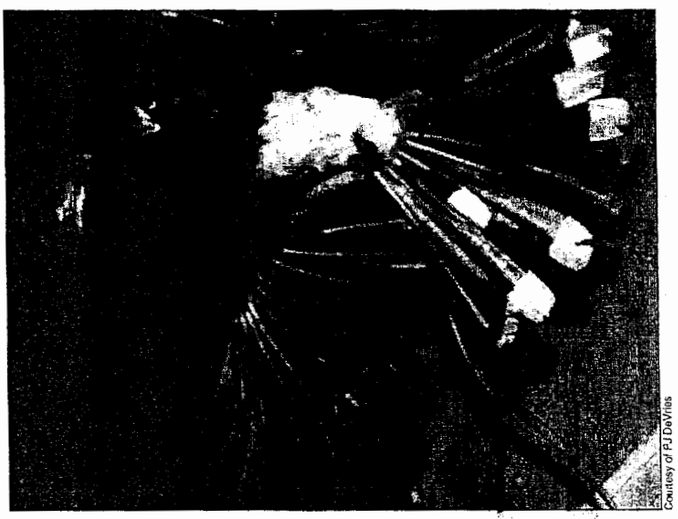

Figure 5. Crowned hornbill (Tockus alboterminatus) *hawking insects at a light at the Kibale Forest National Park, Uganda.*

Communication

Visual communication within and between species may be influenced by artificial night lighting. Some species use light to communicate, and are therefore especially susceptible to disruption. Female glow-worms attract males up to 45 m away with bioluminescent flashes; the presence of artificial lighting reduces the visibility of these communications. Similarly, the complex visual communication system of fireflies could be impaired by stray light (Lloyd 1994).

Artificial night lighting could also alter communication patterns as a secondary effect. Coyotes (*Canis latrans*) group howl and group yip-howl more during the new moon, when it is darkest. Communication is necessary either to reduce trespassing from other packs, or to assemble packs to hunt larger prey during dark conditions (Bender *et al.* 1996). Sky glow could increase ambient illumination to eliminate this pattern in affected areas.

Because of the central role of vision in orientation and behavior of most animals, it is not surprising that artificial lighting alters behavior. This causes an immediate conservation concern for some species, while for other species the influence may seem to be positive. Such "positive" effects, however, may have negative consequences within the context of community ecology.

■ Community ecology

The behaviors exhibited by individual animals in response to ambient illumination (orientation, disorientation) and to luminance (attraction, repulsion) influence community interactions, of which competition and predation are examples.

Competition

Artificial night lighting could disrupt the interactions of groups of species that show resource partitioning across illumination gradients. For example, in natural communities, some foraging times are partitioned among species that prefer different levels of lighting. The squirrel treefrog (*Hyla squirrela*) is able to orient and forage at lighting levels as low as 10^{-5} lux and under natural conditions typically will stop foraging at illuminations above 10^{-3} lux (Buchanan 1998). The western toad (*Bufo boreas*) forages only at illuminations between 10^{-1} and 10^{-5} lux, while the tailed frog (*Ascaphus truei*) forages only during the darkest part of the night at below 10^{-5} lux (Hailman 1984). While these three species are not necessarily sympatric (ie inhabiting the same area), and differ in other niche dimensions, they illustrate the division of the light gradient by foragers.

Many bat species are attracted to insects that congregate around light sources (Frank 1988). Although it may seem that this is a positive effect, the increased food concentration benefits only those species that exploit light sources and could therefore result in altered community structure. Faster-flying species of bats congregate around lights to feed on insects, but other, slower-flying species avoid lights (Blake *et al.* 1994; Rydell and Baagøe 1996).

Changes in competitive communities occur as diurnal species move into the "night light niche" (Schwartz and Henderson 1991). This concept, as originally described, applies to reptiles, but easily extends to other taxa, such as spiders (Frank pers comm) and birds (Hill 1990; Figure 5).

Predation

Although it may seem beneficial for diurnal species to be able to forage longer under artificial lights, any gains from increased activity time can be offset by increased predation risk (Gotthard 2000). The balance between gains from extended foraging time and risk of increased preda-

tion is a central topic for research on small mammals, reptiles, and birds (Kotler 1984; Lima 1998). Small rodents forage less at high illumination levels (Lima 1998), a tendency also exhibited by some lagomorphs (Gilbert and Boutin 1991), marsupials (Laferrier 1997), snakes (Klauber 1939), bats (Rydell 1992), fish (Gibson 1978), aquatic invertebrates (Moore *et al.* 2000), and other taxa.

Unexpected changes in light conditions may disrupt predator–prey relationships. Gliwicz (1986, 1999) describes high predation by fish on zooplankton during nights when the full moon rose hours after sunset. Zooplankton had migrated to the surface to forage under cover of darkness, only to be illuminated by the rising moon and subjected to intense predation. This "lunar light trap" (Gliwicz 1986) illustrates a natural occurrence, but unexpected illumination from human sources could disrupt predator–prey interactions in a similar manner, often to the benefit of the predator.

Available research shows that artificial night lighting disrupts predator–prey relationships, which is consistent with the documented importance of natural light regimes in mediating such interactions. In one example, harbor seals (*Phoca vitulina*) congregated under artificial lights to eat juvenile salmonids as they migrated downstream; turning the lights off reduced predation levels (Yurk and Trites 2000). Nighttime illumination at urban crow roosts was higher than at control sites, presumably because this helps the crows avoid predation from owls (Gorenzel and Salmon 1995). Desert rodents reduced foraging activity when exposed to the light of a single camp lantern (Kotler 1984). Frank (1988) reviews predation by bats, birds, skunks, toads, and spiders on moths attracted to artificial lights. Mercury vapor lights, in particular, disrupt the interaction between bats and tympanate moths by interfering with moth detection of ultrasonic chirps used by bats in echolocation, leaving moths unable to take their normal evasive action (Svensson and Rydell 1998).

From these examples, it follows that community structure will be altered where light affects interspecific interactions. A "perpetual full moon" from artificial lights will favor light-tolerant species and exclude others. If the darkest natural conditions never occur, those species that maximize foraging during the new moon could eventually be compromised, at risk of failing to meet monthly energy budgets. The resulting community structure would be simplified, and these changes could in turn affect ecosystem characteristics.

■ Ecosystem effects

The cumulative effects of behavioral changes induced by artificial night lighting on competition and predation have the potential to disrupt key ecosystem functions. The spillover effects from ecological light pollution on aquatic invertebrates illustrates this point. Many aquatic invertebrates, such as zooplankton, move up and down within the water column during a 24-hour period, in a behavior known as "diel vertical migration". Diel vertical migration presumably results from a need to avoid predation during lighted conditions, so many zooplankton forage near water surfaces only during dark conditions (Gliwicz 1986). Light dimmer than that of a half moon ($<10^{-1}$ lux) is sufficient to influence the vertical distribution of some aquatic invertebrates, and indeed patterns of diel vertical migration change with the lunar cycle (Dodson 1990).

Moore *et al.* (2000) documented the effect of artificial light on the diel migration of the zooplankton *Daphnia* in the wild. Artificial illumination decreased the magnitude of diel migrations, both in the range of vertical movement and the number of individuals migrating. The researchers hypothesize that this disruption of diel vertical migration may have substantial detrimental effects on ecosystem health. With fewer zooplankton migrating to the surface to graze, algae populations may increase. Such algal blooms would then have a series of adverse effects on water quality (Moore *et al.* 2000).

The reverberating effects of community changes caused by artificial night lighting could influence other ecosystem functions. Although the outcomes are not yet predictable, and redundancy will buffer changes, indications are that light-influenced ecosystems will suffer from important changes attributable to artificial light alone and in combination with other disturbances. Even remote areas may be exposed to increased illumination from sky glow, but the most noticeable effects will occur in those areas where lights are close to natural habitats. This may be in wilderness where summer getaways are built, along the expanding front of suburbanization, near the wetlands and estuaries that are often the last open spaces in cities, or on the open ocean, where cruise ships, squid boats, and oil derricks light the night.

■ Conclusions

Our understanding of the full range of ecological consequences of artificial night lighting is still limited, and the field holds many opportunities for basic and applied research. Studies of natural populations are necessary to investigate hypotheses generated in the laboratory, evidence of lunar cycles in wild populations, and natural history observations. If current trends continue, the influence of stray light on ecosystems will expand in geographic scope and intensity. Today, 20% of the area of the coterminous US lies within 125 m of a road (Riiters and Wickham 2003). Lights follow roads, and the proportion of ecosystems uninfluenced by altered light regimes is decreasing. We believe that many ecologists have neglected to consider artificial night lighting as a relevant environmental factor, while conservationists have certainly neglected to include the nighttime environment in reserve and corridor design.

Successful investigation of ecological light pollution will require collaboration with physical scientists and

engineers to improve equipment to measure light characteristics at ecologically relevant levels under diverse field conditions. Researchers should give special consideration to the tropics, where the constancy of day–night lighting patterns has probably resulted in narrow niche breadths relative to illumination. Aquatic ecosystems deserve increased attention as well, because despite the central importance of light to freshwater and marine ecology, consideration of artificial lighting has so far been limited. Research on the effects of artificial night lighting will enhance understanding of urban ecosystems – the two National Science Foundation (NSF) urban Long Term Ecological Research sites are ideal locations for such efforts.

Careful research focusing on artificial night lighting will probably reveal it to be a powerful force structuring local communities by disrupting competition and predator–prey interactions. Researchers will face the challenge of disentangling the confounding and cumulative effects of other facets of human disturbance with which artificial night lighting will often be correlated, such as roads, urban development, noise, exotic species, animal harvest, and resource extraction. To do so, measurements of light disturbance should be included routinely as part of environmental monitoring protocols, such as the NSF's National Ecological Observatory Network (NEON). Future research is likely to reveal artificial night lighting to be an important, independent, and cumulative factor in the disruption of natural ecosystems, and a major challenge for their preservation.

Ecologists have studied diel and lunar patterns in the behavior of organisms for the greater part of a century (see Park 1940 and references therein), and the deaths of birds from lights for nearly as long (Squires and Hanson 1918). Humans have now so altered the natural patterns of light and dark that these new conditions must be afforded a more central role in research on species and ecosystems beyond the instances that leave carcasses on the ground.

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LIGHT POLLUTION AND THE IMPACTS ON BIODIVERSITY, SPECIES AND THEIR HABITATS

P. DEDA, I. ELBERTZHAGEN, M. KLUSSMANN
Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (UNEP-CMS)

What is ecological light pollution?

Longcore and Rich describe artificial light that alters the natural patterns of light and dark in ecosystems as "ecological light pollution".[7]

Ecological light pollution comprises direct glare, chronically increased illumination and temporary, unexpected fluctuations in lighting. The sources of ecological light pollution are very various and found in nearly every ecosystem in the form of "sky glow, illuminated buildings and towers, streetlights, fishing boats, security lights, lights on vehicles, flares on offshore oil platforms, and even lights on undersea research vessels".[7]

Impacts of light pollution

Because the study of light pollution is still in its early days the impacts of this problem are not fully understood. While the increased brightness of the night sky is the most familiar of the many effects of light pollution (it is the most obvious and astronomers recognized it many years ago) many other alarming aspects are still unexplored: for example, the fact that light pollution leads to a great wastage of energy. On a global scale, approximately 19% of all electricity used produces light at night.[18] The by-product of electric illumination generated by the burning of fossil fuels, is the discharge of greenhouse gases. These gases are responsible for global warming and the exhaustion of non-renewable resources.

Light pollution produces many other impacts on the environment. Harmful effects involve the animal kingdom, the vegetable kingdom and mankind. While light pollution is eminently detrimental to nocturnal and migratory animals and to animals in flight, it also produces harmful effects on plants.

Figure 1. © Merlin D. Tuttle, Bat Conservation International, Inc.

IMPACTS ON PLANTS

Plants use darkness in many different ways. The management of their metabolism, their development and their life programmes are affected. Plants measure and react to night length which means the duration of darkness. For this reason short-day plants require long nights. If such a plant is illuminated

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temporarily during a long night, it reacts and interprets as if it had experienced two short nights, instead of one long night with a disruption. As a consequence its flowering and developmental patterns possibly will be entirely disrupted: short-day plants normally bloom in the autumn when the day length shortens. They utilise the long nights to start the onset of flowering; and subsequently, as the nights lengthen, the onset of dormancy, which enables them to resist the harshness of winter.[1]

Trees provide entire ecosystems to numerous animal species. They are harmfully affected by light pollution. Trees have to adjust to seasonal alterations, and artificial light hinders them from doing so: various trees are kept from losing their leaves by light pollution. This has a consequence on the animals that depend on trees as their habitat. For instance, birds are prevented from nesting in trees as a result of the surrounding light pollution.

Impacts on animals

Life has emerged with natural patterns of light and dark, so disturbance of those patterns influences numerous aspects of animal behaviour.[7] Light pollution can confound animal navigation, change competitive interactions, alter predator-prey relations, and affect animal physiology.

Threats to birds

The effect of light in the form of fire or lamps attracting migratory and non-migratory birds at night, especially when foggy or cloudy, has been known since the 19th century and was and still is used as a form of hunting[7]. The reasons for disorientation of birds through artificial night lighting are not well known. Experts suggest that the navigation of birds using the horizon as orientation for the direction is disrupted by lighting and sky glow[12].

Lighthouses

The attraction of lighthouses and ships for birds was first recorded since the first operation in the mid 19th century and was the basis of the first detailed records of bird migration.

The number of casualties depends on the location of the lighthouses and was higher on the migration routes on the East Coast of the USA. Early surveys on the coast of British Columbia recorded an annual mortality of over 6,000 birds at 45 lighthouses.

Figure 2. Doñana, World Heritage site. © José María Pérez de Ayala.

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Paul Tyshchenko - Public Comment re: Buena Vista Township Ordinance 17-2014 Electronic Message Signs

Executive Director's Report on
Buena Vista Township Ord. 17-2014
October 31, 2014
Exhibit #2

From: Temmafish <temmafish@aol.com>
To: <planning@njpines.state.nj.us>
Date: 10/8/2014 5:51 PM
Subject: Public Comment re: Buena Vista Township Ordinance 17-2014 Electronic Message Signs

Dear Ms. Grogan:

I object to this ordinance which would allow electronic message signs in the Pinelands Town and Village Management areas of the township, because it does not conform to the CMP.

The lighting of these electronic message center signs would change every 8 seconds. This would be very disturbing to wildlife such as the barred owl, whip-poor-will and warblers who classify as threatened and/or endangered. These signs would constitute serious light pollution disturbing life in the dark, rural areas of PInelands. Please uphold the CMP and do not allow these signs here.

Thank you for consideration of this matter and for noting my message for public comment.

Sincerely,

Temma Fishman

Temma Fishman
609-654-0718
temmafish@aol.com

October 10, 2014

Executive Director's Report on
Buena Vista Township Ord. 17-2014
October 31, 2014
Exhibit #3

Ms. Susan Grogan
Pinelands Commission
15 Springfield Road
P.O. Box 359
New Lisbon, NJ 08064

Re: Buena Vista Ordinance 17-2014 (by Email to Paul Leaken, Communications Officer)

Dear Ms. Grogan:

I am writing to oppose the certification of Buena Vista Township's Ordinance 17-2014, which was adopted September 8, 2014. The Ordinance will allow electronic message signs in the township's Pinelands Town and Village areas. The Ordinance should not be certified for the following reasons:

A principal goal of the CMP is to maintain the traditional character and integrity of Pinelands villages and towns. The importance of this goal is emphasized by the CMP's statement that infill development within Pineland's towns and villages be "compatible" with their character and integrity (CMP, 1980, page 391). Buena Vista Township's ordinance to permit electronic message signs within Pinelands Towns and Village areas directly conflicts with the CMP's goal to maintain the traditional character and integrity of its villages and towns.

The primary functional characteristic of any sign is the manner in which it displays its content. Traditionally, content was displayed in a static and unlit manner. Modern concessions are now routinely made to allow the illumination of signs. However, even now, on-premise signs, are typically displayed in a static manner as they have always been.

The CMP recognizes the importance of a static display to the visual character of the Pinelands by expressly prohibiting moving images, except to provide for public safety.

> No sign, other than warning or safety signs, which is designed or intended to attract attention by sudden, intermittent or rhythmic movement, or physical or lighting change, shall be permitted in any area (Section 7.50-6.107(a) of the "Mandatory sign provisions).

The enforcement of the letter and spirit of this requirement is particularly important in Pinelands towns and villages because their visual and spatial characteristics were defined by a vernacular of past generations. That vernacular was static. It relied on color and physical design to identify the business.

There is nothing traditional about the display of changing electronic signs which, under this ordinance, could "flip" every eight seconds and have transitional visual effects. Digital signs are very different in their appearance from static signs. First, they are significantly brighter than static signs. Second, because their content is displayed for a period measured in seconds, they identify the business based on change. This is different from a static sign, which

becomes identified with the business or the village by its constancy. In addition, the colors of electronic sign are infinite and are regularly subject to change. This is very different from the palette of a static sign which is constant and can be designed to enhance the character of the village, rather than to call attention to the sign.

For the same reasons, this Ordinance also conflicts with Buena Vista Township's Richland Village Redevelopment Plan's goals and objectives. Like the CMP, one of the goals and objectives requires that "...developments...reinforce the traditional character of the area" (Richland Village Redevelopment Plan. Page 6). As explained above, digital signs are not part of any traditional street scape in the towns and villages of Buena Vista Township.

Because digital signs are so inconsistent with the traditional Pinelands township and villages street scapes, they will be seen as intrusive and inconsistent land uses. Put another way, they will be seen as visual pollution.

The CMP requires that municipal plans should not conflict "...with the ultimate objectives and minimum requirements of this Plan" (Section 7:50-3.1 (d)). The proposed sign ordinance will allow on-premise signs that conflict with the goal of maintaining the traditional character and integrity of Pinelands villages and towns. It should not be certified.

Thank you for your consideration.

Sincerely,

Fran Brooks
78 Moores Meadow Road
Tabernacle, NJ 08088

The Great Egg Harbor Watershed Association

P.O. Box 109
Newtonville, NJ 08346

856-697-6114
akers@gowebway.com

Executive Director's Report on
Buena Vista Township Ord. 17-2014
October 31, 2014
Exhibit #4

October 10, 2014

Ms. Susan Grogan
Pinelands Commission
15 Springfield Road
P.O. Box 359
New Lisbon. NJ 08064
Submitted via email: planning@njpines.state.nj.us

RE: Buena Vista Ordinance 17-2014

Dear Ms. Grogan:

The Great Egg Harbor Watershed Association appreciates the opportunity to comment on the referenced ordinance, and we recommend that you and the Pinelands Commission approve this ordinance **with the condition that electronic messaging center (EMC) signs not be permitted in any Pinelands Village zones, such as the PRVC and PVI zones.**

We offer the following summary comments:

1. Buena Vista Twp. is one of several Pinelands Municipalities that has not update its sign ordinances in years or decades, and updating old ordinances in strict compliance to the CMP is beneficial to the continued protection of the Pinelands.

2. The CMP was written with strong concerns that signs be controlled and have limited impacts on scenic and natural resources, and any new sign ordinances should be consistent with the original intent of the CMP, especially regarding sections 7:50-3.1 (d), 7:50-6.106, 7:50-6.107 (a)

3. Recently, the Pinelands Commission has approved other Municipal sign ordinances with conditions limiting EMC signs to growth areas only, such as Monroe Twp., and the Pinelands Commission should be very consistent with their approvals for sign ordinances between one municipality and another.

4. In the past, the Pinelands Commission approved a change in the Land Capability Map from Rural Development Area to Pinelands Town in Buena Vista Twp. to allow commercial and residential development on sewer similar to a Regional Growth Area, and this should be the zone where EMC signs are permitted in BVT,

5. Buena Vista Twp. has been a serial violator of building public developments that are inconsistent with their own building codes and without Pinelands Commission approvals, and therefore there is no good reason why the Pinelands Commission should make special exceptions for Buena Vista Twp. to have EMC signs in currently prohibited zones.

In conclusion, we thank the Pinelands Commission for the opportunity to comment on the referenced ordinance, and we recommend that you and the Pinelands Commission approve this ordinance **with the condition that electronic messaging center (EMC) signs not be permitted in any Pinelands Village zones, such as the PRVC and PVI zones.**

Sincerely,

Fred Akers

Fred Akers, Administrator

RESOLUTION OF THE NEW JERSEY PINELANDS COMMISSION

NO. PC4-14- 39

TITLE: To Accept the Fiscal Year 2013 Audit Report

Commissioner Lloyd **moves and Commissioner** Prickett **seconds the motion that:**

WHEREAS, the audit of the Pinelands Commission Fiscal Year 2013 Financial Statements, Notes to the Financial Statements and Schedules of Federal and State Assistance was performed by the Office of the State Auditor; and

WHEREAS, the Fiscal Year 2013 Audit Report contains one finding regarding Inadequate Application of Internal Controls; and

WHEREAS, the Business Office will establish additional controls over the financial report process that will include the itemized balances of the Pinelands Conservation Fund accounts and installation of a new Accounting System; and

WHEREAS, pursuant to N.J.S.A. 13:18A-5h, no action authorized by the Commission shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Commission has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE BE IT RESOLVED that the Pinelands Commission hereby accepts the attached Audit Report for Fiscal Year 2013 and directs that it be included as a publication available through the Pinelands Commission's website.

Record of Commission Votes

	AYE	NAY	NP	ABS		AYE	NAY	NP	ABS		AYE	NAY	NP	ABS
Ashmun	X				Galletta	X				Prickett	X			
Avery	X				Jackson	X				Quinn	X			
Brown	X				Jannarone	X				Rohan Green			X	
DiBello	X				Lloyd	X				Witt	X			
Earlen	X				McGlinchey	X				Lohbauer	X			

Adopted at a meeting of the Pinelands Commission Date: Nov. 14, 2014

Nancy Wittenberg
Executive Director

Mark S. Lohbauer
Chairman