United States Department of the Interior

NATIONAL PARK SERVICE
1849 C Street, N.W.
Washington, D.C. 20240

The attached property, Eastburn_Jeanes Lime Kilns Historic District, in New Castle County, Delaware, reference number 77000389, was listed in the National Register of Historic Places by the Keeper of the National Register on 4/28/1977, as evidenced by the FEDERAL REGISTER/WEEKLY LIST notice of Tuesday, February 7, 1978, Part II, Vol.43, No. 26, page 5184. The attached nomination form is a copy of the original documentation provided to the Keeper at the time of listing.

Keeper of the National Register of Historic Places

9/2/2008
Date

S:/nr_nhl/jjoecke/archives/inventoriesandfrc/certificanletter/certifyletter

Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: EASTBURN-JEANES LIME KILNS HISTORIC DISTRICT

AND/OR COMMON: EASTBURN-JEANES LIME KILNS

2 LOCATION

STREET & NUMBER: Limestone Road — __NOT FOR PUBLICATION

CITY, TOWN: Newark — __VICINITY OF — CONGRESSIONAL DISTRICT: ODB

STATE: Delaware — CODE: 10 — COUNTY: New Castle — CODE: 003

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
X DISTRICT	__PUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	X PRIVATE	X UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	PUBLIC ACQUISITION	ACCESSIBLE	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	X OTHER: None

4 OWNER OF PROPERTY

FORM AS SUBMITTED TO O.A.H.P.

NAME: SEE CONTINUATION SHEET

STREET & NUMBER:

CITY, TOWN: — __VICINITY OF — STATE:

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: New Castle County Recorder of Deeds

STREET & NUMBER: Public Building, Rodney Square

CITY, TOWN: Wilmington — STATE: Delaware

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: Historic American Engineering Record

DATE: 1975 — XFEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Library of Congress

CITY, TOWN: Washington — STATE: DC

Form No 10-300a
(Rev 10 74)

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CONTINUATION SHEET ITEM NUMBER 4 PAGE 2

Mr. Hugo Poppy
Paper Mill Road
Newark, Delaware 19711

Mr. Carl Herber
R. D. 3
Newark, Delaware 19711

Mr. John L. Brill
Paper Mill Road
Newark, Delaware 19711

FORM AS SUBMITTED TO C.A.H.P.

DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
_EXCELLENT	_DETERIORATED	X_UNALTERED	X_ORIGINAL SITE
_GOOD	_RUINS	_ALTERED	_MOVED DATE_____
X FAIR	_UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Eight lime kilns and two abandoned quarries, together with stone buildings erected by Abel Jeanes and Joseph Eastburn, stand as reminders of an extensive local lime industry that ceased operation during the first decade of this century, a victim of technological and economic change.

In the lime industry, the term limestone is applied to a class of rock containing above 80% of the carbonates of calcium and magnesium. The "burning" of lime is actually a heat-induced reaction wherein the chemical bond between calcium oxide and carbon dioxide is broken. This chemical change yields quicklime, or CaO. Quicklime is "slaked", or "slacked" by the addition of water to become slaked lime, or calcium hydroxide, $Ca(OH)_2$.

Limekilns were generally erected near the limestone quarry or near woods where fuel was obtained. The location of the Eastburn-Jeanes kilns in Pike Creek Valley was fortunate on both counts, and contributed to the success of the enterprise by limiting internal transportation to short distances for both raw materials.

The most efficient type of limekiln, introduced in America during the early nineteenth century, was the perpetual kiln. This type was erected on the Eastburn and Jeanes farms during the period 1816-1850. The perpetual kiln was so named because once ignited, it could be continually recharged at great savings in fuel. Lime could likewise be "drawn" from the kiln periodically as slow burning converted charge after charge of limestone into quicklime.

A perpetual kiln was generally built into a hillside so that the reverse slope would facilitate charging the kiln from above. The hill further served as a windbreak, preventing crosswinds and sudden drafts from interfering with the burning process. Often the front walls of the kiln were extended to follow the contour of the hill, thereby acting as a retaining wall for the earth alongside the hearth.

FORM AS SUBMITTED TO O.A.H.P.

The Eastburn-Jeanes limekilns vary in size and outward appearance, but all are similar in structure and function. The kiln appears circular in plan. The diameter of the "pot" or kiln shaft is approximately eight feet at the top. In vertical section, the pot appears as an ellipse, truncated at top and bottom, and tapering downward to a diameter of five or six feet at the hearth. The elliptical shape utilized reverberatory heat, and the "boshes", or curved kiln walls facilitated downward settling of the lime as it burned.

The hearth or "thimble" is an opening six to ten feet high, and of nearly equal width, arched or capped by a large lintel stone. Several shaft-type apertures extended horizontally from the hearth into the kiln shaft. These "eyes" or flues regulated the draft and rate of burning within the kiln. A larger horizontal shaft beneath the draft holes facilitated the removal of burnt lime.

Behind the hearth at the bottom of the vertical kiln shaft was an iron grate, which supported the weight of the stone and fuel charge.

The kilns at the Eastburn-Jeanes site were all constructed of mortared rough limestone quarried on the premises. The two largest kilns appear to have a refractory lining of red sandstone in lieu of firebrick. The kilns were originally between fifteen and twenty-three feet high. Most interesting of the kilns is a bank of six adjoining hearths fronting on Pike Creek Road. No two are identical. As the lime burning operation expanded,

it is apparent that kilns were simply added to this group as needed, each perhaps an experiment toward achieving optimum efficiency.

Roofs were common on nineteenth-century limekilns, though no traces remain on the Eastburn-Jeanes kilns. On a bank of several kilns, a lean-to or shed roof often covered the front to protect attendants from the elements. Supporting columns for such a shed roof are evident at the Eastburn group, spaced across the front of the kilns at regular intervals.

Limestone was quarried on the Eastburn-Jeanes farms using sledges, hand drills, and probably an occasional charge of black powder. Large rocks were broken easily, and reduced to stones no larger than 10 cubic inches.

Once fully charged with wood and limestone, the kiln was ignited from below. As the limestone slowly "burned", or calcined, the contents of the kiln settled, whereupon new layers of stone and wood could be added from the top. Once the limestone at the bottom of the kiln was fully burned, "drawing" of quicklime began. Burnt lime was raked out through the shaft below the iron grate using a long hook-shaped iron rake. Drawing was repeated approximately every six to eight hours.

The yield of burnt lime from each kiln varied according to the capacity of the pot and the quality of the limestone as it came from the quarry. A kiln the size of those in Pike Creek Valley held a limestone charge sufficient to make a total of 525 bushels of lime. Once started, the burning process might be expected to produce 300 bushels every 24 hours.

The nominated property consists of the Eastburn house and outbuildings on Paper Mill Road; the Jeanes house and outbuildings on Pike Creek Road; two quarry sites between the farmsteads; two isolated kilns; the bank of six kilns on Pike Creek Road; and a group of industrial buildings around the Jeanes house including an office (now a residence), a wheelwright shop, a wagon shed (now a cabinet shop), and a warehouse. The buildings are set in a wooded rural environment that is rapidly becoming a suburban neighborhood.

FORM AS SUBMITTED TO O.A.H.P.

8. SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER
X 1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
__1900-	__COMMUNICATIONS	X INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES c 1820-1850 BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Eastburn-Jeanes lime-burning industry supplied the needs of builders and farmers in Northern Delaware. Though the enterprise was abandoned shortly after 1900, the Pike Creek Valley kilns remain as vestiges of this industry's important place in the regional economy.

The limestone or marble deposits in Pike Creek Valley of New Castle County are the largest in Delaware. During the first third of the nineteenth century they became the center of an extensive commercial lime-burning industry which continued over 85 years. By the 1830's, the Jeanes and Eastburn families had opened two quarries and erected a number of limekilns. The rapid growth of demand for lime as fertilizer and for mortar made the Eastburn enterprise a profitable one until eclipsed by larger, more efficient Pennsylvania suppliers after 1900. The site reflects the growth and organization of lime-burning from a supplementary agricultural business to a full-time commercial operation. Eight original limekilns remain, as do the quarries and a number of auxiliary structures which comprised the Eastburn-Jeanes lime-burning complex.

A state geologic survey published in 1841 noted, "The limestone found in the upper part of the state, yields an excellent mortar, when well burned and freshly slacked; and with proper care, one bushel of burnt lime will more than double its bulk". It was as an inorganic agricultural fertilizer, however, that burned lime achieved its greatest importance befofe the Civil War.

Lime burning in early America began as one of the farmer's late winter tasks. Limestone was "burned", or calcined for several reasons. By slowly heating the stone, carbonic acid was driven off, leaving a rather pure calcium oxide as an end product. Burning of limestone likewise reduced the bulk of the calcium as its impurities were removed, allowing the lime to be transported and applied more efficiently.

The Pike Creek Valley lime-burning industry began in 1816, when Abel Jeanes first quarried and burned lime on his farm. Jeanes erected a large dwelling house of brick and stone, a massive barn, a double tenant house, springhouse, and a combination warehouse and gristmill, using limestone quarried on the farm.

Abel Jeanes was joined in his farming operations sometime after 1812 by his brother-in-law David Eastburn. Soon after the War of 1812, Eastburn purchased adjoining land where he established a farm of his own. He died in 1824, leaving a widow and 14 children. His eldest son, Joseph Eastburn, developed lime-burning from a part-time agricultural task into a profitable commercial venture.

FORM AS SUBMITTED TO OAHP.

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Conditions in Pike Creek Valley favored the growth of the Eastburn-Jeanes lime-burning enterprise. A contemporary assessment of 1841 observed,

> Limestone . . . occurs in . . . abundance at Jeanes' and Eastburn's on Pike Creek, and in smaller quantity at Klair's, 2 miles W. of Centreville, and at Bullock's, near the crossing of the state line by the Brandywine. It is a pure marble, essentially composed of lime, magnesia, and carbonic acid, with a small amount of foreign matter. It is a coarse and fine-grained crystalline mass, with a white color of greater or less purity, presenting at times a bluish tinge from the presence of carbonaceous matter. It lies in heavy beds, generally disintegrated in its upper layers, and giving rise to a calcareous sand near the surface of the ground.

A second major advantage lay in the abundance of wood available on the Eastburn farm as fuel for the kilns. To supplement his own extensive timber holdings, Joseph Eastburn acquired cutting rights to large adjoining tracts.

Thus having available an abundant supply of raw materials, Joseph Eastburn and Abel Jeanes opened additional quarries, and erected numerous stone kilns. A local historian noted that during this period, seven kilns were in operation on the Eastburn farm; between 10 and 12 limekilns on the Jeanes property. Supplementing this large capacity were a number of scattered limekilns operated by other members of the Eastburn family.

The magnitude and rapid growth of the Eastburn-Jeanes lime operations is discernible from data on Delaware manufactures compiled and reported to Congress in 1832. The lime industry in Pike Creek Valley had a total capital investment of $70,000 in buildings, grounds, and machinery. Jeanes employed between 25 and 30 men; Eastburn, 14. Since 1816, the combined operations had annually produced 85,000 bushels of burnt lime from 95,000 bushels of quarried limestone, a very high yield of product from the raw material. The kilns were kept in constant operation throughout the year, and sales were brisk.

Joseph Eastburn erected several support structures, including a wheelwright shop, office and storeroom, and wagon shed, all built of native limestone, and all still extant.

The rapid growth in demand for agricultural lime met major obstacles in the lack or prohibitive cost of land transportation for such a bulky commodity. These factors were a major impediment to the expanded use of lime in agriculture outside the immediate vicinity of the kiln for many years. In 1832 there were 38 draft horses and 10 or 11 yoke of oxen available to haul lime to market. Pike Creek Valley lime was shipped as far south as Middletown, Delaware, and Chesapeake City, Maryland; and as far to the north as Lancaster, Pennsylvania.

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As the quarrying operation grew, new kilns were erected, production of burnt lime increased, and the price per bushel decreased. In 1832 Eastburn himself noted a constant decline in the costs of labor and materials since his lime-burning business was established.

In hopes of increasing its output and efficiency, the Pike Creek lime enterprise partially converted to coal as the fuel before 1850. Ultimately the local industry was eclipsed by the development of modern blasting and quarrying techniques, which facilitated the opening of large and more efficient quarries in Pennsylvania, Western Maryland, and the Shenandoah Valley of Virginia by 1900.

FORM AS SUBMITTED TO O.A.H.P.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Historic American Engineering Record. 1975 survey report, MS. at Library of Congress.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 200

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	18	438400	4395280
B	18	438600	4392800
C	18	438600	4395060
D	18	438600	4392600

VERBAL BOUNDARY DESCRIPTION

The site lies on the south side of Paper Mill Road and on the south bank of Pike Creek. The south boundary of the site lies about 2,000 feet south of the Paper Mill Road bridge over Pike Creek.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE: Edward F. Heite, Historic Registrar — DATE: April 7, 1976

ORGANIZATION: Division of Historical & Cultural Affairs — TELEPHONE: (302) 678-5314

STREET & NUMBER: Hall of Records

CITY OR TOWN: Dover — STATE: Delaware 19901

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE ___ LOCAL X

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service. FORM AS SUBMITTED TO O.A.H.P.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE Laurence Lee

TITLE Director, Division of Historical & Cultural Affairs DATE 7/23/76

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

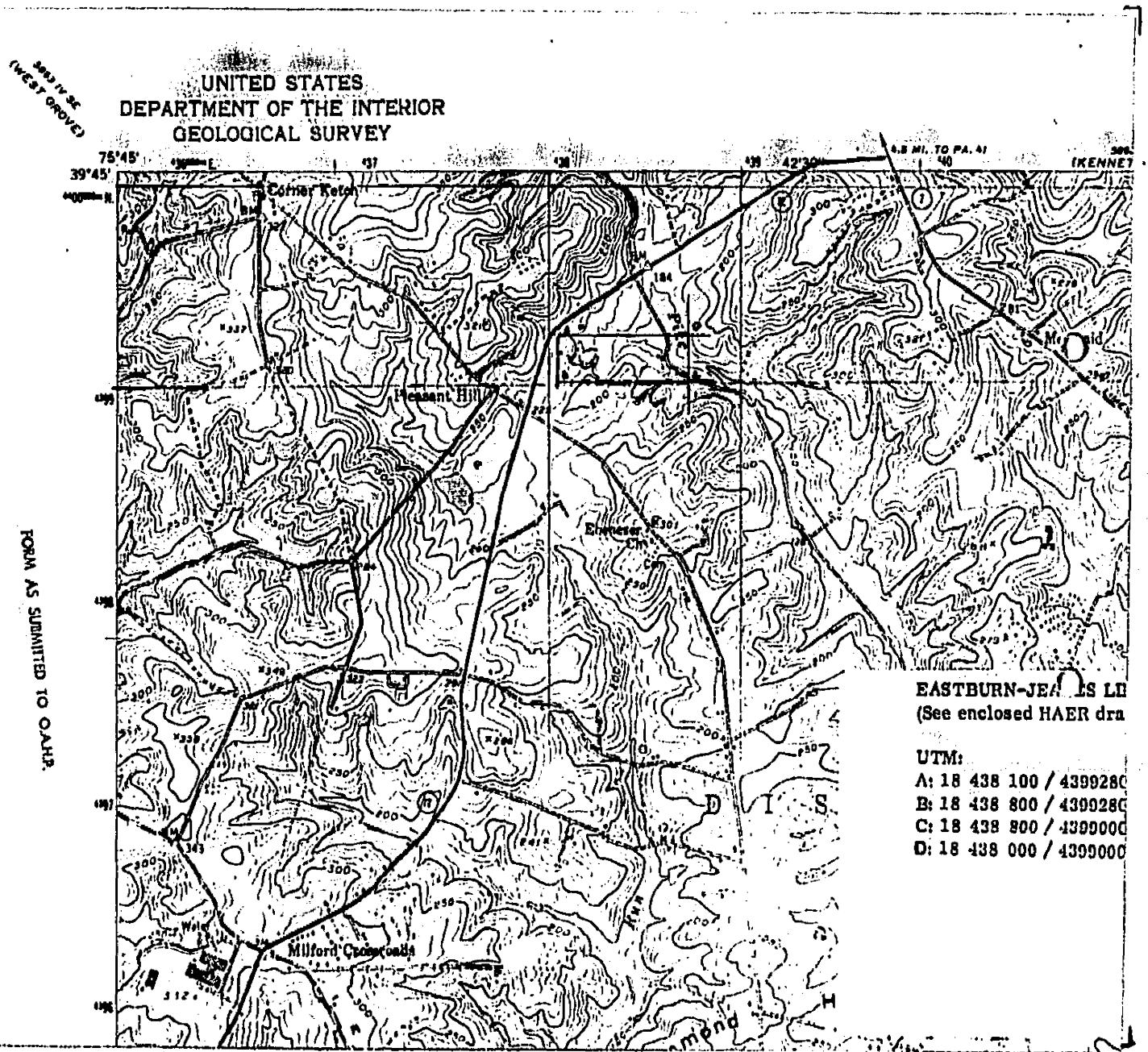
DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

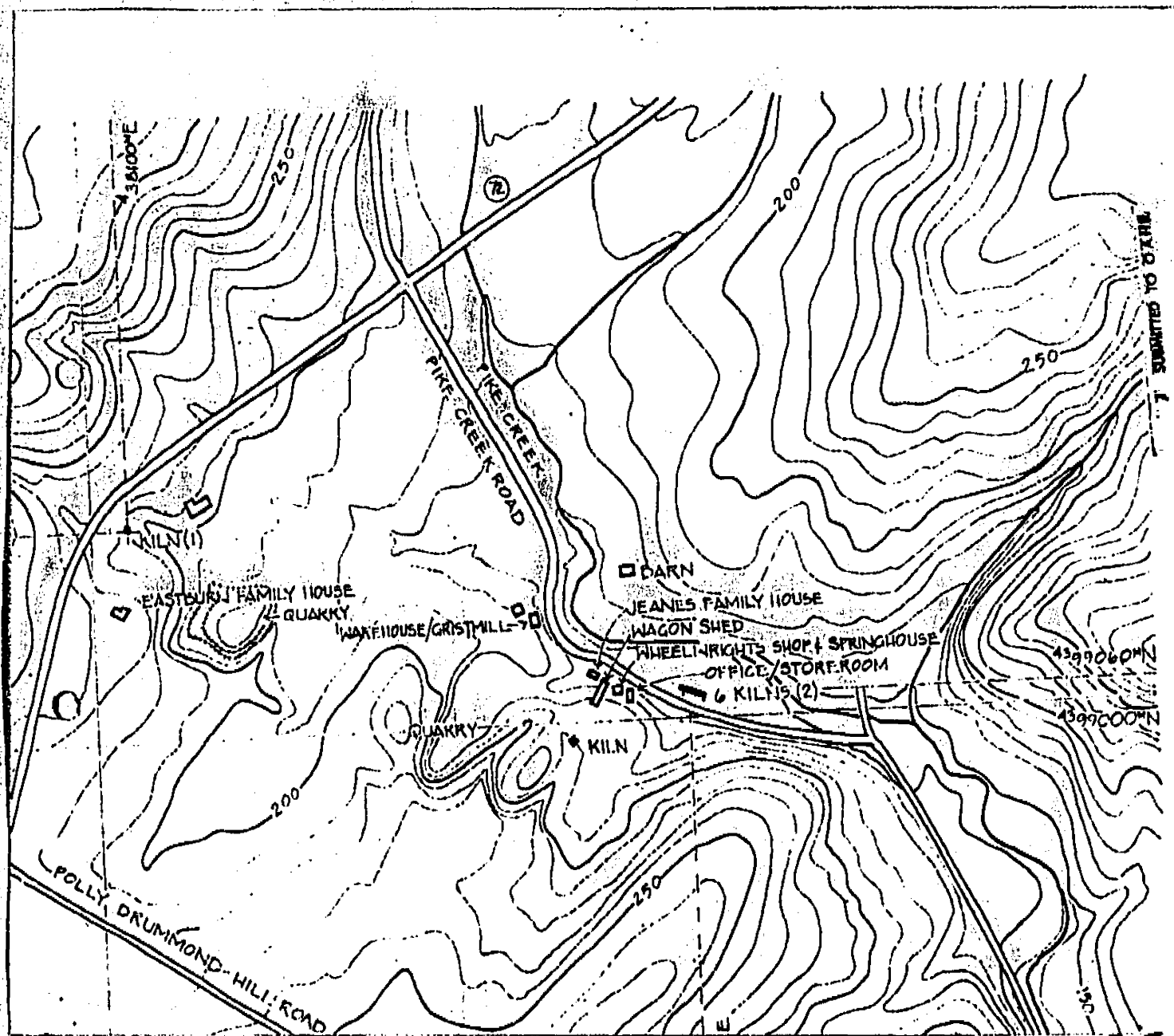
ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

GPO 892-453



FORM AS SUBMITTED TO O.A.H.P.


250
200
250
200
250
PIKE CREEK ROAD
PIKE CREEK
KILN (1)
EASTBURN FAMILY HOUSE
QUARRY
WAREHOUSE/GRISTMILL
BARN
JEANES FAMILY HOUSE
WAGON SHED
WHEELWRIGHTS SHOP & SPRINGHOUSE
OFFICE/STOREROOM
6 KILNS (2)
4399060mN
4399000mN
QUARRY
KILN
POLLY DRUMMOND HILL ROAD
SUBMITTED TO CITIES

NOTICES IN THE NATIONAL REGISTER

STATE DELAWARE

Date Entered APR 2 8 1977

Name	Location
Eastburn-Jeanes Lime Kilns Historic District	Newark vicinity New Castle County

Also Notified

Hon. William V. Roth, Jr.
Hon. Joseph R. Biden, Jr.
Hon. Thomas B. Evans, Jr.

COPY OF CONGRESSIONAL NOTIFICATION