

**CULTURAL RESOURCE MANAGEMENT**  
**IN PENNSYLVANIA:**  
**GUIDELINES FOR ARCHAEOLOGICAL INVESTIGATIONS**

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## Chapter I

## INTRODUCTION: PHILOSOPHY AND PURPOSE

Pennsylvania has a heritage of over 12,000 years of human settlement. This heritage is, in part, preserved in the archaeological record. The inventory of archaeological sites represents the time span from the first Paleo-Indian hunters and gatherers who occupied what is now Pennsylvania some 10 to 15,000 years ago to the urban industrial and rural agricultural communities of the nineteenth and twentieth centuries. The archaeological record offers a unique opportunity, not available through written history and oral tradition, to study and understand our heritage.

Federal and state laws recognize the importance of cultural resources, including archaeological sites, and provide mechanisms to insure that they are considered and protected in the actions of government agencies. Under these laws, federal and state agencies must consider the effects of their actions on significant cultural resources -- historic buildings, structures, objects, districts, and historic and prehistoric archaeological sites. A significant resource is defined as one which is listed or eligible for listing in the National Register of Historic Places. Archaeological sites are considered to be important in elucidating information about past cultural behavior.

The federal legal mandates include Section 106 of the National Historic Preservation Act of 1966 as amended, Executive Order 11593, and the regulations of the Advisory Council on Historic Preservation (36 CFR 800). In Pennsylvania, state legal mandates include the Environmental Rights Amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 507 *et. seq.* (1988). The legal mandate, the philosophy and purposes of the laws, and the definition of significance are discussed in greater detail in A Comprehensive Plan for the Conservation of Archaeological Resources, Volume I and II (PHMC: 1985). Briefly, these laws require that agencies meet their responsibilities by identifying all cultural resources which may be affected by their actions, determining the National Register eligibility of those resources which will be affected, and considering ways to mitigate or avoid the effects of this action on National Register properties. These responsibilities are usually met by a program of archaeological survey, testing, and evaluation.

These cultural resource laws define the role of the State Historic Preservation Officer (SHPO) in providing comment and expert advice on effects. In Pennsylvania, the SHPO is the Executive Director of the Pennsylvania Historical and Museum Commission (PHMC) and the SHPO's responsibilities to review, comment, and advise are fulfilled by the Bureau for Historic Preservation (BHP). Upon notification of an undertaking by an agency (or its applicants for funding or licenses) the BHP reviews the action for its effect on potentially eligible cultural resources and provides comments to the agency regarding the presence of resources and the need for studies to locate or evaluate resources. For archaeological sites, recommended studies may include archaeological survey, limited testing, and excavation. The BHP generally coordinates with the agency or applicant regarding the scope of work and reviews and comments on the adequacy of the methods and results of the studies.

These guidelines contain the standards and specifications by which the BHP reviews and evaluates archaeological survey methods and results, reports, and recommendations. They are intended to insure consistency in BHP evaluations and comparability of data. The nature of archaeological sites is such that expectations are generally modified by the experience of fieldwork and analysis. It should also be recognized that the state of archaeology as a discipline is changing and, with it, our understanding of appropriate methods. There is an inherent uncertainty involved in archaeological investigations that necessitates continued coordination and modification and precludes rigid mechanical approaches.

The guidelines are intended to insure that archaeological studies reviewed by the BHP conform to standards for archaeological survey, data recording and report production currently accepted in the profession. They are not intended to discourage innovation or experimentation but to establish a minimum standard in default of innovative or experimental approaches. In all instances, investigations should conform to accepted current standards of practice in American archaeology. The absence of specific guidance on a particular point should not be taken to imply that any standard or no standard is applicable.

The BHP encourages the use of new or modified approaches not specified in these guidelines, if these approaches are discussed with BHP staff by phone or letter before the studies are initiated. Alternative approaches, however, must be justified by reference to the literature on archaeological methodology and should provide results equivalent to those provided by the methods specified in these guidelines.

The review process insures that significant archaeological resources are considered and treated according to their significance. These guidelines are intended to insure that the process is effective and efficient.

## THE REVIEW PROCESS

The BHP has divided the review process into two parallel processes: (a) review for effect on historic standing structures and, (b) review for effect on prehistoric and historic archaeological resources. This document describes the procedures involved in the archaeological review process. Questions concerning the treatment of standing structures should be addressed to the BHP staff.

The first step in the review process is the submission of project documentation to the BHP. To enable the BHP to complete its review, the documentation must be complete, including the following:

a) Agency (Federal/State) and type of assistance.

b) Project Location: the specific location and boundaries of the project area should be indicated on a U.S. Geological Survey (USGS) 7.5 minute topographic map (or copy thereof) as well as other maps (road or street maps, detailed plans, permit application maps, etc.), as

appropriate. Street address and street map are required for projects in urban areas. Previous construction and the relation of the project to existing roads, sewer lines, pipelines, and so forth, should be shown on clear and detailed maps of the project area. For example, distinctions should be made on project maps for pipelines which are being replaced within their existing trenches and new ground disturbance is therefore minimal. A distinction should also be made between placement in a road berm where it can be assumed that the soil profile has been disturbed by the original road construction or simply in the road right-of-way where that assumption is not necessarily valid.

c) Project Description: Nature and extent of activities licensed, funded, or assisted; size of project; extent and nature of ground-disturbance, previous and anticipated; previous and current land use; known historic and archaeological resources within or near the project area, with sources of information.

When complete documentation has been received, the archaeological review proceeds with the examination of the project location to determine if known archaeological sites are recorded within or near the project area. Site locations are recorded in the Pennsylvania Archaeological Site Survey (PASS) files maintained by the PHMC at The State Museum of Pennsylvania in Harrisburg. The files are the official repository of site information and currently contain information on over 13,000 archaeological sites of all periods. Similar files for more than 100,000 historic structures are maintained by the PHMC/BHP. Comparison of project maps with map information in the PASS files enables the BHP staff archaeologists to determine the presence or absence of recorded sites within the project area.

The absence of recorded sites does not imply the real absence of sites. Although there are a large number of sites currently recorded in the PASS files, these probably represent less than 5% of the total number of archaeological sites within the state. In order to evaluate the potential effect of an action on archaeological resources, the possibility of significant unrecorded sites being located within the project area must be considered. The presence of a prehistoric site for example can be accurately based on the topography, hydrology and pedology of the general project area. Thus, the review by the BHP includes a consideration of patterns of site distribution and models of prehistoric and historic settlement derived from previous cultural resource management surveys, regional surveys, general settlement pattern studies, and local or regional histories.

Other factors considered include (a) previous survey or excavation within or near the project area and (b) the nature and extent of previous land use and ground disturbance that would affect the preservation of archaeological sites. Areas which have been extensively graded or altered (e.g. through surface mining, construction, etc.) may often be eliminated from further consideration, unless there is a possibility that archaeological deposits may be preserved beneath disturbed levels.

The review of project documentation results in one of three responses by the BHP to the agency or applicant:

- (1) No recorded sites occur within the project area and none would be expected.

(2) Recorded sites occur within the project area and other, unrecorded, sites may be expected to exist.

(3) No recorded sites exist in the project area but the area has not been surveyed and there is a high probability that sites exist. The high probability is determined by a consideration of the factors outlined above and refers to the probability that an archaeological resource will exist within a defined area.

(For projects involving Act 537 sewage facility plans, and no other state or federal permits or assistance, when no sites are recorded within the project area, the necessity to conduct a Phase I survey is optional. However, if archaeological materials are uncovered during construction, the entire project must stop and the appropriate surveys must be conducted.)

In addition to evaluating the presence or absence or potential for archaeological resources within the project area, the BHP renders an opinion concerning the probable effect of the action on archaeological resources. It may be that although recorded sites are located within the project area the nature of the project activities is such that there will be no effect on those sites. The BHP response to the agency or applicant thus includes information on the presence or likelihood of archaeological sites and an opinion as to effect.

### RECOMMENDED ACTION

If, in the opinion of the BHP, there are no sites or there will be no effect, no further investigation will be recommended. It should be stressed, however, that should evidence for archaeological resources be revealed during construction or be provided by an informant after the project commences, the BHP must be informed immediately and consulted as to the appropriate action to protect resources. Federal law has established procedures for the treatment of unanticipated discoveries ("late finds") involving coordination with the BHP.

When the BHP has determined that there will be an effect on known resources or that there may be an effect on unrecorded resources, the BHP will recommend that an archaeological survey be performed to develop an inventory of all archaeological resources (prehistoric and historic) within the project area. In order to satisfy the requirement that agencies consider the effects of their actions on cultural resources, a phased approach to resource identification and evaluation is generally recommended. The phases correspond to the required tasks of inventory, evaluation, and mitigation through data recovery. The purpose of these investigative phases is described briefly below. Guidelines for the conduct of investigations appear in the following section.

#### Phase I

The Phase I survey is intended to provide an inventory of all potentially eligible archaeological resources within the project area as per Federal Reg. 51 (169) of 9/2/86 and CFR 800.4 as revised 10/1/86. Predictive models are used by the BHP to delineate areas requiring Phase I survey. The consultant should also devise a predictive model to focus the

Phase I survey, however, the model must be justifiable and designed to locate all potentially eligible archaeological sites within a proposed project area. The methodology of a Phase I survey should be adequate to make it highly probable that all sites will be recorded. Sites may be identified and recorded through a combination of documentary research, informant interviews, surface reconnaissance, and subsurface testing. Any or all of these techniques may be used in a particular survey. The Phase I survey will result in the discovery of any unrecorded sites and the confirmation of the existence and location of previously recorded sites. It should be emphasized that a Phase I survey will identify and record both prehistoric and historic period sites within the project area.

The results of the Phase I survey should be incorporated in a report meeting the standards and specifications of the BHP (see Report Requirements, below). The report serves as the basis for a recommendation by the BHP as to the need for additional work and the adequacy of the Phase I survey. If no sites were discovered and the report reflects an adequate consideration of the potential for archaeological resources, the BHP will recommend that no further investigations are needed and that the project will have no effect on archaeological resources.

For projects covering an area of five acres or less, involving simple residual soils or no stratified Holocene deposits and where no sites are found, a shortened report format is acceptable. (See Chapter III, section A for an outline).

Prehistoric and historic period archaeological survey work and reports should be coordinated with the historic structures survey. The information gained from the historic structures survey work should be incorporated into the investigation of historic archaeological sites.

## Phase II

For archaeological sites, significance is usually defined as having the potential to contribute significant data to our understanding of past cultural behavior. Phase I surveys do not generally provide sufficient information to allow a determination of the significance of the resources discovered. The Phase II investigation is designed to sample the archaeological deposits at sites identified during the Phase I survey and allow a decision to be made as to their significance, defined as eligibility of the site for listing in the National Register of Historic Places. Only significant sites are afforded protection under federal or state law and warrant further consideration. If sites were discovered and documented according to BHP standards during the Phase I survey, in most cases the BHP will respond with a recommendation for a Phase II testing and evaluation investigation.

The Phase II investigation will involve a more intensive study of individual sites through techniques designed to reveal information on stratification, the presence of features, paleo-environment, artifact variation and culturally determined horizontal artifact patterning. The goal of the investigation is to provide evidence from these categories sufficient to relate the site to others in the local area, region, or state. Site significance should be evaluated by establishing the cultural/historical function of the site within the regional settlement pattern and by reference to the study unit summaries and research themes outlined in the State Plan.

As with the Phase I results, the results of the Phase II study are summarized and documented in a report reviewed by the BHP. The BHP response will include an evaluation of the adequacy of the report in terms of the standards and specifications for Phase II reports (see Report Standards) and the discussion of site significance. The BHP response will also include a determination of eligibility and the need for additional consideration of the resources. If sites are determined not eligible on the basis of the Phase II results, no further field investigations will be recommended.

If sites are determined to be eligible, the BHP will recommend either that the significant sites be avoided by project activities or that, if an effect is unavoidable, the scientific information contained in the site be recovered by large-scale data recovery (Phase III) excavations. Federal regulations (36 CFR 800) define a role for the National Register of Historic Places in the determination of eligibility and the Advisory Council for Historic Preservation in the development of a data recovery plan.

If significant sites are located within the project area, will be affected by project activities, and cannot be avoided, the BHP will indicate that the project will have an adverse effect on the sites. The adverse effect may be mitigated by data recovery in most cases. Most eligible archaeological sites are significant solely for the information they contain and need not be preserved in place. There are, however, certain exceptional archaeological sites which derive all or part of their significance from their location, setting, or context and for which the BHP may recommend preservation in place.

### Phase III

Phase III investigations are intended to mitigate the adverse effects to significant sites through data recovery. Data recovery investigations generally involve large-scale excavation of a representative sample of archaeological information from a site. Because of the variety of settings and site types, Phase III investigations must be designed on an individual basis in consultation with the BHP. The Guidelines section outlines some of the basic components of a Phase III investigation but individual investigations will be designed to recover information related to the significance of the site, that is, the investigations will be problem-oriented and designed to answer specific questions.

The results of Phase III studies are incorporated in a final report which is reviewed by the BHP in accordance with its standards and specifications (see Chapter III - Report Standards). Although the content and focus of the Phase III research will vary greatly, it is expected that it will meet certain minimum standards and represent a substantial contribution to the archaeological literature. It is further expected that they will address specific problems outlined in the State Plan and contribute to the study units of the State Plan. The justification for the requirements placed on federal agencies by the Historic Preservation Act is the protection of significant scientific information: Phase III investigations must focus on the research problems which make the site significant.

Completion of the Phase III studies and approval of the final report will, in most cases, satisfy the agency's responsibilities regarding cultural resources. At this point, the construction project may proceed. The BHP will respond to a complete and adequate Phase

III report with an opinion that the project will have no adverse effect on cultural resources. In some cases, (when an MOA exists) the no adverse effect finding may be given prior to Phase III studies, conditioned upon the completion of a final Phase III report.

It must be emphasized again that the agency (or applicant) remains responsible for the consideration of archaeological resources discovered during construction. Unanticipated discoveries or late finds must be reported immediately to the SHPO and steps taken to prevent any further damage to these resources until an appropriate strategy for investigating, evaluating, and protecting them developed. The agency and professional archaeologists involved in a Phase III study should also be responsible for publishing the results of their investigations in a scholarly manner. These studies focus on the most significant sites discovered through the CRM process, consequently the resulting data should be disseminated to the professional community.

## Chapter II

## GUIDELINES FOR THE CONDUCT OF ARCHAEOLOGICAL STUDIES

The following guidelines are designed according to the Advisory Council's Handbook on the Treatment of Archaeological Properties (Nov. 1980) and the Secretary of Interiors Standards for Archaeology and Historic Preservation (36 CFR 61.3 (b) and Chapter 6, Section C.1.a). The guidelines were developed to make explicit the standards used by the BHP in evaluating and commenting on archaeological investigations. The standards are set to insure a consistent and uniform approach to the treatment of archaeological properties. They are based on field methods and procedures which have been successful in Pennsylvania and a wide range of significant research problems have also been considered. This document provides detailed advice for archaeologists working in Pennsylvania and general guidance to agency officials on the level of effort necessary to comply with historic laws and procedures in this state.

The guidelines represent the results of both a theoretical and empirical evaluation of archaeological methods and techniques. The BHP has referred to current discussions of methodology and technique in the archaeological literature as well as drawing on the experience of staff in reviewing the conduct of archaeology in Pennsylvania over the past decade. The approach established by these guidelines has resulted in the identification and adequate evaluation of archaeological sites and provided sufficient information to allow the BHP to make informed and justified comments on the consideration of archaeological sites.

The survey methods recommended below have been extensively tested in Pennsylvania and they have resulted in the discovery of the types of sites which have made a significant contribution to our understanding of past cultural behavior in this state. The specific excavation techniques and the types of analysis which are recommended below reflect the types of research currently conducted in this state. Therefore, this document, in part, is a statement of the types of research which may lead to an improved understanding of cultural behavior.

The approach suggested below is not the only approach. The BHP welcomes and encourages the development of alternative strategies if these are discussed with BHP staff prior to the commencement of work and if the alternatives are justified by reference to the current literature or field experience. It is to be expected that there will be more opportunity or need for innovative alternatives at the Phase II and III levels. Experience suggests certain standard Phase I methods and techniques that have proved effective.

Because of the variety of contexts in which archaeological studies occur, the Guidelines have been developed for four distinct situations: Prehistoric, Urban Contexts, (Non-urban) Historic, and Submerged archaeological sites. Of course, these situations are not mutually exclusive and certain investigations will combine two or more approaches. Moreover, most of the general procedures outlined below will be included in any investigation and will be

appropriate in considering historic or prehistoric archaeological sites. The following sections, therefore, are organized by general procedures.

## PHASE I GUIDELINES

### Site Visit

A site visit provides information on detailed topography, the extent of prior disturbance, and indicators of the presence or absence of archaeological deposits. An initial field visit should be scheduled for all investigations. The results of the site visit should be combined with background documentary research to develop predictions as to site locations.

#### Prehistoric

The initial site visit should include consideration of details of the local topography and environment that would have affected the formation and preservation of archaeological sites. Although some of this information is available from topographic, soils, and geological maps and from documents, there is no substitute for a detailed field examination of the local conditions. The extent of level areas, minor topographic features (slight rises, depressions, slopes) which might have influenced land use, modern vegetation patterns, the extent of alluvial and colluvial deposition and erosion, and the presence of other significant environmental features (rock outcrops, springs, etc.) should all be noted in the site visit.

The other important category of information needed from a site visit involves observations on prior ground disturbance. An attempt should be made to ascertain and document the nature and extent of previous disturbance. Documentation could take the form of photographs, detailed maps, representative test pit profiles, or construction records. If disturbance has seriously affected the preservation of archaeological sites or influenced the extent or intensity of testing, the BHP must be provided with sufficient information to allow concurrence with the investigator's conclusions. In certain cases in which previously unreported but extensive disturbance has affected the preservation of all potential sites within the project area, the BHP should be informed and an opinion solicited as to the need for further work.

In evaluating the effect of disturbance and small-scale environmental conditions, the nature of prehistoric settlement and site formation processes must be considered. Archaeological deposits, for example, may be preserved intact beneath recent disturbance in certain contexts. Likewise, wet or marshy areas may be of recent origin. The margins of marshy areas of long standing may have been attractive areas for prehistoric settlement.

#### Historic

In addition to the considerations outlined above for prehistoric sites, the site visit should note conditions influencing or indicating historic site formation and preservation. Perhaps the

most obvious is the presence of aboveground remains and features: foundations and topographic or vegetational anomalies indicating wells, privies, and property boundaries. The location of existing structures will, of course, guide the search for archaeological features, as well the presence of property boundaries and roads. The site visit will provide information not otherwise obtainable.

### Urban

A site visit is necessary to evaluate the possibility of prior destruction and the visual evidence for a potential archaeological deposit and to make a photographic and written record of the existing conditions. In the urban environment, visual evidence for archaeological deposits is often lacking, especially in an open situation, such as a large parking lot or modern highway. In such cases no amount of surficial inspection will detect the presence or absence of an archaeological deposit. However, if the project area currently contains structures, it is often possible to predict the likelihood of the survival of archaeological resources by an assessment of basement depths, for example.

### Submerged

The site visit should note the presence or absence of maritime architecture or features such as pilings, docks, customshouses, warehouses or shipyards. Such structures and features help to place any submerged resources within their proper historical context. They also help to guide the search for underwater sites and aid in delineating site boundaries. The lack of maritime architecture or features does not imply that submerged maritime resources do not exist.

### Background Research

This segment of the study is an essential precondition for effective fieldwork and interpretation of results. Included are (a) documentary research on environment and culture history using maps, previous survey results, and local or regional synthesis; and (b) informant interviews with knowledgeable persons in the local area.

### Prehistoric

Since the intensity and scope of field testing will depend on the designation of high or low probability zones (see above and Field Investigation Section below), it is essential that investigations establish a reasoned and documented basis for designating portions of the study area as high or low probability zones. As noted previously, archaeological "probability" refers to the potential that a specified zone contains archaeological sites. The determination of probability or archaeological potential must involve a consideration of the factors influencing the formation of all types of archaeological sites. A zone cannot be designated "low probability" simply because no Late Woodland villages would be expected.

In general, the responsibility of the investigator in background research is to develop explicit expectations as to the probability of sites occurring within the study area and the probable distribution of these sites. If the study is located in a part of the state where survey data is available and settlement patterns have been well-defined, these expectations will be derived from a consideration of the known regional settlement patterns and the local conditions. However, the investigator is responsible for referencing the appropriate regional studies (including the State Plan) and documenting the local conditions.

In areas where survey data is lacking and little is known of regional settlement patterns, the development of predictive models of site location is appropriate. These models need not be elaborate for small projects and may involve the application and testing of models developed for other regions. However, the designating of probability zones without any justification or the uncritical and untested application of predictive models developed for other regions is not an acceptable scientific procedure.

To place the investigations within a fuller context and to examine the ecological and culture historical parameters affecting the choice of site location, background investigations of various sorts must be conducted during Phase I. Some background information should address and critically evaluate environmental characteristics that are: a) pertinent to a definition of prehistoric settlement patterns; b) pertinent to establishing relevant cultural ecology; and c) pertinent to devising predictive models for the locations of sites. Some background environmental information is useful simply to orient the reader of the Phase I report to the project area. Since information on modern environmental conditions may be important for understanding prehistoric environment, the Phase I survey should, at a minimum, assemble pertinent data on the following aspects of the project area:

Geomorphology - Land forms affecting site distribution or preservation

Soils - focusing on origin, depositional environments, organic preservation and fertility

Hydrology - types of water, stream orders and drainage patterns

General flora and fauna

Climate - as it effects the growing season or "frost free days"

Geology - especially lithic resources or the potential for rockshelters

Phase I survey reports should integrate and interpret these data and use them to identify areas in which archaeological sites are likely to be present and those in which they are less likely to be present. These expectations should be explicitly stated and defended by reference to the above categories of information and local or regional models of settlement.

A third component of the Phase I background investigation involves a broad-based review of manuscripts, maps, historical documents, notes, prior surveys, and other published

material relative to the project area that may assist in the identification of possible sites. This information will serve to further define the range of archaeological materials which may be expected within the project area.

The literature search should include an examination of relevant culture histories and previous archaeological and historical research to allow the development of explicit predictions regarding the location of sites in the project area. Regardless of the project size, archaeologists are expected to consider all relevant archaeological and environmental data in developing these predictive models. The predictive model need not be elaborate or complex but should be an informed statement on where archaeological sites are likely to be identified in the project area. The exact geographical area from which background information should be drawn will vary according to project size and the availability of comparative data. Where information on the specific project area or environs is not available, predictions about site locations should be developed from regional settlement patterns, investigations of similar environments outside the local area, or other environmental data.

The goal of this phase of the background investigations is not the production of culture histories per se, but to provide a summary of previously established site distributions which can, in turn, be used to predict the likely distribution of sites by phase within the project area and a brief statement on the potential significance of these sites. The range of information used for this summary will vary with the history of work in the area. If the area has been subjected to extensive prior archaeological work, a valley-wide or countywide synthesis may be adequate. In poorly studied areas, counties or even the entire physiographic region may need to be assessed to synthesize prehistoric and historic settlement pattern expectations. The results of this phase of the background research should be included in the report as documentation and justification for site location predictions in the project area.

Another component of the background investigation includes interviews with informants. These are persons (such as local residents and members of the local Society for Pennsylvania Archaeology chapter and local or county historical societies) who may be familiar with the project area and with the locations of recorded and unrecorded archaeological and historical sites. Informant interviews are very important and must be conducted whenever possible. Known locations should be recorded from informant data, collections examined and documented (photographs, drawings of representative artifacts, summary statistics, etc. are all appropriate), and the names and addresses of informants recorded. Again, this information should contribute to the development of explicit expectations regarding site locations.

## Historic

In addition to the general sources of information outlined above for prehistoric resources, investigators should consult sources of environmental and historical information which may direct them to the locations of historic archaeological sites. Background research should include a consideration of the following categories of information:

a) Information on the transformation of the landscape since European settlement: this might include maps prepared by early settlers and surveyors, atlases (Pomeroy, Sanborn, etc.), county histories, early editions of the U.S. Geological Survey topographic maps, or early photographic records.

b) Information on settlement history: this might come from regional and local histories, maps, or informants. Both primary and secondary sources may be informative. In general, however, extensive use of primary sources will not be necessary for Phase I investigations.

c) Information from the survey files of the PHMC (BHP) or local historical survey organizations on the results of previous historic structure inventories.

## Urban

In addition to the information sources outlined above, the following considerations may apply to urban situations: documentary research is by far the single most important technique in the identification of urban archaeological sites or resources. Detailed research, however, is beyond a level necessary to fulfill Phase I objectives of resource identification and preliminary assessment of resource condition. Documentary research should be performed as early in the project planning phase as possible and certainly well in advance of the proposed onset of construction. At a minimum, this research should obtain:

a) information on the pre-urban natural environment, focusing on its relationship to prehistoric and early historic (contact or post-contact) peoples.

b) information on the development of the project area over time, from its pre-urban horizons through to its urban florescence, typically during the twentieth century. The scope of the Phase I research should be broad but integrative and should incorporate discussions of broad social, economic, architectural, technological, ethnic, and other historical and cultural trends in the project area, specifically as these relate to the possibility that potentially significant subsurface cultural resources are or are not likely to be preserved. For example, the effect of municipal services such as water, sewer, and trash disposal should be considered.

c) information on the effects of the urbanization process on the project area; in particular, this phase of investigation should assess the possibility that earlier construction destroyed or has significantly disturbed any pre-existing archaeological sites or features through grading, blasting, excavation for cellars, subways, sewers, etc. The information should document, if possible, the extent to which earlier construction techniques and projects affected the potential preservation of deeply buried cultural resources.

d) the minimum level of documentary research for a Phase I archaeological investigation in the urban environment includes the examination of the following:

i) applicable general or specific secondary histories;

- ii) applicable historical and archaeological survey or excavation reports;
- iii) applicable federal, state and local historic property registers or inventories.
- iv) historic maps, atlases (especially the Sanborn or other insurance maps), photographs, and other primary sources as appropriate to achieve the overall objective of identification of potentially significant cultural resources in the project area and an assessment of their condition of preservation;
- v) in some cases, additional primary documents such as deeds, tax assessments, insurance surveys, census data, road docket, city directories, or other public and/or private records. Additional or more detailed historical documentation may, however, be required in successive work phases as recommended by the BHP.

It should be noted that, in many cases, the documentary research will indicate that potentially significant archaeological sites, features, or contexts are or were once present in the project area. However, it is often possible to demonstrate, by documentary research into previous land uses, that such sites, features, or contexts are no longer likely to be preserved. In cases where the documentary record is found to be sufficiently complete, specific, and unambiguous in its demonstration of the destruction of potential cultural resources, a report detailing this finding normally will suffice to meet archaeological survey requirements, with the concurrence of the BHP.

In certain cases, particularly those involving a previously identified, historically significant area such as an urban historic district, informants often can provide historical information that may be useful for identifying archaeological resources. The informants usually will be professional or avocational historians, archaeologists, genealogists, urban planners or archivists who have spent much time studying the vicinity or historic period of the project area.

### Submerged

Documentary research is by far the single most important technique in the identification of underwater archaeological sites or resources. For this reason, and because it is both time and cost-efficient, documentary research should be performed as early in the project planning phase as possible. At a minimum, this research should include:

- a) A consideration of the prehistoric environment, focusing on prehistoric and early historic (contact or post-contact) shore/bank use and previous shore/bank lines.
- b) A reconstruction of the development of the project area over time, from early prehistoric times to the twentieth century. The scope of Phase I research should be broad but integrative and should incorporate discussions of broad social, economic, architectural, technological, ethnic, and other historical and cultural trends in the project area, with an emphasis on their relationship to potentially significant submerged cultural resources. For

example the effects of levee construction, dam construction, and dredging should be considered.

c) A discussion of the effects of maritime development on the project area; in particular the possibility that earlier construction destroyed or has significantly altered pre-existing archaeological sites or features through dredging, harbor expansion, pier/dock construction, etc.

d) Documentary research for Phase I archaeological investigations in the submerged environment includes an examination of the following:

i) Applicable general or specific secondary histories;

ii) Applicable historical and archaeological survey or excavation reports;

iii) Historic maps, atlases, photographs, navigation charts, and other primary sources as appropriate to identify potentially significant submerged cultural resources in the project area and to assess their condition;

iv) In some cases, additional primary documents such as deeds, tax assessments insurance surveys, census data, naval records, admiralty records, ships' manifests, or other public and/or private records should be consulted. In general, detailed research into such records beyond a level necessary to identify and assess submerged resources is not required at the Phase I level. More detailed historical documentation may be required during site assessment or data recovery work.

v) Interviews with local watermen, the family members or descendants of watermen, and the local diving community may also prove to be valuable.

It should be noted that, in many cases, documentary evidence will indicate that potentially significant submerged archaeological sites, vessels, or contexts are or were once present in the project area. However, it is often possible to demonstrate by further research that such sites, vessels, or contexts are no longer likely to be preserved. In cases where the documentary record is found to be sufficiently complete, specific, and unambiguous, and clearly demonstrates the destruction of potential cultural resources, a report detailing these results will normally meet archaeological survey requirements, with the concurrence of the BHP.

### Field Testing

Field testing will either confirm or fail to verify the expectations developed during the site visit and background research. For this reason, field testing should normally follow these steps. In any case, the field methodology should reflect familiarity with the relevant background information and informed decisions based on an understanding of that information. There is no standard set of techniques which may be mechanically applied in all situations. All methodologies should be derived from and justified by the situation and the background information on the area. As noted above, the procedures outlined here are a

suggested minimum. The general techniques described below have been applied with success in numerous cases: alternatives are acceptable if explicitly justified. It is recommended that consultation with BHP be conducted prior to initiating a project, or at the early stages of a project. In developing alternatives, it should be kept in mind that the goal of Phase I field testing is the identification of all archaeological sites in the project area as required in CFR 800.4. It should be emphasized that all sites, including low density and small manifestations, are potentially eligible for the National Register. Further, sites which contain significant paleoenvironmental data contributing to our understanding of cultural adaptations may also be eligible. Consequently, Phase I surveys should be designed to maximize the identification of archaeological sites. Weather conditions are an important factor in performing good quality field work. It is strongly recommended that archaeological testing not be conducted during cold and/or wet conditions.

### Prehistoric

Field testing according to the following standards is expected for Phase I projects unless alternative methods have been developed in consultation with the BHP. Minimum field testing procedures designed to identify archaeological resources include:

a) a thorough ground surface inspection or "walkover" of the entire project area, including a thorough examination of areas where topographic slope exceeds 15% for the presence of rockshelters, rock ledges, or caves that may preserve archaeological sites. Ground conditions and topography of the survey area should be clearly documented with a photographic record in the report.

b) in areas where adequate ground surface visibility is already available (for example, in a recently plowed field) consultants should attempt to determine the percentage of surface visibility, i.e. non-vegetated ground surface that is open to direct inspection. Such areas should be systematically walked and inspected at intervals of 5-10 meters. If archaeological resources are visible at ground surface, at least form tools (including pottery rim sherds) and a representative sample of all lithic debitage and other artifacts should be retrieved as part of a controlled surface collection. Alternatively, piece plotting of specimens in situ may be employed, but an estimate of artifact density must be made. All artifacts collected during a Phase I survey should be located by provenience unit unless left in place.

c) in project areas of less than 15% slope where adequate ground surface visibility is not readily available (i.e. less than 80% visible), several methods may be employed in the attempt to identify archaeological sites. Again, it is recommended that the consultant propose a predictive model for locating all sites potentially eligible to the National Register, and justification for doing so.

i) Shallow (no deeper than normal) plowing, disking and adequate watering of former agricultural fields may be used to improve ground surface visibility if the area has been previously plowed. Piece plotting of exposed resources may be substituted for the controlled surface collection.

ii) Hand excavation of 0.5 meter x 0.5 meter shovel probes (or 0.57 meter diameter circular pits) may be employed where plowing and disking is not feasible and must be employed in areas with an undisturbed (unplowed) topsoil. Probe interval (i.e., the distance between two adjacent probes) should be 15 meters in high probability areas (or 16 units per acre), 25 meters in medium probability areas, and 30 meters in low probability areas. The location of shovel probes in low probability areas may be intentionally selected rather than using a standard interval pattern but the density should equal approximately six probes per acre. A surface examination with a ground visibility of more than 50% may be substituted in low probability areas for shovel probes. All shovel probes, whether in high or low probability areas, should be excavated in natural stratigraphic levels or 10 cm. levels within natural levels (with the exception of the plow zone). In order to test the predictive model utilized for a particular study area, a sample of low to moderate probability areas should be shovel tested at 15 meter intervals. This may include, for example, areas at greater distance from surface water sources or locations along moderately sloped terrain. Predictive models in current use can only be refined by continued field tests. Otherwise, the effectiveness or suitability of site location models will never be truly known.

Fill from each natural level in each probe must be screened through ¼ inch diameter hardware mesh to test for the presence of cultural resources. Each shovel probe must be excavated to levels in which no archaeological materials could occur (due to the age or depositional environment) or bedrock or, in the case of unusually deep soil profiles, to at least one meter below the depth of the disturbance. If sterile soil/bedrock has not been reached at a depth of 50 cm, procedures for deep testing (see iii below) can be followed. It is not recommended that shovel probes extend below one meter in depth. It should be recognized that many sites may be buried at moderate depths due to colluvial activity. It is suggested that testing should be employed to a depth of at least 10 cm below the A horizon or the deepest cultural component.

When cultural resources are identified in a single shovel probe but not in adjacent tests, either additional shovel probe units should be dug within the 15 meter or 25 meter probe interval, or the initial shovel probe should be expanded to a 1 meter x 1 meter test unit. This is necessary to insure against the phenomenon of "stray finds".

iii) Deep testing is required in areas where archaeologically sensitive surfaces may have been covered by colluvial, alluvial, or aeolian deposits. Floodplains and colluvial slopes are good examples. A geomorphologist or pedologist with experience in the interpretation of stratigraphy must be consulted in the identification of potential buried soil horizons as described in Part III of Principles in the Treatment of Archaeological Properties. The interval for testing in deeply stratified contexts is 30 meters with 1 meter x 1 meter of dirt screened for each 30 meter interval (or four units per acre). Deep testing should continue until confirmed Pleistocene surfaces are identified unless the project impact is narrowly confined and the depth of impact restricted, i.e. water and sewer lines, in which case testing should continue 1.0 meter below the depth of impact. In areas that are likely to contain deeply buried archaeological deposits, testing should continue to Pleistocene surfaces during the Phase I survey even if a site is first defined at ground surface or in any of the post-Pleistocene deposits. Ground water problems should be discussed with the Bureau.

A backhoe may be utilized to make the stratigraphic cuts if test units are placed in the walls of the backhoe cut and all test unit fill is sifted through ¼ inch mesh. The interval for backhoe cuts may be determined after consultation with a geomorphologist or qualified pedologist, and after review of any existing coring data. (However, the test for artifacts in high probability areas must be at a frequency of four screened one meter units per acre.) In some cases, additional coring data may be necessary to pinpoint the location of deeply disturbed deposits as well as high potential areas.

All geomorphological studies must address the issue of soil formation and its relationship to the probability of site location. A model such as Vento and Rollins (1991) should be used.

Additional geomorphological or soils studies may be appropriate where particularly complex or unusual conditions of soil deposition exist. If in doubt, the BHP should be consulted on appropriate testing.

## Historic

The details of field testing for historic period archaeological resources will be determined by the results of the background research and by the expectations as to the nature of the historic archaeological resources. In addition to the procedures outlined above for prehistoric sites, or in place of some of them, specific techniques designed to identify historic period sites will be appropriate. The distinctive character of sites of the historic period must be considered as well as the generally greater availability of independent documentation for their presence and nature.

The procedures outlined for prehistoric sites will, of course, also locate historic archaeological sites. That is, systematic inspection of plowed fields and shovel testing at regular intervals will generally locate historic period artifacts. In the absence of information to suggest a more appropriate shovel testing interval, an interval of 15 meters should be used in high probability areas.

In some cases, units larger than the standard 50 cm x 50 cm shovel test will be appropriate and in other instances, systematic augering will provide equivalent information on the presence or absence of an historic period site.

Stray finds of historic period artifacts should be treated as in the prehistoric case. However, it is assumed that a low frequency of historic "trash" may be found scattered in agricultural fields. It is probable that this is not worth recording (or saving) as an archaeological site.

## Urban

Archaeological field testing in urban contexts will be undertaken where the site visit, informant interviews, and documentary research suggest that potentially significant

archaeological resources are present or are likely to be present. Phase I field testing is also required if insufficient documentary data exist to permit a valid assessment of the archaeological resource potential of the project area.

The purpose of testing during a Phase I survey is to determine the presence or absence of resources, their location and depth, and to provide information on the testing strategy required for a Phase II survey. If the project area is not accessible, subsurface testing is not required during Phase I survey. Where the project area is accessible, testing is expected. Guidance on subsurface testing in urban areas is contained in the following section on Phase II survey. In general, testing will not exceed that needed to confirm or contradict the expectations of the documentary research.

If the results of the site visit, informant interviews, documentary research, and field testing (where appropriate) indicate that archaeological resources potentially meeting the National Register criteria exist or are likely to exist in the project area, but such resources are so deeply buried that the proposed project will not intrude upon them, or if they are in a portion of the project area that will not be disturbed, the report should clearly document this situation.

If the results of the site visit, informant interviews, documentary research, and field testing indicate that archaeological resources potentially meeting the National Register criteria exist or are likely to exist in the project area, and that the proposed project will disturb or destroy them, then a Phase II archaeological investigation is required. The development of a Phase II testing program should be undertaken in consultation with the BHP and with BHP concurrence.

### Submerged

A Phase I archaeological survey is required if documentary data are insufficient to permit a valid assessment of the archaeological resource potential of the project area.

The purpose of the Phase I survey is to determine whether or not cultural resources exist, to document their provenience, and to provide information on the testing strategies required for a Phase II survey. Due to the restrictive nature of submerged environments, sub-bottom testing can be accomplished through electronic or acoustic remote sensing. It is suggested that one or both of these methods be employed. Any anomalies detected by these methods should be investigated by a diving team. Another method that has proven successful is a site swim-over. This method, however, rarely detects sub-bottom cultural remains and is seldom efficient in less-than-perfect environments.

If the results of the site visit, informant interviews, documentary research, and field testing indicate significant submerged archaeological resources exist or are likely to exist in the project area and those resources may be affected by the proposed undertaking, a Phase II archaeological investigation is required. The development of a Phase II testing program should be undertaken in consultation with the BHP.

## Analysis

Although the purpose of Phase I testing is to document the presence or absence of archaeological sites, artifacts recovered during Phase I testing should be treated according to current standards of archaeological documentation and keeping in mind the potential contribution of Phase I information to subsequent testing and evaluation or mitigation efforts. Thus, basic identification and tabulation of artifacts should be a goal of the analysis, rather than more specific problem-oriented analyses. Radiocarbon dating, for instance, will not normally be necessary in a Phase I analysis, nor will the analysis of minimum number of individuals (MNI) or vessels for faunal or ceramic materials. Exceptions to this would be buried occupations where absolute dating would aid in the interpretation of both the archaeological and the geomorphological deposits.

In general, artifacts will be classified by material (lithic, ceramic, metal, etc.) and functional type (e.g., projectile point, nail, flake) and tabulated by count and percentage and by frequency per unit area or volume (e.g. square meter, cubic meter, acre, or other sampling unit). Whenever possible, cultural/chronological types (e.g., Brewerton corner-notched point, Levanna Cord-on-Cord, etc.) and named material types for lithic artifacts (Onondaga chert, Flint Ridge chalcedony) should be specified. However, when in doubt, under-specify: an unambiguous general label is preferable to an unsupported or questionable specific label. The goal of Phase I testing should again be kept in mind: to document the existence of an archaeological site and provide some guidance to Phase II investigations.

For historic period sites, in addition to the above ground classes of material items, analyses should specify and tabulate ceramics by type (paste, ware, manufacturer, if known); metal by type and manufacturing technique, if known; and glass by color and type. Other materials should be tabulated by type and number. Abundant and generally non-diagnostic materials (e.g., slag) may be indicated as present or absent.

Any identifiable faunal or floral remains should be tabulated by taxon and number, if possible.

## PHASE II GUIDELINES

### Background Research

#### Prehistoric

The purpose of background research in Phase II investigations is to define the potential eligibility of the site for listing in the National Register of Historic Places. This will normally involve:

a) Summarizing the results of previous investigations (both Phase I survey information, P.A.S.S. form data, and the results of any non-CRM investigations). This should include tabulation of Phase I artifact and feature information.

b) Defining the regional or local settlement pattern of which the site under study was a part. Regional surveys, CRM surveys, previous archaeological investigations of sites in the region or similar sites may all be relevant to this task. The investigator should demonstrate a thorough grasp of the relevant literature.

c) A discussion of geomorphology, soils, local climate and biota as they relate to (a) site formation and preservation processes, and (b) local or regional settlement systems.

d) A summary of the types of archaeological data that the site may be expected to produce, on the basis of a consideration of analogous sites and previous information from the site under study.

## Historic

Supplementary documentary research beyond that conducted at the Phase I level is necessary to place the project area and its archaeological resources or classes of resources into their proper historical and cultural contexts. This allows a more comprehensive understanding of the significance of the resources and, accordingly, of their potential eligibility for the National Register. This phase of documentary research is necessarily more intensive and specific than that conducted at the Phase I level and should address the following considerations:

a) a more in-depth understanding of the historic character of the project area including the history of property ownership, occupation, land-use, and development. As an example, if the area was primarily industrial in character, the industrial and technological history of the project area should be documented. If the project area was largely residential, more detailed information on, for example, its socio-economic and ethnic character should be assembled.

b) site-specific documentary data on properties to be examined by archaeological field testing (see next section) are particularly important in this phase. This is necessary so that the empirical data derived from the archaeological testing can be interpreted more fully and in historical context.

c) documentation of significant persons or events associated with the project area or sites in the project area should be undertaken. This will allow a more informed evaluation of the project area in light both of the anthropologically-oriented National Register criteria and also those linking archaeological resources with significant events or people.

It should be noted that all the Phase II documentary research outlined above should be conducted prior to any field testing; however, this may not always be possible. In such cases, sufficient documentary research should be conducted prior to the field testing, so that archaeological data will not be evaluated and interpreted in a historical vacuum and so that basic decisions may be made as to field strategy and appropriate techniques.

The minimum level of documentary research for a Phase II archaeological investigation includes examination of the following types of information.

a) Primary documents not previously consulted at the Phase I level should be examined and assessed for the project-relevant information they contain. Typical classes of documents that should be consulted include deeds, tax assessments, insurance surveys, census data, road docket, city directories, maps and atlases, city plots, buildings permits, lithographs, photographs, and other public and private records as may be appropriate for achieving the goals of the Phase II investigation.

b) Historic properties which, on the basis of Phase I information, appear to have high potential for archaeological significance (i.e., National Register eligibility) should be subjected to briefs of title.

c) Secondary literature not consulted at the Phase I level and which pertains to the historical, cultural, or processual contexts of identified sites or properties should be consulted in order to address more fully issues of site significance and National Register eligibility.

## Urban

Additional and intensive background research will usually be necessary to define the potential significance, extent, and distribution of the artifact concentrations and features identified in the Phase I study. Since Phase I field testing in urban situations, will normally be very limited, background research is a particularly crucial component of urban Phase II studies in defining the nature and potential of the expected site. It is particularly important in urban contexts that a major portion of the documentary research should be completed prior to fieldwork, since the results of this research will guide Phase II methodology and determine the appropriate techniques and testing locations. Particular attention should be given to the history of city services, water, sewer, and trash collection, as they affect the nature of the archaeological record. Researchers should consult the reports of earlier archaeological investigations, ordinances and resolutions, health department records, utility company records, and other municipal records and maps, as needed. The differences between public policy and actual practice should be recognized in predicting the existence of archaeological resources.

## Submerged

Documentary research is of utmost importance for Phase II survey of submerged archaeological remains.

a) If a vessel is located, documentation of its history, construction, and importance must be examined. Significant events and individuals associated with the vessel should also be noted.

b) If other cultural remains such as rock-filled timber cribs for city water intake, chevaux-de-frise, submerged maritime commercial sites, or submerged sites are located, research should focus on their construction and purpose. Such research should include the

history of the industry and technology of the project area, as well as its socio-economic and ethnic affiliations.

c) If the area is believed to contain submerged historic resources but has been covered with fill to such an extent that remote sensing techniques are impractical, the documentation should be as complete as possible, incorporating maritime influences, commerce, industry, and residential patterns on the site.

d) The minimum level of documentary research for a Phase II archaeological investigation would include, but not be limited to, those discussed above for historic and urban contexts.

### Field Testing

Field testing in Phase II studies should be oriented toward the recovery of information critical to the determination of eligibility research potential and integrity. Specific methods and techniques will, therefore, be developed on the basis of the results of background research. Despite the expected variability of field methods, certain goals will be common to all Phase II investigations:

(a) Boundary definition is a necessary goal, both to allow a complete evaluation of site significance and to allow an evaluation of project effects. For projects which provide a transect of a portion of a site (eg. pipeline or sewer line rights-of-way) the extent of the site within the right-of-way must be defined. It is highly desirable, although seldom possible, to define the extent of the whole site, including the portions outside the project area. Whenever possible, project planners should consider the possibility of extending testing outside project impact areas to allow for a more accurate definition of site boundaries and more complete characterization of the site. Some type of permanent datum must be established to re-locate Phase II units both horizontally and vertically.

For projects encompassing one or more archaeological sites in their entirety, the boundaries of the site(s) within the project area must be determined. Methods appropriate to prehistoric and historic period sites are detailed below.

(b) Determining the presence and nature of archaeological features is typically a primary goal of Phase II studies. Although the presence of features may not be necessary or sufficient to establish National Register eligibility, features are often important sources of scientific information and must be considered as factors in the determination of eligibility. In considering the importance of features, the precise nature of the information they may produce must be established.

(c) Although detailed studies of artifact distribution and activity areas are appropriate to Phase III data recovery investigations, the potential of a site to yield such information should be considered at the Phase II level. In general our understanding of intra-site artifact patterning and its relationship to social organization is not well documented in Pennsylvania. The definition of specific occupations or activity areas and estimates of relative group size and social composition are extremely important research questions. Thus, Phase II field

studies should establish (i) surface artifact distributions and (ii) the relation of surface distributions to subsurface features and artifacts. This can best be done by a more intensive application of methods used in Phase I studies. It should not be assumed that there is a clear correlation between surface artifact distributions and subsurface features: this correlation must be demonstrated by testing.

For sites which are not culturally stratified (i.e. surface plowzone sites), artifact patterning must be addressed. This will involve analyzing the distribution of different lithic types and artifact types (for example types of debitage).

(d) Dating. Phase II investigations should aim for (i) the recovery of a sufficient number of chronologically diagnostic artifacts to date the site or its components, (ii) the recovery of datable carbon samples, or (iii) the recording of geomorphological data which may provide approximate chronological limits to the occupation of the site. The BHP encourages the collection and dating of carbon samples in all Phase II and Phase III studies, both for the purpose of determining the eligibility of the site and for the broader goal of building regional chronologies. It is recognized that diagnostic artifacts, tool assemblages, or identifiable activity areas should be associated with the radiocarbon samples in order to make them useful chronological tools. On deep sites, radiocarbon dating should be used to sort out stratigraphic problems.

(e) Because of the obvious importance of stratified sites in establishing regional or local chronologies, culture histories, and cultural system interrelationships, the identification of stratified deposits should be a primary goal of Phase II studies. Datable stratified deposits at a prehistoric site in Pennsylvania are important but not necessary in determining a site eligible for listing on the National Register.

(f) Botanical and faunal information can yield important information on environment, diet, and subsistence practices. The potential of the site to yield such samples should be evaluated by the systematic collection and examination of soil samples. The development of a valid sampling design should be part of all Phase II methodologies.

### Prehistoric

#### Boundary Definition

When possible, and when the investigator has ascertained that the topsoil has been previously plowed, the site area should be examined in an intensive walkover after plowing, disking and rain-washing, to produce adequate visibility. Boundaries should be defined by the observed surface distribution of artifacts.

Where surface visibility is restricted by vegetation cover, the placement of additional 0.5 x 0.5 meter units is an acceptable alternative. This testing strategy should incorporate the results of Phase I testing and employ additional tests to define the boundaries for National Register purposes and also to show the limits of construction/development in a project area. A suggested strategy is to place tests at larger intervals (15m or less) in a grid or radial arrangement expanding from the previously defined site area until artifact counts indicate the

approximate limits of the site. Additional tests at 5m intervals or less will then define the site boundaries.

Alternative strategies may be appropriate in certain cases. Such strategies are welcomed if explicitly justified and discussed prior to initiation with the BHP. Portions of the boundary definition may be combined with procedures to address other Phase II concerns (e.g. location of features, stratigraphy, artifact distribution).

### Artifact Distribution

The choice of methods to define artifact distributions will, in part, depend on local conditions and the character of the site. Certain techniques, however, have become widely established and have proven to be satisfactory. These are listed below (a-c) and should be useful in establishing artifact patterns. Again, the use of alternative methods is welcomed, if explicitly justified.

(a) Intensive surface collection involves a walkover of the site area at small intervals (5m or less) and a controlled collection of all artifacts. These procedures rely on adequate surface visibility (i.e. at least 80%): the area should be plowed, disked, and rain-washed to maximize the visibility of surface artifacts. Such procedures are appropriate only if it can be ascertained that the topsoil has been disturbed by previous plowing or other action. Where the potential for an undisturbed topsoil exists, other sampling procedures should be used.

(b) An intensive walkover and piece-plotting of surface artifacts (exact provenience) is one alternative technique. Artifact locations should be plotted on maps (using transit or tape) and the artifacts collected and stored by provenience unit (tied to a permanent datum and grid system).

(c) If plowing is not possible systematic test units should be used to sample the horizontal distribution of artifacts. At a minimum, the BHP would recommend 0.5 meter units placed at five meter intervals.

### Features

The relative importance of archaeological features to the determination of site significance will vary from site to site. The presence of features is not always essential or sufficient to define a site as eligible for the National Register listing. The investigator must consider and explicitly define the importance of features to a determination of significance. This decision will guide the choice of methods and techniques. Again, several techniques exist to discover and characterize archaeological features. The use of one or more of these techniques will depend on several considerations: site area, topography, environmental features, Phase I survey results, and other sources of prior information (collector information, accidental natural exposures of in situ features, etc.). If previous investigations (Phase I or a Phase II controlled surface collection) produce artifacts which suggest features may be present, (i.e. pottery, fire cracked rock, Woodland artifacts or high densities of artifacts) the

BHP will usually recommend that the question of their presence needs to be addressed through a field testing program.

All sources of possible information on the presence and location of features must be considered in selecting a testing procedure. If no such information exists and no implications may be drawn from topography and environmental features, a random sampling procedure may be appropriate to reliably demonstrate the presence or absence of features.

Where such information does exist, expectations as to the number and density of features should be used to plan testing. Systematic or intentional testing may be appropriate.

To insure comparability of results, certain procedures should be applied in the treatment of all archaeological features encountered in Phase II testing:

(a) Prior to excavation, features should be troweled and cleaned to expose them completely, mapped in plan view, and photographed.

(b) Features should be sectioned and profiled by hand to reveal contours and stratigraphy. Profile drawings and photographs should be made.

(c) If stratified fill is apparent or suspected, the feature should be excavated in natural stratigraphic levels or appropriate arbitrary levels (10cm or less), with plan drawings and photographs, as appropriate.

(d) A sample of fill not less than 3 liters (3,000 cm<sup>3</sup>) in volume should be recovered from each feature for flotation (see below) or from each discrete level within a feature. The BHP recommends that 25-50% of the fill from each feature be collected for later sampling, flotation, and analysis (100%, if less than 3 liters).

(e) All features should be assigned unique and consistent feature numbers.

(f) All artifacts recovered from features should be bagged and labeled by provenience unit and feature number.

## Sampling

Where no indicators exist as to the probable number or location of features, the investigator should address the probability of feature occurrence. This is especially important when fire cracked rock is present, artifact densities are high or Woodland period diagnostics are present.

One technique that has proven effective and efficient in defining the potential for feature occurrence and evaluating results statistically is a stratified random sampling design which incorporates a significant number of controlled test units.

(a) This approach is appropriate only where the setting of the site and previous results provide no indication as to the presence or location of features.

(b) If features are encountered during this sampling procedure the question of their presence or absence has been answered and a mean and standard deviation for the frequency of features may be calculated. It is, therefore, not necessary to complete the defined number of tests in order to define the probability of features being present in the site (although it may be necessary to do so for other reasons such as to define artifact patterning or variations).

(c) Several factors may influence the sample size: site size (area); the date and cultural affiliation of the artifact assemblage and the presumed date and significance of the site in the regional settlement system; and available information on comparable sites. The advice of BHP staff should be sought if any questions arise.

(d) In general, Phase II testing should not unnecessarily disturb the site; that is, disturb the site more than is necessary in testing to determine National Register eligibility.

(e) This approach will, of course, also provide a means of obtaining a representative artifact sample, horizontal and functional intrasite variation and it will produce representative stratigraphic profiles. Test units should be excavated, therefore, by strata and with all soils screened through ¼" mesh.

Systematic or intentional testing schemes should be designed on the basis of available information regarding features. The purpose of this testing is to obtain a representative sample of features and information regarding their distribution within the site. Sample size will be determined by known or expected feature distributions based on available information. Relevant factors, will, therefore, include: site area, topography and environmental features, soils, expected feature size and distribution, disturbance, etc.

Test unit size should be selected with the above factors in mind but units must be at least of a size to permit positive identification of features (1m x 1m minimum).

Test unit placement or intervals in a systematic sample will be determined on the basis of the above factors and sample size.

Sample size must be determined by an explicit testing design including a consideration of the factors listed above. A sample size should be chosen which will result in the testing of each defined sub-area within the site and yield quantitative statements on feature occurrence. In general, sample size and sampling strategy must be justified in terms of the available information on features.

### Mechanical Topsoil Removal

Where the absence of stratification in the A horizon can be demonstrated and disturbance/mixing is evident (i.e. plow disturbance), the mechanical removal of topsoil to

expose features may be appropriate. This technique should only be used following the systematic collection of an artifact sample.

This, like the procedures described above, is a sampling procedure and should be explicitly justified in terms of the available data. A systematic, intentional, or random sampling design may be used [see (a) and (b) above] but the chosen design must be justified and produce statistically reliable results. The number, size, and placement of mechanically stripped test units will be determined by the appropriate sampling design. In most cases, Phase II testing should expose at least 40% of the site area (Shott: 1985); this does not represent a major disturbance to the archaeological remains if the plowzone is disturbed and if the cultural information from this horizon has been thoroughly sampled by this stage of the investigation. Mechanical topsoil removal should always be carefully monitored by an archaeologist to insure that the excavation does not extend below previously disturbed soils. Mechanical stripping of the topsoil must be followed by hand-excavation with shovel, hoe, trowel, etc, to clean the subsoil surface and expose any features.

As noted above, since sampling for archaeological features by mechanical topsoil stripping does not produce a controlled artifact collection, this procedure must always be used in conjunction with and following the systematic collection of artifacts by other means. In plowed fields with adequate visibility, intensive surface collection (see above) may be used. Where vegetation obscures the surface, and plowing, disking, and rain-washing is not possible or not convenient, intensive shovel testing may be substituted. The observed distribution of artifacts will be a factor in determining the distribution of test units for locating features.

#### Remote and Indirect Sensing Techniques

Resistivity, magnetometers, sonar and radar scans, chemical tests, and other remote or indirect sensing techniques have been refined and used with considerable success in certain cases. The success of these techniques however, is highly dependent on several factors: bedrock and soil conditions, feature size and composition, and the depth of features, as well as the skill and sophistication of the user. Although remote sensing techniques may prove, in certain instances, an efficient means to obtain information on feature distribution, cost and efficiency must be weighed against the reliability and completeness of results. Remote sensing techniques do not allow for the characterization of features and must, therefore, be combined with a program of selective excavation or exposure of features. They are a complement to, not a substitute for, subsurface testing. Certain conditions -- bedrock at or near the ground surface; consistently or periodically high water tables; soils with hardpans, fragipans, gravel concentrations, and high iron contents -- preclude the use of these techniques.

The effective use of remote sensing techniques requires adequate provenience controls. When employed, these techniques must be used with an established grid system, preferably with small intervals between grid points (inter

vals of 1m may be necessary for certain techniques). The BHP suggests that researchers consult both with its staff and with specialists in these techniques prior to their use.

## Stratigraphy

Stratified archaeological deposits are crucial to the definition of regional chronologies and cultural relationships. Documenting the potential for stratified deposits at a site will be a primary concern in Phase II testing. This will frequently occur in conjunction with other procedures (e.g. those designed primarily to sample artifact distributions or locate features). In many cases, the potential for stratified deposits will have been established during Phase I testing, in which case Phase II procedures will document artifact variation and the extent of the stratified deposits. Regardless of the details, Phase II studies must enable the investigator to make definitive statements regarding the presence and extent of stratified deposits and to discuss the relationship of stratification to National Register eligibility.

The investigation of stratigraphy should involve a consideration of both the potential for stratified deposits -- a characterization of the geomorphology of the site -- and the field results documenting this potential. Supplemental geomorphological investigations may, therefore, be an important part of Phase II testing, especially where there are indications of alluvial, colluvial, or aeolian soil deposition or in rockshelters with substantial soil deposition.

In any case, field testing should include sampling of the soil to the bottom of Holocene levels to document the presence or absence of stratified deposits throughout the site. This will insure the identification of earlier occupations (e.g. Paleoindian through Middle Archaic) which are very significant resources but rarely found in undisturbed contexts. The number and placement of such tests will depend on the pedological characterization of the site (i.e. the pattern of soil deposition, erosion, and development). Field results may be obtained from columns excavated while testing for features and artifacts but must convincingly document the presence or absence of stratified deposits and their distribution across the site.

## Dating

The dating of archaeological components at a site is an essential condition for evaluating site significance. In most cases, the artifact assemblage resulting from surface collection and test excavations will contain some temporally or culturally diagnostic artifacts and permit at least a preliminary dating of the site or some of its components.

Such dating through diagnostic artifacts is never precise. There is considerable uncertainty regarding the precise dates of many artifact styles commonly considered time markers. Certain artifact types considered diagnostic of a particular period may, in fact, have been made and used or reused through several of the common culture historical periods. Artifacts may be assigned to a certain class incorrectly. Diagnostic artifacts may be found in general surface collections or in questionable association with cultural features. All these problems and others beset the use of artifacts as time markers.

Perhaps the most glaring problem is the absence of diagnostic artifacts from many sites which might otherwise be considered significant. Sites with abundant features, faunal and botanical remains, or human skeletal remains may have few or no diagnostic remains.

In all cases, therefore, the BHP recommends that diagnostic artifact dating and stratigraphic relationships be confirmed or cross-checked with some absolute dating technique. Where diagnostic artifacts are absent but the site is otherwise potentially significant, it is essential that an effort be made to date the site absolutely if the site/component contains clearly interpretable remains.

The most common, most reliable, and least expensive absolute dating technique, and the one most appropriate to the environmental and archaeological conditions of Pennsylvania, is radiocarbon or carbon-14 dating. Phase II investigations should include plans for the collection of carbon samples from any features encountered, regardless of which samples or how many are to be processed. The latter decision may be made arbitrarily beforehand or on the basis of the results of the Phase II fieldwork. Carbon-14 dating should certainly be pursued in investigations where no diagnostic artifacts are discovered or when the sample of diagnostics is small or derives from questionable contexts. The BHP encourages the dating of carbon samples whenever possible, for the purpose of building regional chronologies. The use of this method for dating a site is a sampling process and it would not be un-reasonable to get twenty-five dates from a large, complex site.

Alternative absolute dating techniques -- thermoluminescence, hydration of glasses or cherts, archaeomagnetism -- have rarely been attempted in Pennsylvania. We strongly recommend experimentation with such techniques, but they are not normally appropriate or expected in Phase II studies.

#### Botanical/Faunal Analysis

The potential of an archaeological site to offer data on environment, subsistence, and diet is largely dependent on the possibility of recovering and analyzing a sample of animal and plant species contemporary with and used by its human occupants. The identification of this potential will, therefore, be one of the primary concerns of Phase II studies. Unless the site is stratified, the collection of samples from general contexts (i.e. not from definable features) will not be productive. Therefore, attention should be focused at most sites on the retrieval of faunal and botanical remains from features through screening (¼" mesh or finer) and flotation. The flotation technique has been extensively discussed in the literature and will not be described here. Any of the several standard techniques and types of apparatus are acceptable, if consistently applied and fully described in the report.

At stratified sites, potentially significant information may be gained from the analysis of carefully excavated and provenienced columns. Flotation of the soils from such columns should be planned for all stratified sites, in addition to the flotation of feature contents. In general, such columns should be at least 30cm x 30cm in cross-section, to provide sufficient volumes of soil for flotation, and may be taken in conjunction with soils samples for pedological or geomorphological analyses.

Analysis of flotation samples during Phase II investigations is oriented toward the demonstration and definition of research potential as a condition of National Register eligibility. The analysis, therefore, will not be exhaustive or detailed, beyond the level necessary to define research questions which might be addressed by data from the site. Sorting of specimens to the generic or specific level and counts of specimens should permit the development of research questions. Such analysis may require the services of a specialist or the careful use of an adequate type collection.

## Historic

### Boundary Definition

In addition to the techniques which were described for prehistoric sites above, factors peculiar to historic period sites may suggest modified procedures.

Background documentary research may indicate probable boundaries to the site and associate these with visible natural or artificial features. Even in the absence of documentary information such features may suggest historic site limits.

In many cases, boundary definition for historic period sites will be arbitrary, reflecting the difficulty of defining a "site" in an historic complex, particularly in the urban setting. The results of background research will guide the definition of "site" and the choice of site boundaries.

### Artifact Distribution

Although all the techniques previously described for prehistoric sites may be applied to historic period sites, it is to be expected that documentary evidence on the size and internal organization of historic sites will guide the artifact collection strategy.

The treatment of surface sheet deposits of historic period artifacts will be guided by the available background information. The possibility of associating these deposits with a particular activity or dating them to a particular period of interest, is important at the Phase II level.

### Features

All the techniques described for prehistoric sites may be applied to historic sites. However, the greater availability of information on feature type and distribution for historic sites will generally suggest a systematic or intentional sampling strategy (see above).

The larger size and more substantial nature of many historic period features (e.g. foundations, wells, privies) make the use of remote sensing techniques (see above) in conjunction with selective subsurface testing appropriate in many cases. There are, however, limitations to the use of these techniques, as noted above. Environmental conditions, as well as the expected nature of features, must be carefully considered in deciding to employ these techniques.

The typically more substantial character of most historic site features, the standardization of many later artifact and feature types, and the availability of documentary evidence will influence the treatment of historic site features. Documentation through photographs and drawings at each stage of exposure, cleaning, and excavation is essential (plan and profile views). Various historic site features (foundations for example) will require an approach to excavation modified from that described for prehistoric sites. Wherever possible, however, the general approach used for prehistoric sites should be applied to historic site features: that is, (a) the exposure of the feature, first in plan, then in profile where possible; (b) the identification of stratification and the excavation of the feature by natural strata, if present, or arbitrary strata, if stratification is suspected; and (c) the collection of a sample of fill for flotation and analysis. The sample size for flotation should be at least 3 liters (or 100%), although the fill sample collected may be less than 25-50%, if the context and comparative data suggest that a large sample would be redundant or unproductive.

Sealed features that may contain large quantities of artifacts, such as deep privy or well shafts, may not require complete excavation at the Phase II level. The emphasis in this phase should be on the recording and evaluating of such features. The assumption is that many such features will contain large quantities of artifacts, some of which may provide significant information if excavated, others of which may not. As there is no practical way to test the entire depth of a well or privy shaft, at the Phase II level of investigation it may be appropriate to excavate them down to the beginning of (into but not through) apparently archaeologically significant levels. Testing should be sufficient to determine the origin of feature fill and using a probe to determine the maximum depth is frequently useful.

### Stratigraphy

The general approach suggested for prehistoric sites applies to historic sites as well.

### Dating

The accurate and precise dating of historic period components is usually an essential aspect of evaluating site significance. Sites should be dated using ceramics, glass, and other datable classes of artifacts as well as using historic records. If large assemblages of suitable artifacts have been recovered pipe stem and mean ceramic date formulas or other appropriate analyses should be applied. Each of the principal contexts or components of a historic site should be dated.

### Botanical and Faunal Remains

See section above.

### Urban

Because of the particular difficulties associated with archaeological testing in an urban setting, a work plan should be developed by the project sponsor and the cultural resources

consultant in consultation with the BHP. The plan should be submitted for BHP comment well in advance of the proposed construction activities.

Phase II work in the urban setting should be undertaken to define and evaluate preserved archaeological components, to assess the research potential (e.g. stratification, artifact content, environmental data), and to determine the integrity of archaeological resources in the project area.

### Boundary Definition

The main problem in boundary definition in the urban situation is deciding on the relevant archaeological unit, the "site". The "site" in question may be a single-event feature, a property, or a city block. It must be noted that the spatial limits of urban archaeological deposits are not usually defined by the same parameters that set the boundaries of non-urban sites. The boundaries of urban archaeological resources (except prehistoric or historic period Indian sites within modern urban settings) often coincide with established physical features of the urban landscape such as historic property lines, streets defining a block, and political or traditional boundaries that define a neighborhood. Consequently, documentary research and analysis of visible landscape features are of major importance in determining the limits of urban archaeological resources. With limits defined prior to fieldwork, field testing specifically to define boundaries is usually unnecessary or is limited to documenting the presence or absence of features within the defined limits of the site and may occur in conjunction with testing for other purposes.

### Other Field Testing

Constraints imposed by urban conditions and the results of documentary research will dictate the testing strategy appropriate to individual projects. The same goals outlined for prehistoric sites (see above) apply to urban sites but the techniques used will vary. The minimum level of field testing necessary for a Phase II investigation in the urban environment should include the following:

- a) An adequate sample size and valid testing strategy that take into account the full nature and extent of the anticipated resources must be developed in consultation with the BHP.
- b) The sample will primarily be non-random; that is, the location and size of test units will be based on available documentary evidence and current site conditions.
- c) The objective should be to delineate the presence and distribution of architectural evidence, site stratification, and features preserved in the project area, and determining whether or not this evidence provides significant information when interpreted in conjunction with available documentary evidence.
- d) Sealed features that may contain large quantities of artifacts, such as privy or well shafts, do not require complete excavation at the Phase II level. The emphasis in this phase should be on the recording and evaluating of such features.

e) The use of mechanized equipment such as backhoes, gradalls, front-end-loaders, pneumatic drills, and the like, will often be desirable for efficient exposure of archaeologically sensitive sites or portions of sites, particularly where extensive fill deposits can be documented. Fill deposits themselves, however, may or may not be significant to the history of the site, and this will need to be determined as part of the Phase II investigation. Emphasis should be placed upon the reasonable and judicious use of mechanized equipment as a practical aid in conducting time and cost-effective archaeology in the urban environment. This equipment is a complement to, not a substitute for, more traditional archaeological field methodologies. The choice of when to employ mechanical or hand excavation techniques in urban archaeological settings must be carefully considered so as to optimize the achievement of the overall goals and purpose of the testing program. The proposed work plan should provide justification for the field methods selected.

f) Careful examination of hand or machine-excavated soil matrices should always be undertaken; however, such soil matrices need not always be screened through hardware cloth. The need to screen samples of this material must be assessed on an individual basis and the proposed work plan should discuss this.

g) Drawings and photographs should document each step of the excavation procedure. A representative selection of these should be planned for use in the final report.

h) Safety precautions should be taken at all times. Nothing in these guidelines is intended to require unsafe working conditions.

### Special Circumstances

Because of the nature of the urban environment and the contemporary development which takes place there, Phase II field testing prior to site clearing or construction is not always possible. For example, if an existing at-grade expressway is slated to be upgraded by depressing the highway surface below grade, archaeological testing prior to Phase III is not practicable. Indeed, it may not be possible prior to construction activities while the existing highway is still in use. Similarly, the exigencies of modern condemnation procedures frequently do not allow access to a standing property, whose basement may contain significant archaeological resources, until just prior to demolition and new construction. For these and other reasons, Phase II testing in the urban environment may not be possible prior to site preparation, condemnation, demolition, and construction activities.

If it is not possible to conduct Phase II testing prior to demolition or construction it may be necessary to determine that archaeological resources which meet National Register criteria are likely to exist in the project area based on the Phase I investigation. If the proposed project is likely to disturb significant resources, which have not been fully identified, a conditional determination of "No Adverse Effect" may be made provided that:

(a) the agency, applicant, or developer agrees to sponsor a professionally conducted and planned pre-construction testing program developed in consultation with the BHP;

(b) should significant resources be identified, the agency, applicant, or developer agrees, in consultation with the BHP, to sponsor a professionally conducted archaeological

data recovery program, coordinated with site clearing, demolition, or construction. The data recovery program must follow the standards of the Secretary of the Interior issued pursuant to the Archaeological and Historic Preservation Act and the National Historic Preservation Act, the guidelines of the Advisory Council on Historic Preservation contained in "Treatment of Archaeological Properties: A Handbook," and be in conformance with "A Comprehensive Plan for the Conservation of Archaeological Resources in Pennsylvania";

(c) the agreement must be contained in writing in an exchange of letters or a Memorandum of Agreement between the involved agency, BHP, and for federal projects, the Advisory Council on Historic Preservation. The agreement must contain a procedure to be followed should the BHP and the involved agency not be able to agree on the significance or treatment of any resources identified; and

(d) the archaeological work is based on a planned research design, developed in consultation with the BHP and Advisory Council.

In fact, archaeological investigations under the provisions noted above may not develop as distinct or discrete phases of work with a normal reporting and review period. Rather, they may require constant feedback from the field investigations and close coordination with the BHP. The nature of the program, in fact, may require rapid decisions on the part of the sponsor and the BHP, with the significance of the emerging data allowing for either an increase in the work effort or a termination of the program if few significant cultural data appear to be present. If the latter occurs, it has become evident that no archaeological resources which meet the National Register criteria are present. If, on the other hand, field testing strategies are either increased or substantially altered, the project has, in essence, entered into the Phase III data recovery phase.

## Monitoring

While in some cases legal responsibilities for the preservation of archaeological data can be accomplished through a carefully planned survey with a contingent data recovery program during construction, monitoring, as usually conducted, is almost never acceptable. Monitoring is often defined as the stationing of an observer to identify archaeological resources revealed during construction as a substitute for a planned survey program. This type of monitoring does not meet agencies' legally-mandated responsibilities to identify all significant resources, to consider the effect of their projects on them, and to provide the BHP and Advisory Council an opportunity to comment. Such monitoring frequently leads to the unnecessary loss of significant resources, increased administrative conflict, expensive construction delays and greater data recovery costs. The BHP will rarely accept this as an appropriate survey or treatment strategy.

## Submerged

Because of the particular difficulties associated with archaeological testing in an underwater setting, a work plan should be developed by the responsible agency or developer

and the cultural resources consultant in consultation with the BHP. The plan should be submitted for BHP comment well in advance of the proposed construction activities.

Phase II work in the submerged setting should be undertaken to define and evaluate preserved archaeological components and to determine the integrity of archaeological resources in the project area.

### Field Testing

Constraints imposed by underwater conditions and the results of documentary research will dictate the testing strategy appropriate to individual projects. The minimum level of field testing necessary for a Phase II investigation in the underwater environment should include the following:

- a) An adequate sample size and valid testing strategy that take into account the full nature and extent of the anticipated resources must be developed in consultation with the BHP. The sample will primarily be non-random; that is, the location and size of the test units will be based on knowledge of the submerged vessel or cultural remains.
- b) Site boundaries and content should be clearly delineated following the implementation of Phase II testing.
- c) Mechanized equipment should only be used where extensive modern overburden is present.
- d) Careful examination of air-lifted and water-dredged soil samples should always be undertaken; and the soil samples should always be screened through mesh or net bagging.
- e) Drawings (and photographs, if visibility allows) should document each step of the excavation procedure. A representative selection of these should be planned for use in the final report.
- f) Safety is of the utmost importance when conducting underwater archaeology. Nothing in these guidelines is intended to require unsafe diving and working conditions. A dive plan and diving standards must be in accordance with a nationally recognized diving organization (PADI, NAUI, SSI, etc.)

### Analysis

The analysis for Phase II studies should specifically address the potential of the site to yield significant information. In general, more extensive analyses than those performed at the Phase I level will be necessary. Both the types of information potentially available from the site and the methods appropriate to their recovery must be defined. The precise nature of the analyses required will thus be determined on the basis of the character of the site and its research potential. However, certain standard minimal types of analysis may be defined:

- a) The tabulation of all artifacts (and ecofacts) by type (see B below) and by provenience unit, stratum or arbitrary level, and feature.
- b) The categorization of artifacts (and ecofacts) in a manner that allows for comparisons with other sites and collections. For stone tools, this includes, at a minimum, classification by functional/technological/morphological type and raw material. For ceramics, classification should reflect type/ware and temper. For floral and faunal specimens, an attempt should be made to classify by taxon (genus or species) and structural part of form (e.g. long bone, scapula, scales, nut, etc.)
- c) When appropriate, techniques such as cross-mending and distributional plotting should be used to assess site structure. This is particularly important in stratified sites.
- d) When available, flotation, phytolith, and constant volume samples should be analyzed to define research questions and potential paleoenvironmental implications.
- e) Radiocarbon samples, when available, should be analyzed, if Carbon-14 dating will appreciably improve the reliability of site chronology or help to define site research potential.
- f) Intra-site artifact patterning and the potential to identify activity areas should be examined. In all cases where a controlled surface collection has been conducted, an analysis of the horizontal artifact patterning must be completed. This should include the mapping of differential artifact densities, artifact types and types of lithic material. These types of analysis are of paramount importance in interpreting the significance of stratified sites.
- g) When features are present, models of feature formation such as Moeller (199) should be addressed. If the site will be undergoing data recovery, this step may be postponed until the Phase III report after consultation with the BHP. If excavations are terminated at the Phase II level, this analysis should be completed at this time.

### PHASE III -- DATA RECOVERY THROUGH EXCAVATION

When an archaeological site that is on or eligible for inclusion on the National Register of Historic Places will be adversely affected by a project, mitigation of effects through data recovery may be necessary. Sites are rarely completely excavated and no investigation can recover all the data from a particular site. Data recovery from an eligible site involves developing an excavation plan which will recover that data which makes the site significant (i.e. eligible to the National Register).

In general, archaeological data recovery involves relatively large-scale excavations, detailed laboratory analysis, and the production of reports containing significant archaeological findings. Previous Phase I and II studies may indicate some of the types of information to be sought; however, sponsors and consultants should seek to identify and recover other categories of information as well. It is essential that detailed Phase III

workplans be developed in advance, and that these workplans be discussed with the BHP prior to implementation.

A suggested outline for Phase III projects is as follows:

#### A. Goal

To recover the significant data contained by a site through archaeological excavation as a mitigation alternative prior to the total or partial destruction of a site.

#### B. Potential Procedures to Achieve Goal

1. Maximize data retrieval through the use of an explicit research design.
2. Determine intra- and inter-site variability in artifact content, feature types, settlement patterns, etc.
3. Disseminate recovered information through reports, publications, lectures, exhibits, and/or tours for the public and the professional community.

#### C. Potential Background Research Activities

1. Formulate hypotheses to be tested. (Ideally these should be developed in the Phase II report)
2. Define suitable excavation strategies with assistance from pertinent participating agencies, such as the BHP, National Park Service, Advisory Council, etc.
3. Summarize previous work.
4. Analyze known collections from the site.
5. Use as many of the literature and documentary resources enumerated above as are relevant.

#### D. Potential Field Procedures

1. Implement total excavation or a system of excavation units that intensively samples all areas of a site.
2. Excavation may be limited to the project right-of-way. For certain projects, areas outside the right-of-way may be sampled.
3. Some of the methods described above for Phase I and Phase II investigations may also be applicable here.

4. Use state-of-the-art methods necessary to maximize data collection regarding stratigraphy, features, artifacts, etc.

E. Potential Artifact Analyses

1. The procedures described above for Phase I and Phase II are also applicable here.
2. Employ appropriate procedures for special artifact analysis and dating techniques, such as radiocarbon and thermoluminescence dating, residue analysis, artifact composition analysis, feature formation analysis, etc.

F. Report Standards (cf. Chapter 3 below)

- G. Dissemination of research results to the public through popular publications, slide shows, videotapes, exhibits, etc.

## Chapter III

### REPORT STANDARDS

#### Report Format

The format outlined below represents a means for organizing data for presentation in archaeological reports. For each phase of a project, this outline should be consulted in conjunction with the standards and procedures listed above to determine what is applicable. While some standardization of reports aids in timely and efficient review of projects by the BHP, it should be emphasized that such standardization is not intended to inhibit particular analytical approaches or the creativity of individual researchers. Instead, the format represents the minimum level of acceptable documentation for archaeological compliance projects. It should be modified as needed to accommodate the special needs of particular projects and project phases.

It should be emphasized that a management summary should include all of the relevant site information, methodology, stratigraphic descriptions, absolute dates, recommendations and so forth in condensed form. This will facilitate the review process, particularly for large scale projects involving several sites and extensive acreage.

#### I. Title Page

- A. Title of report including project name.
- B. Author(s).
- C. Organizational affiliations.
- D. Agency and/or client.
- E. Date.
- F. BHP assigned Environmental Review number.

#### II. Abstract or Management Summary

This section should include the physiographic zone of the project location, size (in acres or hectares), the percent/acreage of the project area previously disturbed, the agency sponsor, radiocarbon dates, number of sites found, how sites were located (i.e. STPs, surface collection, deep tests, informant interviews), what portions of the project area were not covered and why, and any other relevant summary information about the project. The management summary should also include the items listed below. On smaller projects, an abstract will suffice in lieu of a detailed management summary.

- A. Type of project.
- B. Location and size of project (area in metric and English units).
- C. Findings.
- D. Significance.
- E. Project impact.
- F. Recommendations.

### III. Table of Contents

### IV. Lists of Figures, Plates, and/or Tables

### V. Introduction

- A. Purpose.
- B. Project administration and organization; identify sponsors.
- C. Description of proposed project and specific location.
- D. Dates when survey was conducted.
- E. Project constraints, when applicable.
- F. Acknowledgements.

### VI. Project Location and General Description

- A. Physiographic description of project area.
- B. Present land use patterns; e.g., commercial, agricultural, etc.
- C. Description of current conditions (with photographs).

### VII. Background Research

- A. Prepare a concise synopsis of the prehistoric and historic cultural record of the physiographic area and the study unit as well as the local area within which the project is located (refer to A Comprehensive State Plan for the Conservation of Archaeological

Resources, Volumes I and II, 1986). Discuss changing land use and settlement patterns for both the region and the local area.

- B. When feasible and relevant, reconstruct the changing pattern of the environment by period for the project area, based on recently published regional reconstructions of past environments.
- C. Review the results of background research, describing previous investigations, communications with collectors and other individuals, consultation of various site files, etc.
- D. Use the collected information to make predictions about what types of sites are expected in the project area and where.

#### VIII. Research Goals and Design

Describe research objectives and rationale and predictive model(s) used to locate sites.

#### IX. Field Methodology

- A. Limits of total project area versus area actually surveyed, if different.
- B. Sampling design and rationale.
- C. Testing methods and rationale.
- D. Include pertinent maps.

#### X. Field Results

- A. Review site stratigraphy.
  - 1. Include soils descriptions.
  - 2. Include pertinent maps and drawings.
- B. Summary of cultural features: include plans and profiles.
- C. Describe site chronology.

#### XI. Artifact Description and Analysis

- A. Furnish a descriptive artifact inventory, by provenience and class/type.
- B. Use artifact tables to summarize large quantities of material, if feasible.
- C. Reference artifact identification sources.

- D. Include photographs and/or drawings of diagnostic artifacts.
- E. Summarize faunal and floral remains by species, condition and/or provenience, as appropriate.
- F. Summarize sample analyses, as appropriate.
- G. Discuss artifacts utilized in constructing site chronology.
- H. Discuss disposition of the collected data.
- I. Whenever possible, tables, figures, and photographs should be placed on the page following the reference or discussion in the text.

## XII. Interpretations

- A. Discuss the elements of the background research, fieldwork, and artifact analysis that form the basis for interpretation.
- B. Discuss how the sites that were located relate to the archaeological record of the area.
- C. Discuss site function(s), distributions, and settlement patterns.
- D. Assess predictive models and other theoretical constructs, as appropriate.
- E. Assess the reliability of the data.
- F. Assess project results as compared to the goals and purposes of the study.
- G. Discuss future research potential.

## XIII. National Register Eligibility (for Phase II studies only)

Provide sufficient documentation for assessments of site eligibility (cf. attached bibliography). This should be a detailed statement describing significant research which could be conducted at this site, including methods.

## XIV. Assessments of Possible Project Effects

- A. Discuss effects: utilize maps, when appropriate.
- B. Assess whether effects may be adverse (cf. attached bibliography).

## XV. Recommendations

- A. No effect to archaeological resources.
- B. Additional investigation required to determine National Register eligibility and/or appropriate mitigation alternatives.
- C. Mitigation alternatives.
  - 1. Project avoidance.
  - 2. Monitoring.
  - 3. Data recovery.
- D. Other cultural resources appropriate for study by other professionals (i.e. architectural historians, folklorists, etc.)

## XVI. Sources

- A. Referenced cited.
- B. Additional sources.
- C. Maps.
- D. Primary records.
- E. Personal communications.
- F. Artifact collections.

## XVII. Appendices

- A. Qualifications of authors and/or investigators: abbreviated resumes or vitae may be used. (If not on file with the BHP)
- B. Scope of work.
- C. Artifact inventory, by provenience or catalogue unit
- D. When collections will be donated or transferred to PHMC ownership, a deed or statement of artifact ownership (see Curation Standards).

- E. Tables, figures, and plates, if not incorporated into text. Whenever possible, such material should be placed on the page following the reference or discussion in the text.
- F. PASS forms.
- G. BHP Report Summary Forms (Appendix A).
- H. Special reports and/or data.
- I. National Register of Historic Places Registration forms.
- J. Relevant communications with BHP including minutes of meetings.

### Abbreviated Report Format

For projects covering an area of 5 acres or less, which are not stratified and where no sites are found, a shortened format is acceptable. This format should include an abstract which describes the nature of the project, the environmental setting (briefly) of the project area, method of testing, number of test units, and recommendations. The report format should approximate that shown below:

- I. Title page including project name, county, ER#, author and affiliation, client (agency), and date.
- II. Abstract (same as with standard report format)
- III. Methodology
- IV. Results and Recommendations

Appropriate maps (USGS 7½' with quad name shown) and graphics (e.g. photos of survey area) should also be included.

A BHP Report Summary Form must accompany the report.

### Criteria for BHP Review of Archaeological Compliance Reports

- Are the methods and techniques of the investigation adequately justified, described and located?
- Is the research design coherent? Are the methods and results appropriate to the purposes and goal?

- Have previous related investigations been considered and incorporated into the work?
- Has the present investigation been related to the broader theoretical, methodological, or descriptive concerns in anthropology, archaeology, or history listed in the study unit summaries (cf. A Comprehensive State Plan for the Conservation of Archaeological Resources, Volume II, Raber 1986).
- Are all sites adequately described and mapped?
- Are artifact inventories, photographs, drawings, and descriptions presented?
- Are artifacts described according to the standard categories and nomenclature and directly labeled with standard PHMC catalogue numbers?
- Are artifacts and sites recorded using the standard PHMC codes and numbers?
- Are artifacts, sites, features, and their distribution interpreted in terms of human cultural behavior?
- Are sites placed in their environmental and cultural (historical) context?
- Are statistical manipulations and special techniques correctly applied and described?
- Is the significance of sites adequately justified by reference to previous research, the type and quantity of data derivable, and the relevance of these data to broad anthropological/archaeological problems?
- Is the potential impact of the project on a site fully considered?
- Do the recommendations reflect a careful and accurate evaluation of the nature and degree of impact on archaeological sites?
- Is the potential National Register eligibility of all sites considered?
- Are maps, photographs, and drawings appropriate, clear, and adequately labeled and numbered?
- Is the list of references and persons consulted complete?
- Is the disposition of artifacts clearly described? Are provisions for storage and curation adequate?
- Have site forms been included or provided separately?

### BHP Review Requirements

- (1) Two draft copies (both with original photographs) of reports are necessary for our review. For the final report, at least five copies (three bound, one unbound and when appropriate one bound version delivered with the artifacts and field records to the State Museum) all with original photos of each final report should be submitted to the BHP for review and filing.
- (2) Photographs, maps, etc. should be on high-quality (preferably acid-free) paper. Blue-line drawings or equivalents should not be included in final reports.
- (3) Black and white photographs are required for archival reasons.
- (4) Permalife bond paper, or equivalent, is recommended, although high rag content bond (thesis bond) is acceptable.
- (5) A dry-process (xerox or equivalent) photocopy is required for all copies supplied to the BHP.

Chapter IV

CURATION GUIDELINES OF THE SECTION OF ARCHAEOLOGY,  
THE STATE MUSEUM OF PENNSYLVANIA,  
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

**This chapter should be replaced each time new curation guidelines are issued by the State Museum. This document includes the current edition as of the date this document was provided to you.**

## Chapter V

## PROFESSIONAL STANDARDS

Principal Investigator

In the conduct of archaeological field investigations, the following will be considered the minimum qualifications for a principal investigator responsible for supervising field and laboratory work and the preparation of the final report. These are established in 36 CFR 61:

(A) A graduate degree in anthropology, archaeology, or a closely related field.

(B) At least sixteen months of professional experience or specialized training in archaeological field, laboratory, or library research, including:

(1) at least four months of experience in general eastern North American archaeology, and

(2) at least six months of field experience in a supervisory role in eastern North America.

(C) A demonstrated ability to carry research to completion, usually evidenced by timely completion of thesis, reports, etc.

(D) For prehistoric, historic, or underwater archaeology, the principal investigator should have had at least one year of experience in research on the relevant period or specialization.

Field Supervisor

The field supervisor is responsible for the full-time direction of fieldwork and must be capable of conducting survey, testing, and excavation without the daily supervision of the principal investigator.

Field supervisors should have an advanced degree, at least 12 months of experience (field and laboratory) in North American archaeology, of which 4 months must be in a field supervisory position.

Specialists

Specialists in history, geology, ethnobotany, zoology, etc. must have an advanced degree (e.g. baccalaureate degree and experience) in their specialties with experience in the analysis of archaeological materials.

## CHAPTER VI

BIBLIOGRAPHY OF SOURCES FOR  
ARCHAEOLOGICAL COMPLIANCE PROJECTSApplicable State and Federal Regulations and Guidance

Executive Order 11593: Protection and Enhancement of the Cultural Environment, 16 U.S.C. 470 (Supp. 1, 1971).

36 CFR Part 800: Protection of Historic Properties, Federal Register, September 2, 1986.

36 CFR Part 60: National Register of Historic Places.

36 CFR Part 61: Procedures for Approved State and Local Government Historic Preservation Programs. Federal Register, 49:73, April 13, 1984.

36 CFR Part 63: Determinations of Eligibility for Inclusion in the National Register of Historic Places.

36 CFR Part 68: The Secretary of the Interior's Standards for Historic Preservation Projects.

Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. Federal Register, 48:190, September 29, 1983.

36 CFR Part 66: Recovery of Scientific, Prehistoric, Historic, and Archeological Data: Methods, Standards, and Reporting Requirements (proposed guidelines). Federal Register, 42:39, February 28, 1977.

43 CFR Part 7 (also issued as 36 CFR Part 296, 18 CFR Part 1312, and 32 CFR Part 229): Uniform Regulations: Archeological Resources Protection Act of 1979. Federal Register, 49:4, January 6, 1984.

36 CFR Part 801: Urban Development Action Grant Program: Historic Preservation Requirements. Federal Register, 46:161, August 20, 1981.

Guidelines for Exceptions under Section 214 of the National Historic Preservation Act. Federal Register, 47:210, October 18, 1982.

Treatment of Historic Properties Under Emergency Conditions Pursuant to Section 106 of the National Historic Preservation Act. Federal Register, 50:37, February 25, 1985.

36 CFR Part 78: Waiver of Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act.

Treatment of Archeological Properties: A Handbook. Prepared by the Advisory Council on Historic Preservation, 1980.

Introduction to Federal Projects and Historic Preservation Law. Prepared by the GSA Training Center and the Advisory Council on Historic Preservation. January 1987.

36 CFR Parts 60 and 63: National Register of Historic Places: Proposed Rules. Federal Register 51:150, August 5, 1986.

How to Apply the National Register Criteria for Evaluation. National Park Service, National Register Division, 1982.

Nomination of Archeological Properties. National Register of Historic Places, Bulletin No. 12, 1985.

Guidelines for Completing National Register Nomination Forms. National Register Bulletin No. 16, 1986.

National Park Service Procedures and Policies for Processing National Register Nominations. National Register of Historic Places, Bulletin No. 19, 1986 (see also "Checklist for Using Bulletin 19").

Mitigation Options Related to Historic and Archeological Properties. U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy, Washington, DC 1983.

Section 4(f) of the Department of Transportation Act of 1966, 49 U.S.C. 303 (1982).

National Environmental Policy Act of 1966, 42 U.S.C. 4321-4347 (1982).

Compliance Archaeology: A Selected Bibliography of Secondary Literature

- Barnes, M.R.  
1977 The National Register of Historic Places and the Grants-in-Aid Program. Pennsylvania Archaeologist 47(1): 25-28.
- Bense, J. A., H. A. Davis, L. Heartfield, and K. Deagan  
1986 Standards and Guidelines for Quality Control in Archaeological Resource Management in the Southeastern United States. Southeastern Archaeology 5(1): 52-62.
- Berry, M. S.  
1984 Sampling and Predictive Modeling on Federal Lands in the West. American Antiquity 49(4): 842-54.
- Bohnert, A. S. and R. L. George  
1980 Surface Mining and Pennsylvania Archaeology. Pennsylvania Archaeologist 50(4): 13-18.
- Brose, David S.  
1985 Good Enough for Government Work? A Study in "Grey Archeology." American Anthropologist 87:370-377.
- Brown, R. H.  
1981 Evolution of Federal Aid Programs for Community Development. Implications for Historic Preservation. Journal of Field Archaeology 8(1):98-103.
- Butler, W. B.  
1978 Some Comments on Contracting with the Federal Government: Types of Contracts. American Antiquity 43(4): 741-46.
- Butler, W. P.  
1979 The No-Collection Strategy in Archeology. American Antiquity. 44(4): 795-800.
- Carlevato, D. and K. Erickson  
1981 Guidelines for the Inclusion of Curation Information in Project Reports. ASCA Report 8(4) :3-6.
- Chace, P. G.  
1982 Perspectives on Archeological Site Capping. Contract Abstracts 3(1): 41-42.

- Christenson, A. C.  
1979 The Role of Museums in Cultural Resource Management. American Antiquity 44(1): 161-163.
- Corbyn, R. C.  
1980 What is Adequate Mitigation? ASCA Newsletter 7(August): 10-14.
- Cummings, C. R.  
1981 Cultural Resources Management: A Statement of Concerns from a Conservation Archeology Perspective. Journal of Field Archaeology 8(1): 95-98.
- Cunningham, R. D.  
1979 Why and How to Improve Archeology's Business Work. American Antiquity 44(3): 572-575.
- Custer, J. F.  
1986 An Assessment of Contract Archaeological Research in Southeastern Pennsylvania, 1975-1985. Pennsylvania Archaeologist 56(1-2): 42-51.
- Davis, Hester A.  
1979 The Problems and Ethics of Budgets and Cost Accounting. ASCA Newsletter Proceedings 6:10-14.  
1982 Professionalism in Archeology. American Antiquity 47(1): 158-163.
- Derry, Anne, E. Ward Jandl, Carol D. Shull and Jan Thorman  
1977 Guidelines for Local Surveys: A Basis for Preservation Planning. National Register of Historic Places, Bulletin 24, Washington. Revised 1985.
- Dincauze, D. F.  
1981 Planning, Preservation, and Public Policy - New Demands on Professional Archaeologists. Popular Archaeology Occasional Publication No. 19.
- Doyel, David E.  
1982 Medieval Men, Ethnic Significance, and Cultural Resource Management. American Antiquity 47(3): 634-642.
- Dunnell, R. C. and W. S. Dancey  
1978-79 Assessments of Significance and Cultural Resource Management Plans. ASCA Newsletter 5(December): 2-8.

- Fehon, Jacqueline R. (ed)  
 1979 Proceedings of the Compliance Workshop, Chapel Hill, NC: 1977.  
 Raleigh: North Carolina Archeological Council and Archeology Branch,  
 Division of Archives and History.
- Fitting, J. E.  
 1978 Client Oriented Archeology: A Comment on Kinsey's Dilemma.  
Pennsylvania Archaeologist 48(1-2):12-15.  
 1981 The Cost of Mitigation. Contract Abstracts and CRM Archeology 2(1):  
 10-12.
- Flamm, B. R. and J. C. Friedman  
 1981 United States Department of Agriculture: Its Role in Protection of our  
 Heritage Environment. American Antiquity 46(1): 188-192.
- Geier, Clarence R.  
 1981 Archeological Training, Theory, and Technique: Problems in the  
 Professional Base of Contract Archeology. Popular Archaeology  
Occasional Publication No. 5.
- Glassow, Michael  
 1977 Issues in Evaluating the Significance of Archaeological Resources.  
American Antiquity 42(3):413-20.  
 1985 Comments on Tainter's and Lucas's "Epistemology of the Significance  
 Concept." American Antiquity 50(4): 879-881.
- Glassow, M. A., J. R. Johnson, and L. R. Wilcoxon  
 1981 The Adequacy of Research Designs and the Adequacy of Mitigation  
 Programs. ASCA Proceedings.
- Goodyear, A. C. et. al.  
 1978 The Status of Archeological Research Design in Cultural Resource  
 Management. American Antiquity 43(2): 159-73.
- Gyrisco, G. M.  
 1981 Cases of Direct and Incidental Protection of Archeological Sites Through  
 Easements. Contract Abstracts and CRM Archeology 2(1): 32-36.
- Hale-Pierce, C. A.  
 1984 The Resource Protection Planning Process (RP3): Integrating the Small-  
 Scale Survey into a Research and Management Framework. American  
Archeology 4(1): 5-11.

- Handsman, R. G.  
1979 Strategies for Cultural Resource Management Research: A Case Study from the Upper Potomac Valley. Pennsylvania Archaeologist 49(1-2): 55-74.
- Hansen, Eric  
1984 The Whole is Greater Than the Sum of its Parts: Small-Scale Surveys and Regional Level Research. American Archeology 4(1): 35-43.
- Hester, J. J.  
1982 Conservation Archaeology, The Latest Archaeological Paradigm. ASCA Report 9(3): 9-25.
- Hilliard, J. E.  
1980 Levels of Survey in Contract Archeology. ASCA Newsletter 7(October): 2-20.
- Judge, W. James  
1979 Minimal Impact Archeology: A Plea for a Formalized Ethic. ASCA Newsletter Proceedings 6: 1-9.
- King, Thomas F.  
1975 Cultural Resource Law and the Contract Archaeologist: Methods of Evaluation and Reporting. New York Archaeological Council: Buffalo and Albany, NY.  
1976 Archeological Property Nominations. 11593. Office of Archeology and Historic Preservation, National Park Service, 7-9.  
1978 The Archeological Survey: Methods and Uses. Heritage Conservation and Recreation Service, Washington.  
1980 The Roles of the Agency Archeologist in Managing Large Mitigation Programs. Contract Abstracts and CRM Archeology 1(1): 12-16.
- King, Thomas F. Patricia Parket Hickman and Gary Berg  
1977 Anthropology in Historic Preservation: Caring for Culture's Clutter. New York: Academic Press.
- King, T. and M. M. Lyneis  
1978 Preservation: A Developing Focus of American Archeology. American Anthropologist 80(4): 873-93.

- Kinsey, W. Fred III  
1977 One Archaeologist's Dilemma: A Personal View. Pennsylvania Archaeologist 47(1): 42-44.
- Knudson, R.  
1982 Basic Principles of Archeological Resource Management. American Antiquity 47(1): 163-167.
- Knudson, R., S. E. James, and A. E. Kane  
1981 How Much is Enough? The Problem of Sufficiency in Archaeological Resource Management. ASCA Proceedings.
- Lenihan, Daniel J. et. al.  
1977 The Preliminary Report of the National Reservoir Inundation Study. Joint Publication of the National Park Service, Southwest Cultural Resources Center, Santa Fe, and Cultural Resources Management Division (Archeology), Washington.
- Lindsay, A. J., Jr. et. al.  
1980 The Curation and Management of Archeological Collections: A Pilot Study. Heritage Conservation and Recreation Service.
- Lipe, W. D.  
1974 A Conservation Model for American Archeology. The Kiva 39-213-245.
- Marquardt, W. H. et. al.  
1982 Resolving the Crisis in Archeological Collection Curation. American Antiquity 47(2): 409-418.
- Mayer-Oakes, W. J. and A. W. Portnoy  
1979 Scholars as Contractors. U. S. Department of the Interior, Heritage Conservation and Recreation Service, Interagency Archeological Services Division. Washington.
- McGimsey, Charles, R. III  
1981 Still A Band of Brethren? American Antiquity 46(2): 378-81.  
1984 Archeology Has Crossed the Rubicon. American Archeology 4(3): 224-227.
- McGimsey, Charles R. III, and Hester A. Davis (eds.)  
1977 The Management of Archeological Resources: The Airlie House Report. Special Publication of the Society for American Archaeology.

- Niquette, C. M.  
 1980-81 Errors of Omission in Survey Reports. ASCA Newsletter 7 (July): 13-16.  
 1980-81 Archaeological Contract Reporting Standards. ASCA Newsletter 7(December).  
 1984 Lands unsuitable for Mining: A Kentucky Example. American Antiquity 49(4): 834-842.
- Noble, V. E., Jr.  
 1979 On Planning and Preservation. Historical Archaeology 13(120-122).
- Patterson, L. W.  
 1979-80 Research Deficiencies in Contract Archeology Under Environmental Laws. ASCA Newsletter 6(February): 9-16.  
 1981 Cultural Resource Considerations for Pipeline Construction. Contract Abstracts and CRM Archeology 2(3): 50-53.
- Plog, Fred  
 1980 The Ethics of Archeology and the Ethics of Contracting. Contract Abstracts and CRM Archeology 1(1): 10-12.
- Portnoy, Alice (ed.)  
 1978 Scholars as Managers. U.S. Department of Interior, Heritage Conservation and Recreation Service, Interagency Archaeological Services Division, Washington, D. C.
- Powell, S. and G. E. Rice  
 1981 The Incorporation of Small Contract Projects into a Regional Sampling Design. American Antiquity 46(3): 602-09.
- Raab, L. Mark  
 1980 Clients, Contracts, and Profits: Conflicts in Public Archaeology. American Anthropologist 82:539-551.  
 1981 Getting First Things First: Taming the Mitigation Monster. Contract Abstracts and CRM Archeology 2(1): 7-10.
- Raab, L. Mark, and T. C. Klinger  
 1977 A Critical Appraisal of "Significance" in Contract Archaeology. American Antiquity 42(4): 629-633.
- Rondeau, M. F.  
 1981 The Data-Focused Research Design for Contract Excavations. Contract Abstracts 3(1): 33-35.

- Schiffer, Michael B., and George J. Gumerman (eds.)  
1977 Conservation Archaeology: A Guide for Cultural Resource Management Studies. New York: Academic Press.
- Sharrock, F. W. and D. K. Grayson  
1979 "Significance" in Contract Archeology. American Antiquity 44(2): 327-28.
- Shott, M.  
1985 Shovel Test Sampling as a Site Discovery Technique: A Case Study from Michigan. Journal of Field Archaeology 12: 457-468
- Somers, Gary F.  
1979 Using NTIS, or How to Disseminate Archaeological Reports. American Antiquity 44(2): 330-33.
- Tainter, J. A.  
1983 Settlement Behavior and the Archaeological Record: Concepts for the Definition of "Archaeological Site." Contract Abstracts 3(2): 130-133.
- Tainter, J. A. and G. J. Lucas  
1983 Epistemology of the Significance Concept. American Antiquity 48(4): 707-719.
- Talmage, Valerie, and Olga Chesler  
1977 The Importance of Small, Surface, and Disturbed Sites as Sources of Significant Archeological Data. Cultural Resource Management Studies. Washington: National Park Service, U. S. Department of Interior.
- Thomas, David Hurst  
1975 "Nonsite Sampling in Archeology: Up the Creek Without a Site? In Sampling in Archeology, J. W. Mueller (ed.), Academic Press.
- Thompson, D. M. and E. A. Bettis III  
1981 Out of Sight, Out of Planning: Assessing and Protecting Cultural Resources in Evolving Landscapes. Contract Abstracts and CRM Archeology 2(3): 16-22.
- Thompson, R. H.  
1978-79 Beyond Significance. ASCA Newsletter 5(February): 15-22.

- Tiedt, G. F.  
1982 Easements and Artifacts: An Archeological Investigation of the Internal Revenue Code. American Antiquity 47(2): 376-81.
- U. S. General Accounting Office  
1981 Are Agencies Doing Enough or Too Much for Archeological Preservation? Guidance Needed. Washington, D. C.
- Walka, J. J.  
1979 Management Methods and Opportunities in Archaeology. American Antiquity 44(3): 575-82.
- Watters, D.R.  
1983 The Law of the Sea Treaty and Underwater Cultural Resources. American Antiquity 48(4): 808-816.
- Weakly, Ward F.  
1979 Ethics and the Archeological Contractor. ASCA Newsletter Proceedings, 6: 22-24.
- Weil, M. E.  
1978 A Canadian perspective on Legislation and the Role of the Private Sector in Archaeology. Historical Archaeology 12: 51-57.
- Wildesen, L. E., and Y. T. Witherspoon  
1978-79 Archaeology for the People: The Ethics of Public Archaeology. ASCA Newsletter 5(June): 2-5.
- Wilson, Rex L., and Gloria Loyola (eds.)  
1981 Rescue Archeology: Papers from the first New World Conference on Rescue Archeology. The Preservation Press.

A Selected Bibliography Especially Appropriate for Projects in Pennsylvania

- Callahan, E.  
1979      The Basics of Biface Knapping in the Eastern Fluted Point Tradition: A Manual for Flint Knappers and Lithic Analysts. Archaeology of Eastern North America 7: 1-180.
- Carbone, V. A.  
1976      Environmental and Prehistory in the Shenandoah Valley. Ph.D. Dissertation, Catholic University of America. University Microfilms, Ann Arbor.
- Carr, Kurt W.  
1989      The Shoop Site: Thirty-Five Years After. In New Approaches To Other Pasts, W. Fred Kinsey, III and Roger W. Moeller (eds.) Bethlehem, Conn.: Archaeological Services, pp. 5-28.
- Cavallo, J. A.  
1984      Fish, Fires and Foresight: Middle Woodland Economic Adaptations in the Abbott Farm National Landmark, Trenton, New Jersey, North American Archaeologist 5.
- Cee Jay Frederick Associates and John Milner Associates  
1981      Resource Protection Plan: A Framework for Decision-Making in Protecting the Cultural Resources in the Pennsylvania/Delaware River Coastal Zone. Report on file at the Pennsylvania Historical and Museum Commission.
- Coe, J.  
1964      The Formative Cultures of the Carolina Piedmont. Transactions of the American Philosophical Society 54 (5).
- Cowin, Verna L.  
1981      1980-1981 Archaeological Survey in Region VII, West Central Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.
- 1982      Archaeological Survey in Region VII, West Central Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.
- Cox, J. Lee, Jr.  
1984      Underwater Archaeology Project: A Preliminary Survey to Analyze the Potential Presence of Submerged Cultural Resources In the Delaware

and Susquehanna Rivers. Report on file at the Pennsylvania Historical and Museum Commission.

1986 Underwater Archaeology Project: A Historical and Archaeological Assessment of Three Submerged Cultural Resources in Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.

1986 Presque Isle Bay Underwater Archaeology Survey. Report on file at the Pennsylvania Historical and Museum Commission.

Custer, Jay F.

1984 Delaware Prehistoric Archaeology: An Ecological Approach. Newark: University of Delaware Press.

1986 Late Woodland Cultures of the Middle Atlantic Region. Newark: University of Delaware Press.

1989 Environmental Change and Cultural Dynamics on the Delmarva Peninsula: Structure vs. Composition. In New Approaches to Other Pasts, W. Fred Kinsey III and Roger W. Moeller (eds.), Bethlehem, Conn: Archaeological Services, pp. 61-70.

Dickens, Roy S. Jr., editor

1982 Archaeology of Urban America: The Search for Pattern and Process. New York: Academic Press.

East, T.C., J.M. Adovasio, W.C. Johnson, J. Donahue and T.

F. Jorstad

1989 Archaeological Investigations at 36Bk549, An Archaic and Woodland Lithic Workshop in Berks County, Pennsylvania. University of Pittsburgh Anthropological Papers No. 3.

Graybill, Jeffrey R.

1989 The Shenks Ferry Complex Revisited. In New Approaches To Other Pasts. W. Fred Kinsey and Roger W. Moeller (eds.) Bethlehem. Conn: Archaeological Services, Inc.. pp.51-60.

Joukowsky, Martha

1986 A Complete Manual of Field Archaeology: Tools and Techniques of Field Work for Archaeologists. New York: Prentice Hall Press.

Hatch, James W. (ed.)

1980 The Archaeology of Central Pennsylvania, Volume 1: The Fisher Farm Site, A Late Woodland Hamlet In Context. The Pennsylvania State University, Department of Anthropology, Occasional Papers, No. 12.

- Hay, Conran A.  
 1981 The 1980-1981 Central Region Archaeological Survey. Report on file at the Pennsylvania Historical and Museum Commission.
- 1982 The 1981 Central Region Archaeological Survey. Report on file at the Pennsylvania Historical and Museum Commission.
- Hay, Conran A., Ira C. Beckerman and Christopher M. Stevenson  
 1980 The 1979-1980 Central Region Archaeological Survey. Report on file at the Pennsylvania Historical and Museum Commission.
- Hay, Conran A., James W. Hatch and Janet Sutton  
 1987 A Management Plan for Clemson Island Archaeological Resources in the Commonwealth of Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.
- Herbstritt, James T.  
 1982 Prehistoric Archaeological Site Survey in Pennsylvania, Region II with Emphasis on Fulton County Cultural Resources. Report on file at the Pennsylvania Historical and Museum Commission.
- Honerkamp, N., and C. H. Fairbanks  
 1984 Definition of Site Formation Processes in Urban Contexts. American Archeology 4(1): 60-67.
- Kent, Barry C., Janet Rice, and Kakuko Ota  
 1981 A Map of 18th Century Indian Towns in Pennsylvania. Pennsylvania Archaeologist 51(4): 1-18.
- Kent, Barry C., Ira F. Smith III, Catherine McCann, editors  
 1971 Foundations of Pennsylvania Prehistory. The Pennsylvania Historical and Museum Commission. Anthropological Series No. 1. Harrisburg, PA:
- Kent, Barry C.  
 1984 Susquehanna's Indians. The Pennsylvania Historical and Museum Commission, Anthropological Series No. 6.
- Kinsey, W. Fred III  
 1972 Archeology in the Upper Delaware Valley. The Pennsylvania Historical and Museum Commission. Anthropological Series No. 2. Harrisburg, PA:
- 1989 Susquehannock Zoomorphic Images: Or Why the Seasons Change. In New Approaches To Other Pasts. W. Fred Kinsey and Roger W. Moeller (eds.), Bethlehem, Conn: Archaeological Services, pp. 71-88.

- Knoerl, J. J., and N. Versaggi  
 1984 Plow Zone Sites: Research Strategies and Management Policy. American Archeology 4(1): 76-80.
- Lewarch, D. D., and M. J. O'Brien  
 1980-81 A Cost-Efficient Approach to Mechanical Removal of Plowzone Site overburden. ASCA Newsletter 7(December): 14-18.
- Lewis Berger & Associates, Inc.  
 1988 Clemson's Island Cultures in the West Branch Valley: Phase II and III Archaeological Investigations, 36Un11, St. Anthony Street Bridge Replacement, L.R. 59024, Section 007, Lewisburg, Union County, Pennsylvania. Report prepared for the Pennsylvania Department of Transportation, District 3-0, Montoursville, Pennsylvania and the Federal Highway Administration.
- Lightfoot, K. G.  
 1966 Regional Surveys in the Eastern United States: The Strengths and Weaknesses of Implementing Subsurface Testing Programs. American Antiquity 51(3): 484-504.
- McManamon, F. P.  
 1981 Probability Sampling and Archaeological Survey in the Northeast: An Estimation Approach. In Foundations of Northeast Archaeology, D. R. Snow (ed.) pp. 195-227. Academic Press.
- 1984 The Integrity of Plowzone Sites. American Archeology 4(1): 70-76.
- Michels, Joseph W. and John B. Hunter (eds.)  
 1968 A Preliminary Report of Archaeological Investigations of the Workman Site (36Bd36), Bedford County, Pennsylvania. The Pennsylvania State University, Department of Anthropology, Occasional Paper No. 4.
- Miller, George L.  
 1980 Classification and Economic Scaling of 19th Century Ceramics. Historical Archaeology 14: 1-40.
- Mueller, J. W., editor  
 1975 Sampling in Archaeology. Tucson: University of Arizona Press.
- Nance, J. D. and B. F. Bale  
 1986 No Surprises? The Reliability and Validity of Test Pit Sampling. American Antiquity 51(3): 457-483.

- Neusius, Sarah W. and Phillip D. Neusius  
 1989 A Predictive Model for Prehistoric Settlement Systems in the Crooked Creek Drainage. Report on file at the Pennsylvania Historical and Museum Commission.
- Noel Hume, Ivor  
 1969 Historical Archaeology. Alfred A. Knopf. New York  
 1985 A Guide to Artifacts of Colonial America. Alfred A. Knopf. New York
- Raber, Paul A. (ed.)  
 1985 A Comprehensive State Plan for the Conservation of Archaeological Resources, Volumes 1 and 2. Pennsylvania Historical and Museum Commission, Historic Preservation Planning Series, No. 1.
- Regensburg, R.  
 1971 The Savich Farm Site: A Preliminary Report. Bulletin of the Massachusetts Archaeological Society 32 (1-2): 20-23.
- Riordan, Timothy and William Adams  
 1985 Commodity Flows and National Market Access. Historical Archaeology 19(2): 5-18.
- Ritchie, William A.  
 1971 A Typology and Nomenclature for New York Projectile Points. New York State Museum and Science Service Bulletin No. 384.  
 1969 The Archaeology of New York State. Garden City, N.Y.: The Natural History Press.
- Schlanger, S. H. and J. D. Orcutt  
 1986 Site Surface Characteristics and Functional Inferences. American Antiquity 51(2): 296-312.
- Schuyler, Robert L., editor  
 1978 Historical Archaeology: A Guide to Substantive and Theoretical Contributions. Farmingdale, NY: Baywood Publishing Co., Inc.  
 1980 Archeological perspectives on Ethnicity in America. Farmingdale, NY: Baywood Publishing Co., Inc.
- Smith, Ira F. III  
 1977 Early and Middle Woodland Compsites on Three Mile Island, Dauphin County, Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.

- 1978            A Description and Analysis of Easly Pottery Types in the Lower Susquehanna River Valley of Pennsylvania. Report on file at the Pennsylvania Historical and Museum Commission.
- 1984            A Late Woodland Village Site in North-Central Pennsylvania: Its Role in Susquehannock Culture History. Report on file at the Pennsylvania Historical and Museum Commission.
- South, Stanley  
1977            Method and Theory in Historical Archaeology. New York Academic Press.
- Spencer-Wood, Suzanne (ed.)  
1987            Consumer Choice in Historical Archaeology. New York: Plenum Press.
- Stein, Julie K.  
1986            Coring Archaeological Sites. American Antiquity 51(3): 505-527.
- Stein, Julie K. and William R. Farrand  
1985            "Archaeological Sediments in Context." Peopling of the Americas, Volume 1: Center for the Study of Early Man, Institute for Quaternary Studies, University of Maine, Orono.
- Stewart, R. M.  
1980            Prehistoric Settlement/Subsistence Patterns and the Testing of Predictive Site Location Models in the Great Valley of Maryland. Ph. D. Dissertation, Department of Anthropology, The Catholic University of America, Washington, D.C. University Microfilms, Ann Arbor, Michigan.
- 1984            South Mountain (Meta) Rhyolite: A prespective on Prehistoric Trade and Exchange in the Middle Atlantic Region. In Prehistoric Lithic Exchange Systems in the Middle Atlantic Region, J.F. Custer (ed.), Center for Archaeological Research, University of Delaware, Newark, pp. 14-44.
- 1985            Prehistoric Ceramics of the Lower/Middle Delaware River Valley. Paper presented at the Annual Meeting of the Society for American Archaeology, Denver, Colorado.
- 1987            Gropp's Lake Site (28 Me 100G), Archaeological Data Recovery I-195, Segment 1-A, 1-E, 10-D. Report prepared by Louis Berger and Associates, Inc., East Orange, J.J. for the Federal Highway Administration and the New Jersey Department of Transportation.

Stewart, R.M. and J.A. Cavallo

1983 a Summary and Conclusions of Phase II Prehistoric Archaeological Investigations of the Abbott Farm National Landmark. In Abbott Farm National Landmark, Phase II Survey and Mitigation Plans (2 vols.). Report prepared by Louis Berger and Associates, Inc., East Orange, J.J. for the New Jersey Department of Transportation.

1983 b Cultural History. In Abbott Farm National Landmark, Phase II Survey and Mitigation Plans (2 Vols.). Report prepared by Louis Berger and Associates, Inc., East Orange, N.J. for the New Jersey Department of Transportation.

Stewart, R.M., C. Hummer and J.F. Custer

1986 Late Woodland Cultures of the Middle and Lower Delaware River Valley and the Upper Delmarva Peninsula. In Late Woodland Cultures of the Middle Atlantic Region, J.F. Custer (ed.) Newark: University of Delaware Press, pp. 58-89.

Turnbaugh, W. H.

1977 Man, Land and Time. Lycoming County Historical Society Williamsport.

## CHAPTER VII

## GLOSSARY OF TERMS

Archaeological activities: all tasks performed by qualified archaeologists in carrying out their work. Many of these activities involve field and laboratory work, analysis and report writing; teaching and field training, administration, and other related jobs may be considered as archaeological activities.

Archaeological report: any document that describes archaeological activities and presents conclusions and interpretations drawn from these activities. Archaeological reports often describe fieldwork and the results of this work and must be prepared by or under the supervision of qualified archaeologists. There are various kinds of archaeological reports, including cultural resource management studies.

Archaeological resources: all evidences of past human occupations which can be used to reconstruct the lifeways of past peoples. These include sites, artifacts, environmental and all other relevant information, and the contexts in which they occur. Archaeological resources are found in prehistoric and aboriginal sites, as well as historic Native American and European areas of occupation and activity.

Archaeology/archeology: the scientific discipline responsible for recovering, analyzing, interpreting, and explaining the material culture of the historic and prehistoric past.

Avoidance: active attempts to avoid threatened resources by partial or complete project redesign or relocation.

Controlled Surface Collection: the systematic walkover of the site area at close intervals (5 m or less) and an intensive collection of all artifacts. This procedure relies on adequate surface visibility (i.e., at least 80%). The site should be plowed, disked and rain-washed to maximize surface visibility. Controlled surface collection is appropriate only if it is certain that the topsoil has been disturbed by previous plowing or other action. Two alternative methods involve either (a) piece plotting: exact proveniencing of each surface artifact using transit and tape; or (b) a collection grid: superimposing a grid pattern on the site area for horizontal control so that all artifacts can be provenienced by grid unit. Either method ties the location of artifacts to a permanent datum point.

Consultants: persons specially trained to provide professional or technical advice on research or management related problems. Other consultants are sometimes employed by archaeologists to conduct ancillary studies for research or management programs. Consultants would include archaeologists, hydrologists, soils scientists, aerial photography interpreters, ethnologists, palynologists, civil engineers, etc.

Criteria of adverse effect: the Advisory Council on Historic Preservation's definition of harm to historic properties caused by federal actions. These criteria are spelled out in the Council's regulations 36 CFR 800.9 (b) and (c).

Criteria of effect: the Advisory Council on Historic Preservation's definition of change to historic properties caused by federal action. This criterion [36 CFR 800.9 (a)] says, "An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register. For the purpose of determining effect, alteration to features of a property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

Cultural affiliations: the known, projected, or hypothesized cultural, ethnic, or tribal group (e.g., Hopewellian, Mississippian, Puebloan, Eskimo, Apache, historic Anglo, etc.) with which archaeological remains may be identified on the basis of careful scientific study.

Cultural resource management: the development and maintenance of programs designed to protect, preserve, and scientifically study and manage cultural resources (including evidences of prehistoric, protohistoric, historic, and recent remains) and the natural resources that figured significantly in cultural systems. Developers of such programs may include governing bodies or agencies of government, academic and research institutions, and private corporations. The goal of such programs should be the conservation of cultural values and the maximum effective conservation and utilization of these resources for the public good.

Culture history: the chronological and spatial framework for describing the development of human societies and cultures, and the documented process of change involved in this development. Studies in culture history are primarily concerned with defining the geographic extent, relative age, and course of development of cultures.

Culture process: the general factors and mechanisms responsible for cultural change and variability. In cultural resource management studies, investigations of culture process involve providing and testing explanations, expressed in terms of explicit formulations, for cultural events which occurred in the study area.

Data recovery techniques: the archaeological and supportive techniques (fossil pollen collection, carbon-14 dating, stratigraphic studies, vegetation transects, excavation) utilized in the intensive and extensive collection of cultural materials, relevant environmental facts, and pertinent contextual information.

Determination of eligibility: the process of ascertaining a property's eligibility for the National Register of Historic Places. A property eligible for the National Register--

but not actually listed or formally determined eligible by the Secretary of Interior--is afforded the same protection under Section 106 as a listed property.

**Ecofacts:** archaeological data which can be used to reconstruct past environments. This ordinarily includes faunal remains, botanical remains, pollen samples, phyloliths, soils data, and other pertinent environmental information.

**Excavation:** the scientifically controlled recovery of subsurface materials and information from an archaeological site. Recovery techniques are designed to produce maximum knowledge about the utilization of the site, its relation to other sites and the natural environment, and its significance in the maintenance of the cultural system. Recovery techniques may include the use of heavy equipment (e.g., backhoe, etc.) and specialized instruments (pollen coring tools, etc.). If excavation is the mitigative measure selected it is usually undertaken following the final design stage of a project.

**Feature:** a distinct pattern of artifacts, soil disturbance, or buried architectural remains resulting from past human activity on a site. This includes discrete workshop areas, pits, burials, hearths, post molds, trenches, foundations, and any other residues representing the remains of cultural activities.

**Field survey:** this involves in-field inspection of the area of potential effects to seek and record historic properties in sufficient detail to determine their significance and identify potential effects on them.

**Historic context:** the unit created for planning purposes by grouping information about historic properties within explicit theoretical or historic concepts that are associated with a specific time period and geographical area.

**Historical resources:** all evidences of human occupations that date from prehistoric or historic (i.e., recorded history) periods. These resources include documentary data (i.e., written records, archival material, photographs, maps, etc.) sites, artifacts, environmental data and all other relevant information. Historic resources are cultural resources and may be considered archaeological resources when archaeological work is involved in their identification and interpretation.

**Hypothesis formulation:** the development and statement of one or more specific hypotheses (hypotheses are tentative explanations or theories set forth to be tested). This activity usually includes an intuitive pretesting phase, wherein some hypotheses are abandoned because of poor fit to the data at hand or lack of testability. Though fruitful hypotheses can come from a variety of sources, those chosen for testing relate to specifiable investigative needs.

**Informants:** knowledgeable persons capable of providing information (usually local) on various aspects of cultural resource studies (e.g., location of sites, local history, regional use of natural materials, etc.) Informants differ from consultants in that they

are seldom trained in a specific professional discipline or technical skill and usually have personal familiarity or experience with the resources under study.

**Integrity:** the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period of significance.

**Intentional Sampling Strategy:** the process of locating archaeological sites or features within a site by using existing documentary or comparative information to pinpoint the location.

**Intrasite relationships:** the spatial relationships of artifacts and their contexts that are used for developing greater understanding concerning past human behavior within a single site.

**Land modifications:** alterations of any magnitude to the surface of the terrain including changes in adjacent water bodies (reservoirs, lakes, streams).

**Literature search:** an examination and review of all written reports (including published, unpublished, reproduced, and manuscripts forms), books, articles, etc., pertinent to the investigations carried out for a cultural resource management study. Literature searches differ from records checks in that the latter usually are limited to formalized recorded information which are maintained as reference files.

**Memorandum of Agreement (MOA):** the agreement—resulting from consultation—that states the measures the agency will take to avoid or reduce effects on historic properties as the agency carries out its undertaking. The MOA is signed by the agency, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation, if participating.

**Mitigation:** the alleviation of adverse impact by avoidance through project redesign or project relocation, by protection or by adequate scientific study of cultural resources.

**National Historic Preservation Act (NHPA):** (16 USC 470-470w-6) the basic legislation of the Nation's historic preservation program that established the Advisory Council on Historic Preservation and the Section 106 review process.

**National Register:** The Nation's master inventory of known historic properties worthy of preservation. The National Register of Historic Places is administered by the National Park Service on behalf of the Secretary of the Interior. National Register listings include buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance. Properties listed are not limited to those of nationwide significance; most are significant primarily at the state or local level.

**National Register Criteria:** the established criteria for evaluating the eligibility of properties for inclusion in the National Register of Historic Places.

**Phytoliths:** distinctively shaped silica bodies which may be used to identify the types of plants which were formerly located on archaeological sites. Phytoliths may be analyzed in combination with pollen studies for research on environmental reconstruction.

**Predictive modeling:** this refers to a body of techniques in which background information covering topography, geography, history, prehistory, and ethnography are used to predict where historic properties are likely to occur and what their characteristics are likely to be. These predictions are then tested using field surveys and the model is refined.

**Preservation:** all efforts to conserve and maintain the cultural resource base. This may include the protection of archaeological and historical remains and their preservation through stabilization, reconstruction and care of artifacts, and the establishment of federal, state, and municipal archaeological preserves. When such measures are not feasible, preservation of information, though a less desirable measure, should be accomplished through scientific excavation and study.

**Project sponsor:** the federal, state or local agency, corporation, business, institution, or other individual or group responsible for the development, planning, and financing of a project. Project sponsors assume the responsibility for compliance with pertinent legislation.

**Public interpretation:** the illustration and explanation of cultural resources (prehistoric and historic sites, artifacts, buildings, etc.) in terms understandable by the general public. Explanations may be at in situ exhibits, in books, magazines, articles, brochures, illustrated lectures, etc.

**Reconnaissance:** a relatively superficial and brief examination of representative portions of a project area, conducted for the purpose of defining the general categories of cultural and related environmental resources contained in the area. Test excavations may or may not be appropriate in the reconnaissance. A reconnaissance should be so designed as to be adequate to estimate the time and cost of an intense field study.

**Regional context:** the background information on the study area in relation to its history, its past and present utilization by man, its demographic character, and its relationship to pertinent characteristics that differentiate it from adjacent areas.

**Register, state or local:** listings maintained by state or local boards or societies or archaeological, historical, and architectural sites selected for their local or state significance. Protection of sites listed on these registers varies by state. Not all states

have such registers and review and nomination procedures for listing are often handled in the office of the State Historic Preservation Officer.

**Research design:** a plan for conducting an archaeological investigation preparatory to undertaking a particular study. It includes a statement of the problem, basic assumptions, activities, and techniques, including strategies and methods required for problem solution and hypothesis testing, and a specification of the relevant data and how they will be utilized for a full understanding of the resource. A research design is usually in sufficient detail to permit the evaluation of its methodological sophistication and feasibility.

**Sample survey:** survey of a representative sample of lands within a given land area in order to generate or test predictions about the types and distributions of historic properties in the entire area.

**Sampling:** the process or technique of selecting a part of an area of study and presenting it as representative of the whole for inspection or analysis. Sampling should be appropriate to the problems under consideration. Sampling is utilized in archaeological research both for recovering data from study areas and from sites. Sampling may be employed both to survey and excavation with the level of intensity depending upon the required precisions.

**State Historic Preservation Officer (SHPO):** the official in each state or territory who (among other duties) consults with federal agencies during Section 106 review. The SHPO administers the national historic preservation program at the state level, reviews National Register nominations, and maintains file data on historic properties that have been identified but not yet nominated. SHPO's are designated by the Governor of their respective state or territory.

Agencies seek the views of the appropriate SHPO(s) while identifying historic properties and assessing effects of an undertaking on historic properties. Agencies also consult with the SHPO when developing Memoranda of Agreement.

APPENDIX A

BUREAU OF HISTORIC PRESERVATION

REPORT SUMMARY FORM

APPENDIX B

PENNSYLVANIA ARCHAEOLOGICAL SITE SURVEY

SITE IDENTIFICATION CRITERIA



## SITE IDENTIFICATION CRITERIA

## PENNSYLVANIA ARCHAEOLOGICAL SITE SURVEY FILES

2 OCTOBER 1991

The following represent Pennsylvania Archaeological Site Survey (PASS) site identification criteria and definitions developed by the Section of Archaeology, The State Museum of Pennsylvania and the Bureau of Historic Preservation, Pennsylvania Historical and Museum Commission.

## PREHISTORIC SITES

1). Three or more culturally modified objects, excluding Fire-cracked rock (FCR), found within a 15 m diameter area while surface collecting a plowed field represent a site.

a. Three or more flakes or any combination of flakes and tools (lithic, pottery sherds, etc.) found within 15 m of each other represent a site in plowed contexts.

b. Single points are usually considered isolated finds, however all Paleo-Indian point localities should be recorded as sites because of the sparseness of debris from Paleo-Indian sites.

c. Isolated diagnostic artifacts (points, ceramics, etc.) should be fully recorded on PASS site forms. These will not be assigned official PASS site numbers but will remain on file as important information concerning prehistoric land use.

2). Flakes and/or other culturally modified items in adjacent 15 m spaced shovel tests represent a site regardless of the number (minimum of 2) of objects recovered.

3). Five or more finished tools recovered within an acre indicate the presence of a site, and the consultant should further refine site boundaries within that area (unless it is a village site covering more than an acre).

4). The presence of any subsurface culturally derived feature requires designation of the locality as a site.

## HISTORIC SITES

- 1). Any above ground structure and associated debris scatter is a site.
- 2). Any subsurface historic structure represents a site.
- 3). Any historic debris scatter associated found in an area where an historically important incident occurred defines a site. Surface structures need not be present.
- 4). Historic debris associated with known yards/lots in urban situations, even if there are no remaining structures and the yards are deemed ineligible for the National Register, must be recorded as historic sites.
  - a). Materials from these sites have to be curated along with other remains. They must be assigned site and catalog numbers for them to have research value.
  - b). This definition includes 20th century sites. Recording evidence of modern land use is every bit as important as that from earlier periods.
- 5). Record all industrial localities as sites.
  - a). Canals, iron furnaces, mills, logging camps, preserved sections of old roads, etc., should all be recorded as sites.
  - b). Bridges should also be recorded as sites if they are older than 50 years of age or have some important architectural feature.
- 6). Do not record post-Civil War Era farm field scatters as sites unless they are associated with an important event or family. Recent historic debris litters all farm fields and recording all such occurrences would not be of much interpretive use.
  - a). However, if there is an extremely heavy concentration of historic debris, the consultant should check to be certain that it is not associated with a destroyed structure or represent a dump area. If either are found to be the cause of the historic debris, the area should be designated an historic site.
  - b). Record all pre-Civil War Era field scatters as sites.