

ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Grantee/Contractor Laboratory: Princeton University/Princeton Plasma Physics Laboratory (PPPL)

Project/Activity Title: Princeton Plasma Innovation Center (PPIC)

CH NEPA Tracking No.: \_\_\_\_\_ Type of Funding SC B&R

Code: \_\_\_\_\_ Total Estimated Cost: \$ 85 million

DOE Cognizant Secretarial Officer (CSO): Mike Weiss

Contractor Project Manager: \_\_\_\_\_ Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Contractor NEPA Reviewer: Dorothy M. Strauss

Signature: Dorothy

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Dorothy M. Strauss  
Date: 2021.07.21  
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Date: M. Strauss

**I. Description of Proposed Action:**

Princeton Plasma Physics Laboratory (PPPL) has developed a long-term initiative to make mission-critical improvements to offices and lab facilities. These improvements are needed to support PPPL’s unique and distinct competencies and close existing capability gaps that support the laboratory programs. This would include the construction and/or modernization of space for small/medium bay labs, collaboration center, and office space called the Princeton Plasma Innovation Center (PPIC). It would provide both office space and flexible laboratory space for large-scale, high-precision diagnostic and plasma-facing component (PFC) research and development. The center would also provide world-class computer visualization tools adjacent to remote participation space for real-time access to fusion research machines outside of PPPL.

The proposed new building would provide an additional 67,000 – 84,000 square feet of space and associated site work, with a footprint of approximately 50,000 GSF. LEED Gold certification would be sought. Partial demolition of the existing Theory and Administration buildings, which are one-story structures over 50 years old, would be included. The Administration Building, per NJ State Historic Preservation Office (SHPO) review, is eligible to be included on the National Register of Historic Places due to its connection with a person of significance (renowned astrophysicist, Lyman Spitzer, Jr.) and events that contributed to our history (the Cold War and the Atoms for Peace program). It is not eligible from an architectural standpoint. A memorandum of agreement was signed between the US Department of Energy, Princeton Site Office and the New Jersey State Historic Preservation Officer, with the Princeton Plasma Physics Laboratory and the Trustees of Princeton University as concurring parties, acknowledging these points and allowing PPPL to commemorate the historic significance of the Administration Building through a variety of means.

The PPIC would be a multi-story building that would include small and medium bay labs, collaboration space, conference rooms, and offices to accommodate functions currently in spaces rated as substandard. The project would include sustainable features, and strategies to reduce energy consumption.

The PPIC would address the critical facilities and infrastructure gaps at PPPL in order to meet the DOE Office of Science (DOE-SC) mission need by:

Princeton Plasma Innovation Center (PPIC)

- Consolidating talent for efficient scientific collaboration
- Providing world class visualization capability
- Establishing U.S.-based remote control room capability for remotely-located fusion experiments
- Providing operations and infrastructure support for leadership in advanced plasma diagnostic development
- Providing modern, medium bay, reconfigurable laboratory space
- Providing additional office space needed for future growth in theory, admin and physics departments.
- Providing additional office space needed for an expanded user-base anticipated during NSTX-U and FLARE operations.

Overall, the PPIC would enhance U.S. leadership in experimental and theoretical plasma physics and fusion science capabilities.

Construction of the PPIC would include, in part, the relocation of a generator and manhole, and installation of a geo-exchange system for heating and cooling.

A portion of the proposed site is occupied by building C23 (Theory Bldg.) and the western expansion of building C13 (Admin. Bldg.) (see figures 1 and 3). All existing electrical systems in these building areas would be removed in their entirety with the primary feeder to C23 pulled back to its source. Outside of the southwest corner of building C13 is an existing utility yard with mechanical and electrical equipment, including a 300KW diesel-fired emergency generator with skid mounted tank and existing substation 17, that would be circumscribed upon completion of the new facility (see figure 5). Appropriate access to this yard would be incorporated into the PPIC's floorplan for continued maintenance and replacement of the existing equipment. The existing 300KW diesel emergency generator would be relocated to a nearby position on site with full access for re-fueling and proper intake/exhaust. This generator supplies emergency power to the existing PPLCC data center in building C13. Relocation of the existing emergency generator would be within a previously disturbed location approximately 200' to 300' from the original location. The existing generator would receive a new concrete equipment pad and separate vibration isolation pad to prohibit any transmission of vibration from the generator to the new building during operation. In addition, the existing feeders would be captured within a precast concrete manhole at the original generator location and extended in conduit through a new concrete-reinforced ductbank to provide standby power to the data center.

The southeast corner of the PPIC footprint falls on top of an existing electrical manhole that connects the ductbank system between buildings C13 and C51 (C-Site MG Bldg.) (see figure 5). This manhole and associated ductbanks would be removed for a relocation shift to make way for the new research facility. A new manhole of similar size would be provided in an area away from the footprint of the proposed new construction. New conductors would be extended from the new manhole location to refeed existing substation.

The cooling and heating for the building would be provided through a closed loop vertical borehole, ground-coupled, hybrid geo-exchange heat pump system. A geotechnical conductivity test would be completed to confirm the size, quantity, and spacing of the well field. The geo-exchange well field would be coordinated with the required setbacks and limitations. The estimated size and quantity of wells would consist of approximately 125-200 wells at an approximate depth of 500' (see figures 6 and 7). Wells would be spaced approximately 15 feet on center and would be a high efficiency, u-bend type with thermally enhanced grout. Each circuit would contain eight wells piped in a reverse return arrangement back to the header. The piping headers would be installed in concrete vaults throughout the well fields. It is estimated that eight to nine circuits (64 to 72 wells) could be served from a single vault to optimize circuit runs and minimize vault quantity, resulting in approximately two to four vaults.

II. **Description of Affected Environment:** C-Site, west of the LSB Bldg. (see attached figures 1-7).

PPPL is located on Princeton University's James Forrestal Campus in Plainsboro Township, Middlesex County (central New Jersey), adjacent to the municipalities of Princeton, Kingston, East and West Windsor, and Cranbury, NJ. It occupies approximately 90.83 acres in the areas known as "C- and D-Sites." PPPL has operated on the current site since 1959. The closest urban centers are New Brunswick, 14 miles (22.5 km) to the northeast, and Trenton, 12 miles (19 km) to the southwest. Within a 50-mile (80 km) radius are the major urban centers of New York City, Philadelphia, and Newark. Princeton University's main campus is approximately three miles west of the site, primarily located within the borough of Princeton.

The estimated resident population within 10 miles (16 km) of PPPL is approximately 500,000. The total estimated population within a 50-mile radius (80km) of PPPL is approximately 17,735,164.

Surrounding the site are lands of preserved and undisturbed areas including upland forest, wetlands, open grassy areas, and a minor stream, Bee Brook, which flows along PPPL's eastern boundary. These areas are designated as open space in the James Forrestal Campus (JFC) site development plan.

The climate of central New Jersey is classified as mid-latitude, rainy climate with mild winters, hot summers, and no dry season. Temperatures may range from below zero to above 100 degrees Fahrenheit (°F) (-17.8° Celsius (C) to 37.8° C); extreme temperatures typically occur once every five years. Approximately half the year, from late April until mid-October, the days are freeze-free. Normally the climate is moderately humid with a total average precipitation of about 46 inches (116 cm) evenly distributed throughout the year.

III. **Potential Environmental Effects:** (Attach explanation for each "yes" response, and "no" responses if additional information is available and could be significant in the decision-making process.)

**A. Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?**

	<u>Yes/No</u>
1. Threatened/Endangered Species and/or Critical Habitats	1. No
2. Other Protected Species (e.g. Burros, Migratory Birds)	2. No
3. Wetlands	3. No
4. Archaeological/Historic Resources	4. Yes
<i>Potential impacts from the demolition of part of the Admin. Bldg. would be mitigated by various measures per a Memorandum of Agreement between DOE/PSO and NJSHPO, with PPPL and the Trustees of Princeton University as concurring parties.</i>	
5. Prime, Unique or Important Farmland	5. No
6. Non-Attainment Areas	6. No
7. Class I Air Quality Control Region	7. No
8. Special Sources of Groundwater (e.g. Sole Source Aquifer)	8. No
9. Navigable Air Space	9. No
10. Coastal Zones	10. No
11. Areas w/ Special National Designation (e.g. National Forests, Parks, Trails)	11. No
12. Floodplain	12. No

**B. Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities?**

	<u>Yes/No</u>
13. Clearing or Excavation (indicate if greater than 1 acre [43,560 sq. ft.]; if more than 5,000 sq. ft., a Soil Erosion / Sediment Control Permit may be required from Freehold Soil Conservation District.)	13. Yes
<i>Note: Soil disturbance includes clearing, grading, excavation, storage, and filling. Soil erosion and sediment control permits required if <math>\geq 5,000</math> sq. ft.</i>	
<i>Note: Excavations expected to encounter ground water may require a permit. Approximately 55,000 sq. ft. of ground would be disturbed, including excavation, soil stockpiles, utilities, etc. Permits would be obtained from the Freehold Soil Conservation District.</i>	
14. Dredge or Fill (under Clean Water Act section 404; indicate if greater than 1 acre)	14. No
15. Noise (in excess of regulations)	15. No
16. Asbestos Removal	16. Yes
<i>Demolition of the Theory and Admin. Buildings would generate asbestos waste consisting of approx. 567 pipe fittings/valve end caps, 7,270 sq. ft. of floor tile, mastic, wallboard, etc., and 17 linear feet of pipe insulation, which would be removed by an asbestos-certified subcontractor.</i>	
17. PCBs	17. No
18. Import, Manufacture or Processing of Toxic Substances	18. No
19. Chemical Storage/Use	19. Yes
<i>Standard construction chemicals (paints, sealants, mastics, caulk, etc.) would be used with SDSs provided to Occupational Health &amp; Safety at least 24 hours prior to first use. Post-</i>	

	<i>construction chemical use/storage would not change significantly from current activities.</i>	
20.	Pesticide Use	20. No
21.	Hazardous, Toxic, or Criteria Pollutant Air Emissions	21. No
22.	Liquid Effluent	22. No
	<i>Liquid effluents to sanitary sewer and wetlands should not change significantly from current activities.</i>	
23.	Underground Injection	23. No
24.	Hazardous Waste	24. No
25.	Underground Storage Tanks	25. No
26.	Radioactive (AEA) Mixed Waste	26. No
27.	Radioactive Waste	27. No
28.	Radiation Exposures	28. No

**C. Other Relevant Disclosures. Will the proposed action involve the following?**

		<u>Yes/No</u>
29.	A threatened violation of ES&H regulations/permit requirements <i>The requirements of 10CFR851 (as implemented under the DOE-approved PPPL Worker Safety and Health Program) would be applied to work at PPPL under this proposed action.</i>	29. No
30.	Siting/Construction/Major Modification of Waste Recovery, or TSD Facilities	30. No
31.	Disturbance of Pre-existing Contamination <i>Note: Excavations that encounter contaminated ground water require a permit.</i>	31. No
32.	New or Modified Federal/State Permits	32. No
33.	Public controversy	33. No
34.	Action/involvement of Another Federal Agency (e.g. license, funding, approval)	34. No
35.	Action of a State Agency in a State with NEPA-type law. (Does the State Environmental Quality Review Act Apply?)	35. No
36.	Public Utilities/Services	36. No
37.	Depletion of a Non-Renewable Resource	37. No

IV. **Section D Determination:** Is the project/activity appropriate for a determination under Subpart D of the DOE NEPA Regulations for compliance with NEPA?

**DOE-PSO NEPA Compliance Officer (NCO) Review:**

Concurrence with Proposed Class of Action Recommended

**CX**                      EA                      EIS

Categories: B1.23 (Demolition and disposal of buildings), B3.6 (Small scale research and development, laboratory operations, and pilot projects), B1.16 (Asbestos removal), B5.19 (Ground source heat pumps)

For Categorical Exclusions (CXs):

- A. The proposed action fits within a class of actions that is listed in Appendix A or B to Subpart D.

For classes of actions listed in Appendix B, the following conditions are integral elements; i.e., to fit within a class, the proposal must not:

- 1) Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive Orders;
- 2) Require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities, but may include such categorically excluded facilities;
- 3) Disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; or
- 4) Adversely affect environmentally sensitive resources.
- 5) Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those of the Department of Agriculture, the Environmental Protection Agency, and the National Institutes of Health.

B. There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal; and

C. The proposal is not "connected" to other actions with potentially significant impacts, is not related to other proposed actions with cumulatively significant impacts, and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

V. **DOE Recommendation Approval:**

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by TRACY ESTES  
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PSO Staff: Tracy Estes

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

SC GLD: Michael M. McCann

Signature: Michael McCann

Date: 7/23/22

VI. **NEPA Compliance Officer Subpart D CX Determination and Approval:**

**Based on my review of information conveyed to me and in my possession (or attached) concerning the proposed action, as NEPA Compliance Officer, I have determined that the proposed action fits within the specified class of actions, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.**

PSO NCO: Peter Siebach

Signature: \_\_\_\_\_

Date: \_\_\_\_\_