NEW JERSEY HISTORIC PRESERVATION OFFICE

Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources

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Contents

1.0. Introduction

The New Jersey Department of Environmental Protection (NJ DEP), Historic Preservation Office (HPO), reviews proposed projects for their potential to affect significant cultural resources under provisions of both Federal and State laws and regulations.

These include:

- Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended,
- The National Environmental Policy Act of 1969,
- The Archaeological and Historic Preservation Act of 1974, and
- The New Jersey Register of Historic Places Act of 1970.

The HPO also assists State agencies in reviewing compliance with their cultural resource regulations. These include the Department of Environmental Protection's

- Land Use Regulation Program,
- Green Acres program,
- Office of Program Coordination, and
- The Municipal Finance and Construction program.

These programs in some cases take the lead in administering their individual cultural resource reviews.

As part of the review process, the HPO may request that archaeological investigations be conducted. These investigations range from Phase I (survey or site identification), to Phase II (evaluation), to Phase III (treatment).

- Phase I investigations are conducted for the purpose of identifying archaeological sites that may exist in a project area.
- Phase II projects are conducted to evaluate identified sites for their eligibility for listing in the National Register of Historic Places (National Register or NR). Eligible archaeological sites as well as those actually listed in the National Register are referred to as ***archaeological historic properties***. Phase II evaluation usually entails test unit excavation rather than shovel testing or other kinds of subsurface probing often conducted during Phase I survey.
- Phase III projects involve treatment of archaeological historic properties, typically involving "data recovery" (i.e., salvage excavation).

Following are the HPO's guidelines for assessing the need for Phase I surveys of proposed project areas. Thereafter, guidelines are presented for conducting Phase I surveys.

These guidelines are consistent with

(1) Federal regulations developed pursuant to Section 106 of the NHPA,

(2) The Secretary of the Interior's Standards and Guidelines for Identification,

(3) The NJ DEP, Municipal Finance and Construction Program's cultural resource survey requirements (N.J.A.C. 7:22-10.8), and

(4) The NJ DEP, Land Use Regulation Program, Rules on Coastal Zone Management regarding historic and archaeological resources (N.J.A.C. 7.7E-3.36).

2.0. When Is a Phase I Archaeological Site Survey Recommended?

Three factors are considered in assessing the need for a field survey to identify archaeological sites in the Area of Potential Effects (APE) for a proposed project. These are

(1) The nature of the proposed project and its APE,

(2) The presence or absence of documented archaeological historic properties in the APE, and

(3) The potential for the presence of undocumented archaeological historic properties in the APE.

2.1. Nature of the Proposed Project and Its Area of Potential Effects

The HPO first considers the nature of a proposed project and its APE. Survey is recommended if the proposed project *could* result in significant changes in the character of archaeological historic properties and such properties may be located in the APE [as defined in federal regulations, 36 CFR 800.16d].

Projects that could result in such changes usually involve earthmoving. For example, survey might be recommended for a proposed new golf course development because building a golf course usually involves large-scale recontouring of the landscape. Survey would not be recommended for a fairway reseeding program on an existing golf course because a project of this sort would not likely involve earthmoving that would result in changes in the character of any archaeological historic properties that might be present.

For archaeological considerations, the APE for a proposed project includes areas where earthmoving is planned directly as part of a project as well as areas where landscape alterations will result from activities associated with the project. In the proposed new golf course example, the actual area of the links layout would clearly be included in the APE. But some other areas might also be included. Examples include areas to be leveled for parking, areas where access roads will be built, construction staging areas, and areas from which fill will be borrowed.

2.2. Presence or Absence of Documented Archaeological Historic Properties

A Phase I survey is usually recommended if archaeological historic properties have been previously recorded within the APE. Sites of this sort usually need to be revisited and information regarding them (boundaries, etc.) updated so they can be adequately considered in project planning. Further, if one archaeological historic property is known within an APE, then there may be others.

Survey is not recommended if the APE has been previously covered by an adequate Phase I survey that identified no archaeological historic properties.

2.3. Potential for the Presence of Undocumented Archaeological Historic Properties

A Phase I survey is usually recommended if there is high potential for the presence of archaeological historic properties within the APE. Such potential exists when

(1) Archaeological sites have been documented in the project locality, or

(2) Landforms or topographic settings within the APE are assessed as likely places for the occurrence of undocumented sites based on similarities to known site locations elsewhere.

A Phase I survey is not recommended if there is little or no potential for the presence of archaeological historic properties in the APE. For example, there is no potential for the presence of intact archaeological deposits in areas where prior earthmoving has removed or reworked all soils that developed during the past 12,000 years. Examples of such areas include most gravel pits, road cuts, and pipeline trenches. But some forms of historic land use have sealed off and preserved ancient archaeological deposits rather than destroying them. Intact site deposits have been found beneath zones of modern disturbance such as layers of fill, plowzones, parking lot pavements, and roads.

3.0. Guidelines For Conducting Phase I Archaeological Surveys

Archaeological sites are places where there are physical traces of people's past activities. The primary goal of a Phase I archaeological survey is to locate and identify archaeological sites within an APE, and generate well reasoned assessments as to which, if any, of these sites have potential to qualify as archaeological historic properties. Information collected during a Phase I survey is usually sufficient to adequately evaluate some identified sites as *not* eligible for listing in the National Register of Historic Places. It is generally not sufficient to adequately support evaluations of eligibility. Phase II evaluation work is usually needed to collect and analyze information sufficient to document sites as archaeological historic properties.

If no potential archaeological historic properties are identified by a Phase I survey, then the archaeological investigation is usually terminated at that point. However, when possible archaeological historic properties are identified, a preliminary assessment should be made of the possible effects of the proposed project on them. If identified sites will not be affected by the proposed project, or if the proposed project can be redesigned so as to avoid affecting them, then further work is usually not recommended.

A Phase I survey research design typically involves five tasks: background investigation, identifying expectations for site locations within the APE, field investigation, data collection and analysis, and reporting. These guidelines deal primarily with the first four tasks. (Guidelines for archaeological survey reporting are presented separately.) All of this work should be carried out under the direct supervision of a qualified project director.

3.1. Qualifications of Project Director

The project director for Phase I archaeological surveys (i.e., person in direct charge of the five major project tasks) should be a trained professional archaeologist who meets the qualification standards of the National Park Service (NPS) as defined in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (*Federal Register* 48:190, September 29, 1983):

The minimum professional qualifications in archaeology are a graduate degree in archaeology, anthropology, or closely related field plus:

1. At least one year of full-time professional experience or equivalent specialized training in archaeological research, administration, or management;
2. At least four months of supervised field and analytic experience in general North American archaeology; and
3. Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archaeology has at least one year of full-time experience at a supervisory level in the study of archaeological resources of the prehistoric period. A professional in historic archaeology has at least one year of full-time experience at a supervisory level in the study of archaeological resources of the historic period.

The HPO maintains a list of consultants with qualified archaeologists on staff and who have expressed interest in working on projects in New Jersey. However, project sponsors are responsible for selecting consultants who have qualified archaeologists available to direct their surveys.

3.2. Background Investigation

The purpose of background investigation is to review information from documentary and informant sources which, when combined with findings from a field inspection, should be sufficient to formulate a site location model, plan the field investigation, and identify anticipated directions for data collection, analysis, and reporting. Existing information sources include documents, artifact collections, informants, and the APE itself. This information is analyzed to make an assessment of the kinds of sites that may exist within the APE, their likely distribution, and the most effective and efficient methods for detecting them.

3.2.1. Documentary and Informant Sources

In order to gain understanding of the kinds of sites that may exist in the APE and their likely locations, information regarding known sites and previous research in the locality should be reviewed. Current environmental conditions, paleoenvironmental conditions, and historic land use should also be considered. Relevant sources include the following

General Sources

4. Cultural resource reports on file at the HPO
5. New Jersey & National Register files at the HPO
6. New Jersey State Museum archaeological site records
7. *Bulletin of the Archaeological Society of New Jersey* (see Bello 1986, 1990)
8. Reports of excavations at sites in the APE locality
9. Individuals knowledgeable about local history and/or prehistory [e.g., professional archaeologists with an interest in the region, avocational archaeologists, artifact collectors, members of the Archaeological Society of New Jersey (ASNJ)]
10. University, regional, and local libraries
11. Construction plans of previous undertakings within the APE

12. Pinelands Commission site records
13. County Cultural and Heritage Commissions and Certified Local Governments
14. Overviews of the region's natural environment
15. Topographic, geologic, pedologic, hydrologic, and other maps
16. Researchers in other relevant fields who have worked in the project locality (e.g., geologists, geographers, folklorists)
17. Aerial photographs often on file with the USDA, Natural Resources Conservation Service (formerly SCS) and NJ DEP
18. Artifact collections from the locality
19. Soil boring data

Sources Specifically Dealing with Prehistoric Sites

1. Synthetic studies of regional cultures (e.g., Custer 1986, Kraft 1986, and various articles in Chesler 1982)
2. Regional archaeological surveys (e.g., Cross 1941, Ranere and Hansell 1984, Skinner and Schrabisch 1913)
3. HPO historic context files for prehistoric periods

Sources Specifically Dealing with Historic Resources

1. Various articles in Chesler (1982, 1984)
2. Regional and local histories
3. Historic maps (e.g., insurance maps, older USGS and other government maps, land survey maps)
4. Members of the Society for Industrial Archaeology-Roebling Chapter, Canal Society of New Jersey, and other such special interest associations
5. County and local historical societies
6. Architectural survey reports on file at the HPO
7. Deed and tax records (county courthouses and/or NJ Bureau of Archives and History)
8. Wills and probate inventories (county courthouses and/or NJ Bureau of Archives and History)
9. Local newspapers
10. Historic American Buildings Survey (HABS)
11. Historic American Engineering Record (HAER)
12. Federal and State census records
13. Early aerial photographs

Additional sources are specific to urban contexts. Some of these are city directories, photographic collections, and municipal records regarding the installation or initiation of water, sewer, and trash collection services.

3.2.2. Field Inspection

Part of the recommended background investigation is an inspection of the APE. The purpose is to collect information which, when combined with that obtained from documentary and informant sources, enables developing a site location model and field testing strategy. Observations are usually made regarding topography, historic land disturbance, field conditions, and indicators of intact archaeological deposits (e.g., standing structures and surface artifact scatters).

3.2.2.1. Prehistoric Sites, Rural Settings

The sorts of observations specifically relevant to the discovery of prehistoric sites in rural settings include small-scale variations in physical geography (i.e., topography, hydrology, pedology, geomorphology) and biotic communities. These sorts of observations can supplement the more generalized data available from geologic, soils, and topographic maps. Small-scale environmental variations were often important considerations in prehistoric site selection. Also, evidence of prior natural and cultural landscape modifications (e.g., alluvial sedimentation and drainage ditching) can enable refining plans for fieldwork. Under certain circumstances, a geomorphologist or pedologist should be consulted to assess potential for deeply buried artifact deposits within an APE (e.g., in floodplain, colluvial slope, or alluvial fan depositional contexts).

3.2.2.2. Historic Sites, Rural Settings

Indicators of historic archaeological sites in rural settings include buildings and other standing structures, foundations, artifact scatters, ground-surface anomalies (e.g., mounds, depressions, ridges), roads, paths, fence lines, and vegetational anomalies (e.g., ornamental plantings, groves of trees, hedge rows). A "field check" of sites indicated on historic maps and other sources is useful at this time.

3.2.2.3. Urban Settings

A field visit for a project in an urban setting can provide important information regarding the conditions under which fieldwork will be undertaken. There may be standing structures, demolition rubble, vacant lots, or paved lots. If structures are standing, it may be possible to determine basement depths and examine backyards to search for evidence of features such as privies. Visual inspection may yield clues regarding prior landscape modification. For example, if backyards on one side of a block are higher than those on the other side, it usually indicates prior terracing of a slope).

In many areas of New Jersey, settings are neither fully urban nor rural, but suburban. Differing degrees of urbanization lead to varying possibilities for archaeological site preservation and concomitant field investigation strategies (*see* Marshall 1984).

3.3. Site Location Model

The site location model for a Phase I archaeological survey incorporates the results of the background investigation in a consideration of the kinds and locations of sites, or lack thereof, that are anticipated in the APE. The site location model should include a map depiction of the APE that delineates areas of high, medium, and low probability to hold archaeological sites, as well as areas that will be excluded from field survey investigation. Modeling considerations often include factors regarding the possibilities for survival of sites or remnants of sites in disturbed locations. References to particular time periods (e.g., Late Archaic) should utilize the chronological categories of the Historic Contexts portion of the State Historic Preservation Plan.

The level of detail of the site location model will vary depending on the quantity and quality of background information including the degree to which prior investigations have produced models or elements thereof relevant to the APE. The model provides the basis for designing a field strategy by identifying variables that permit the subdivision of the APE into four categories: zones of high, medium, and low potential for site occurrence, plus excluded areas.

There are a number of special conditions that can lead to excluding all or part of an APE from field investigation. For example, it may be possible to eliminate part or all of the APE from further investigation if it can be demonstrated that recent disturbance has rendered it unlikely that any potentially significant archaeological sites have survived. However, in order to do this, it is necessary to document the severity and extent (horizontal and vertical boundaries) of the disturbance and to assess the degree to which this disturbance would compromise the significance of any sites that may have been present. Documentation may take the form of test excavation unit profile drawings, written or graphic records of past land use (e.g., maps showing a sand quarry), or photographs and written descriptions showing how current conditions differ from the historic configuration of the landscape.

Each situation should be assessed individually to determine whether the cultural resource potential is in fact limited by any special condition. For example, steep slopes are unlikely to hold many types of prehistoric sites, but may contain rockshelter or quarry sites. While inundated lands are not apt to contain most types of sites, they may contain the remains of historic period shipwrecks or sawmills. Sites that are inundated today may have been fast land prior to recent sea level rise, or may have become inundated as the result of increased runoff, changes in routing of storm water, or construction of impasses to drainage such as dams or railroad or road alignments.

In sum, it is important to assess the range of site types that could be present, as well as changes in site conditions through time, in assessing the need to survey a particular area. It is advisable to discuss any special conditions with the HPO and other relevant agencies in advance of fieldwork so that a strategy for surveying or excluding special condition areas can be agreed upon.

3.3.1. Prehistoric Sites, Rural Settings

Data gathered from all sources is synthesized in order to rank the APE or subdivisions thereof with regard to the probability that prehistoric sites are present. This is done by identifying factors that can be demonstrated to act as predictors of site location. When possible, these should be correlated with variables such as chronological period and site function. This has been done on a broad scale in New Jersey in an analysis of the Pinelands by Cavallo and Mounier (1980). Most cultural resource projects are not of sufficient scale to permit such extensive research. Nonetheless, the Cavallo and Mounier study demonstrates an approach that can be used to generate the needed information.

In order to appraise the potential horizontal and vertical extents of archaeological site occurrence, it is usually necessary to consider background information from geology, geomorphology, and pedology. Conversely, some formations, such as terraces in river valleys or the surfaces of glacial features such as kame terraces, may be especially likely locations for prehistoric sites. This analysis should take into account environmental changes that may have resulted in masking likely settings of archaeological sites. The identification of environmental settings in which archaeological deposits may be deeply buried is of particular importance.

As indicated, it is expected that a site location model's probability predictions will be ordinal in scale (e.g., high, medium, low). Prehistoric research in New Jersey is not developed to the point where the presence or absence of sites on different sorts of intact landforms can be predicted with certainty. Nor is there sufficient data to make ratio-scale predictions (e.g., 30% probability), though some ongoing research may eventually lead to such a capability in certain parts of the State (see Ranere and Hansell 1984). Also, it is expected that most models will simply deal with site occurrence irrespective of chronological period and site type. However, developing more refined models is of course the long-range goal.

The level of detail achieved in the model is dependant on the existing data and interpretations, and should be justified in those terms. The expertise of the investigator can be an important element in the design of the model by introducing additional factors which identify likely locations of prehistoric sites.

3.3.2. Historic Sites, Rural Settings

The development of models regarding the distribution of historic period sites in rural contexts will tend to be more location-specific than is the case for prehistoric sites. Maps and other documents will generally identify specific locations, with a greater or lesser degree of accuracy, where sites were situated. One basis for the stratification of the APE will therefore be the presence or absence of areas with recorded indications of historic occupation. However, especially for the earlier part of the historic period, documentary sources may be inadequate or nonexistent. Poorer segments of the population and more ephemeral buildings and structures (e.g., tenant residences, neighborhoods of ethnic or racial minorities) are also frequently under-represented in the documentary record. Therefore, it is also important to assess the general development of the APE, and identify types of settlements, industries, modes of transportation, and the like which will permit the generation of predictions about likely locations of unrecorded historic sites, as is done for prehistoric sites. Observations made during the field inspection may also be useful in historic site location modeling.

3.3.3. Urban Settings

Urban archaeology deals with archaeological remains of both the urban and pre-urban periods. Therefore, the approach to modeling site characteristics in urban contexts is likely to combine elements of models for prehistoric and historic sites in rural contexts along with criteria unique to urban settings. Urban archaeology also requires special field and analytical techniques suited to this context.

To begin with, the prehistoric configuration of the landscape should be determined to the extent possible, both in order to assess the likelihood of prehistoric occupation and to have a baseline against which subsequent development can be assessed. In addition, attention should be paid to reconstructing physical changes in the APE resultant from urbanization. Typically, successive buildings on a lot become larger, encompassing increasingly greater percentages of its area. A lot which once had a backyard with outbuildings and facilities (e.g., privy, well, cistern, etc.) may later support a building encompassing its entire area. Depending on the depth of the new building's foundation, the earlier backyard features may or may not have been destroyed. Also, natural landscape features (e.g., streambank, fast land adjacent to wetlands) which may have been occupied in the past are often progressively altered by filling, cutting, or other modifications. These will frequently retain important archaeological deposits if they have not been destroyed by subsequent development. The subdivision of once-larger lots also tends to obscure the pattern of earlier occupations. A discussion of the survival of prehistoric and early historic sites in urban contexts is provided in Marshall (1984).

The reconstruction of the physical evolution of the APE may indicate that significant archaeological deposits are unlikely to have survived, in which case further investigation may be waived. However, if undisturbed deposits are likely, then Phase I fieldwork may be unnecessary, and more intensive investigation may be appropriate. Finally, if the evidence is ambiguous, the reconstruction can be used to direct investigative techniques such as coring (SEE below) to test specific locations for the presence or absence of predicted deposits. These decisions should be made in consultation with the HPO and other relevant agencies.

In any case, an understanding of environmental change within the APE, combined with its historical development as synthesized from documentary sources, will result in the generation of a model of land use and development that predicts what kinds of archaeological deposits are likely to have been generated (e.g., 18th century residential, 19th century industrial) and whether any of these are likely to retain integrity.

3.4. Field Investigation

The data generated during a Phase I investigation is primarily of the presence/absence variety. The purpose of the Phase I work is to locate all possible archaeological sites within the APE, and identify those with potential to qualify as archaeological historic properties. It is not necessary to precisely determine site boundaries, functions, or ages. It is only necessary to identify those that have potential to be evaluated as archaeological historic properties and those that do not.

Field methods appropriate for Phase I data acquisition may take a variety of forms. They should be designed so that fieldwork recovers samples from which data can be collected and analyzed to test the project's site location model. The design and application of field techniques and methods are areas in which the expertise of the project director is of critical importance. Innovative approaches are encouraged, but should be developed in consultation with the HPO and other relevant agencies.

The horizontal and vertical extents of disturbed areas in which archaeological deposits are likely to have lost their integrity should be documented. This usually requires excavation of subsurface tests in selected locations to collect stratigraphic information unless existing data (e.g., from previous construction plans) are sufficient. No portion of the APE should be excluded from examination without justification based on evidence (e.g., geophysical description and sample excavations) that demonstrates that significant archaeological sites are unlikely to be present. This applies equally to wetland and submerged areas.

The site location model should designate different portions of the APE to one of the following four categories:

(1) Excluded from field survey consideration,

(2) High potential for the presence of archaeological sites,

(3) Medium potential, and

(4) Potential.

High, medium, and low potential areas should be covered by pedestrian surface survey and subsurface probing. In order to maximize the number of potentially significant sites identified, the intensity of surface and subsurface investigations should be proportional to the probability of site occurrence. That is, investigations should be most intensive in high potential areas and least intensive in low potential areas.

The high, medium, and low potential portions of the APE should be covered with an average of 17 one-foot diameter subsurface probes per acre. This is equivalent to probing on a 50 ft rectilinear grid. If rectilinear grid sampling is employed, then the probe grid interval should be smaller in high potential areas and larger in low potential areas. (Shovel testing on a grid in urban settings might be inappropriate, and investigators should contact the HPO to plan testing strategies.)

In lieu of rectilinear grid sampling, other forms of statistically quantifiable sampling strategies are encouraged. Statistically quantifiable sampling strategies are necessary in order to generate data that are cross- comparable with data from other surveys, and to provide a context within which the results of any given survey can be replicated and evaluated. This is necessary both in order to evaluate the effectiveness of an identification level survey, and so that other investigators working in the area can draw upon the survey results to design subsequent field surveys and site location models.

For linear projects (e.g., road widenings or installation of buried utility lines) with an APE measuring 50 feet or less in width, shovel testing/subsurface probing should average one test for every 50 linear feet with closer spacing of probes in high potential areas and wider spacing in low potential areas.

Judgementally placed subsurface probes can be an important adjunct to a structured sampling scheme. They can be placed to investigate locations that are deemed during fieldwork to be likely site areas that were not identified as such during project planning. They can also be placed to collect information to supplement that obtained from the planned probes. Consequently, provision should be made in advance for excavation of additional judgementally placed probes. The location and intensity of this probing will vary depending on the specific project circumstances.

The particular subsurface probing technique or techniques (e.g., shovel testing, post hole shovel testing, power augering, bucket augering) selected for a given project should be appropriate for the target APE (see Kintigh 1988; Krakker et al. 1983; Nance and Ball 1986; Shott 1985). Probes should penetrate the full depth of intact Holocene sediments. To the extent possible, subsurface probes should be excavated according to visible stratigraphy (i.e., cultural or natural strata). All sediments should be screened through 1/4-inch mesh. Some sorts of artifacts can be discarded in the field, provided their data value is fully documented and possible subsequent phases of investigation are not compromised by the discard of these specimens. Other specimens should be retained for laboratory examination.

Areas that may hold deeply buried cultural deposits will, of course, necessitate use of an alternate sampling strategy. This will usually be developed in consultation with a pedologist or other soils specialist with expertise in Holocene geomorphology. Matrix excavated by mechanical means should be treated in the same manner as manually excavated soil matrixes. For example, cores should be recorded stratigraphically, to the extent possible, and the matrix screened for artifacts. When heavy equipment such as a backhoe is employed for subsurface exploration, the total volume of excavated earth is usually too great to screen in its entirety, and sampling is necessary. Whatever sort of sampling is done, stratigraphic control should be maintained. Also, the use of heavy equipment should always take into consideration potential for destruction of potentially significant archaeological deposits.

Some useful references pertaining to archaeological survey sampling include:

- Dunnell and Dancey (1983),
- Grossman and Cavallo (1982),
- Lightfoot (1986),
- McManamon (1984),
- Mueller (1974 and 1975),
- Nance (1983),
- Plog et al. (1978),
- Ranere and Hansell (1984),
- Redman (1987), and
- Schiffer et al. (1978).

3.4.1. Prehistoric Sites, Rural Settings

In most situations, a combination of surface inspection and subsurface testing is the most effective and efficient way to locate sites. The relative level of effort expended on each technique will depend on a variety of factors.

The selection of surface investigation methods (e.g., systematically spaced transacts, intensive inspection of sample quadrants) should be tailored to the characteristics of the APE (see Chartkoff 1978, Lovis 1976). Controlled surface collection from small-sized grid units typically generates more data potential than is necessary for a Phase I survey, and is, therefore, usually more appropriate to later phases of investigation. However, the degree of provenience control should be sufficient to provide preliminary indications of intrasite variation.

In contexts where it can be demonstrated that all Holocene sediments are contained within a plow zone, surface inspection supplemented by broad interval subsurface testing is recommended to identify sites, provided that rainfall subsequent to plowing has been sufficient to wash obscuring sediments from exposed artifacts and that the ground surface visibility is at least 50%. Cultivated fields may be plowed or disced to eliminate ground cover, as long as the plowing does not extend deeper than previous disturbance. The absence of potentially artifact bearing deposits below the depth of plowing should be adequately documented by subsurface probing, especially within the limits of identified sites.

In unplowed areas and in areas where plowing has not penetrated the full depth of intact Holocene sediments, subsurface probing is called for. In situations where cultural deposits may be deeply buried, techniques should be employed to ensure safe and efficient examination of all potentially artifact bearing strata. These may include the use of bucket augers with extendable handles, test excavation units, mechanical coring, and backhoe trenches (see Stein 1986). Special techniques may also be necessary to examine wetland and submerged areas likely to contain sites.

The design of a sampling strategy depends on the expected characteristics of the target population (see Kintigh 1988, LeeDecker 1984). Three of the most important variables are site size, site distribution, and intrasite artifact density (i.e., number of artifacts per unit area or volume). Other things being equal, these variables determine whether sampling locations will intersect artifacts and thus reveal the presence of a site. In some areas, systematic non-exclusive surveys have been conducted that provide at least preliminary data regarding these variables (e.g., Ranere and Hansell 1984). However, in most of New Jersey, such studies have not been undertaken. Therefore, estimates of these variables should be made by extrapolating from data presented in sources examined during background investigations.

With regard to site size, there is a correlation between the size of the sampling interval and the minimum size of the site likely to be discovered. Any systematic sampling scheme (i.e., placement of sampling locations at fixed intervals) will encounter only a fraction of sites whose minimum dimensions are smaller than the sampling interval. Therefore, the known or estimated size structure of the site population should be taken into account when selecting a sampling interval. The rationale for this selection should be presented in the report. The inevitable bias of systematic sampling against smaller sites may be partly offset by the addition of extra tests placed according to random or judgemental criteria, or both. A totally random sampling scheme would overcome the size bias, but could leave some areas entirely unexamined.

The square grid frequently used in Phase I surveys does not actually produce a lattice of equally-spaced sampling locations, because the diagonally opposed points are actually farther apart than those "in line." Therefore, sites with maximum horizontal dimensions equal to or slightly larger than the nominal grid interval could be missed. Alternate arrangements of tests can lessen this possibility (see Kintigh 1988).

Intrasite artifact density and distribution also affect the probability that a site will be discovered even if a sampling point falls within a site's boundaries (see Lynch 1980, Stone 1981). If the site location model indicates that there may be sites with low artifact densities within the APE, then field procedures should be designed accordingly. One way of doing this is to increase the number of sampling points (i.e., more tests); the other is to increase the size of probes.

As a corollary to the above, low density sites may first appear as single artifacts in isolated probes. Additional investigation, in the form of more and/or larger probes in the vicinity of such "isolated finds," should be undertaken in order to establish whether they are indeed parts of sites or truly isolated artifacts.

3.4.2. Historic Sites, Rural Settings

Methods and techniques for the discovery of historic sites in rural contexts are largely similar to those employed for prehistoric sites (South and Widmer 1977); and many of the same concerns regarding site distribution, stratification of the APE, and the need for statistically valid sampling apply (House 1977). However, the availability of written and graphic records and visible physical remains will often make the stratification of the APE into high, medium and low potential areas more precise, at least for the later, better- documented periods. Nevertheless, the field techniques for detecting the presence of sites--primarily surface inspection and various forms of subsurface probing--are similar. A few techniques, such as the use of metal detectors, are specific to historic period sites. The basic intensity of examination used to identify historic sites should be the same as that used to detect prehistoric sites.

As indicated previously, landscape modification has been an important aspect of historic period culture and, therefore, a useful clue in the detection of historic sites. Indeed, certain sites may consist primarily or exclusively of relatively large-scale features with few associated artifacts. This is especially true of some kinds of industrial sites. Part of any field investigation should be a consistent search for evidence of such features as might exist in the APE, based on expectations developed in the background investigation.

As with prehistoric sites, some historic sites may now be inundated or contained within wetlands. Potential for such sites should be identified by the background investigation, and field procedures should be selected with and eye toward identifying such sites.

3.4.3. Urban Settings

Phase I investigations in urban settings rely heavily on documentary research. It is often logistically difficult to conduct shovel testing or other forms of subsurface probing at this level of investigation. The decision to proceed with Phase I field survey or to terminate the investigation can often be made by reviewing documentary information when that information indicates that archaeological historic properties are likely to be either present or absent. If it is appropriate for survey to be conducted, given the accessibility and other logistical difficulties frequently associated with the investigation of urban lands, it will frequently be most efficient to combine survey phases to include both inventory and evaluation for National Register eligibility.

In situations where access to the property is possible, a variety of subsurface testing techniques may be appropriate. The selection of a technique should take into consideration both the kinds and probable locations of the needed data and the physical characteristics of the deposits which should be sampled. If there is little or no structural material, either in the form of standing architecture or destruction rubble, and the historic ground surface is not deeply buried, then techniques used in rural settings such as shovel tests or excavation units may be employed. However, in many cases, the deposits are more difficult to penetrate and, therefore, alternative techniques are necessary. These can include coring, augering, or boring with a power rig, or excavation of trenches with a backhoe. Whatever techniques are selected, the placement of the tests should be controlled as much as possible by information obtained from the documentary research in order to maximize the probability that relevant data is recovered and damage to potentially eligible deposits is minimized.

3.5. Data Collection and Data Analysis

The analyses of data resultant from fieldwork should focus on testing the project's site location model. However, analysis should also include basic classification of artifacts according to chronology, cultural affiliation, technology, and function. There should also be consideration of cultural stratigraphy including artifact depositional contexts vis a vis natural stratigraphy for each investigated site.

Recovered artifacts should be cleaned (except in cases where this might impair future analysis) and labeled or repackaged to clearly indicate provenience. Some categories of artifacts may be discarded after they have been identified and recorded. This includes modern objects and bulk items which have no diagnostic value beyond their presence (e.g., coal and coal waste; and construction materials such as mortar, brick fragments, and cut stone fragments). Representative specimens of these latter items should be retained. Artifacts of all categories should be recorded quantitatively.

Provisions should be made for the permanent curation of artifact collection and records at an approved repository (e.g., the New Jersey State Museum) as part of the Phase I survey project design. The receiving institution should be contacted in advance in order to ascertain their requirements. It may be possible to discard artifacts not associated with a potentially significant site at the conclusion of an investigation, but only with the explicit approval of the reviewing agency and the repository.

3.6 Reporting

See "Guidelines for Preparing Cultural Resources Management Archaeological Reports Submitted to the Historic Preservation Office" (July 2000).

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