

Surveys

INTRODUCTION

To conduct the historical research and existing conditions investigations for a Cultural Landscape Report (CLR), several types of surveys may be needed. Generally, the two primary surveys required are a site survey and a topographic survey. The site survey graphically documents the findings of a site investigation. The topographic survey accurately records existing conditions and is often used to prepare a base plan. Other types of surveys provide site-specific information, such as legal boundaries and the location of utilities, and are conducted as needed, based on a CLR's project agreement. The following sections briefly describe relevant types of surveys, their purpose in a CLR, and the expertise required to perform them.

SITE SURVEY

Documentation of the existing conditions of a cultural landscape requires both site research and a site survey. Site surveys are usually conducted by a historical landscape architect and require the recording of as much information as is pertinent to, and defined by, the project agreement.

Site surveys range from general reconnaissance and windshield surveys to detailed condition assessments for individual features. Site surveys require on-the-ground fieldwork to inventory and document existing landscape characteristics and associated features, such as vegetation, circulation, and land use. Also recorded are contemporary site functions and detailed technical information, as appropriate. The goal of the site survey is to record the landscape as objectively as possible.



The findings from the existing conditions investigation and site history are compared to identify the landscape characteristics and associated features that have significance based on National Register criteria. Significant landscape characteristics and associated features are those that have existed since a period of significance and have retained integrity.

Ideally, a site survey should be preceded by historical research so that the history and historic context of the landscape are understood. With this information, the type of landscape characteristics and associated features likely to be found can be anticipated. In preparing for a site survey, landscape boundaries should also be determined. If legal property lines are not known, a boundary or cadastral survey may be required before the site survey. During the site survey it is useful to have copies of a United States Geological Survey (USGS) map, a historic site map, an aerial photograph, historical photographs, and a topographic survey map.

The appearance of landscape characteristics and associated features, their physical condition, and visible changes that have occurred since the period(s) of significance, should be recorded in a format that is easily used for analysis and evaluation. A standard form may be prepared for recording observations, including a map for geographically referencing landscape characteristics and associated features, and space for writing notes and making sketches. Field work should include taking black and white photographs and color slides, as well as detailed notes and sketches.

A datalogger, a type of hand-held computer used as a part of a Global Positioning System, may be used to expedite the recording of site survey data. A datalogger can be digitally programmed with a “data-dictionary” or standard inventory form before the survey begins, allowing responses to be entered in the field. The recorded information can then be downloaded to a computer. (See *Landscape Lines II: Global Positioning Systems*.)

The scheduling and number of site surveys is determined by park operational and program functions, and the management objectives and level of investigation outlined in the CLR project agreement. For example, management objectives may require more than one site survey to investigate the effect of seasonal changes in the existing conditions of a landscape. Operational or program functions may require site surveys to be scheduled at only off-season times of the year. A limited level of investigation may restrict the site investigation to one site survey. A site survey must be scheduled during the most revealing conditions for information gathering; for example, when wetlands are submerged rather than dry, when deciduous trees, shrubs, and herbaceous plants have foliage, when steep topography is traversable, or when the daily altitude and azimuth of the sun best reveals geologic formations in black and white photography.

TOPOGRAPHIC SURVEY

A topographic survey (also called a location ground survey) is an accurate technique for recording the positions of all detectable landscape

The topographic survey map shows contours at a prescribed interval and indicates spot elevations of peaks (high-points), depressions (low-points), and selected features. (See Figures 1 and 2.) To determine the position of landscape characteristics and associated features, the survey uses the horizontal and vertical position relative to an established “ground control” point. (See “Ground Control Survey” later in this text.) The types of

The level of detail desired in a topographic survey, such as the contour interval and accuracy of spot elevations, must be specified. The specifications should indicate that a registered land surveyor or civil engineer will perform the topographic survey.

Unlike a site survey, a topographic survey does not record qualitative information about the appearance, physical condition, or relative

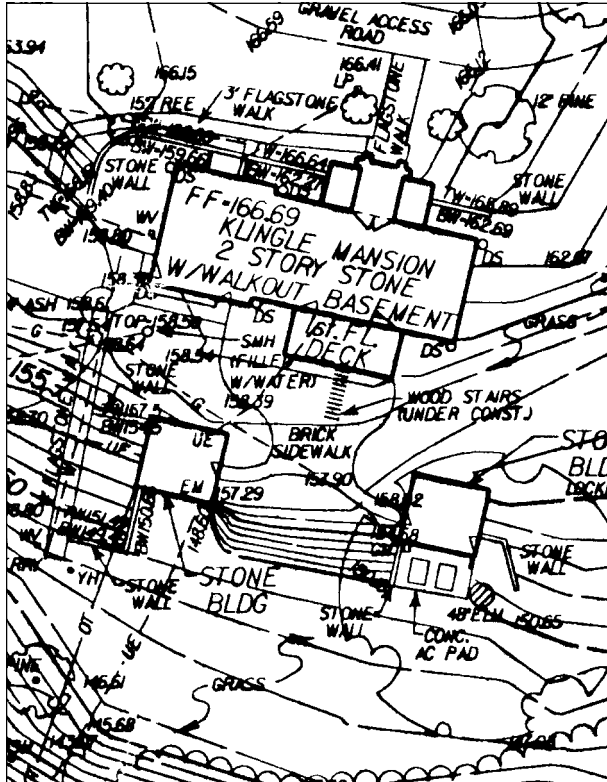


Figure 2. Typical portion of a topographic survey of English Camp. San Juan Island National Historical Park. (NPS, 1987)

importance of a cultural landscape. A site survey performed before a topographic survey can aid in selecting features to be recorded in a topographic survey. If a topographic survey is performed before a site survey, the resultant topographic survey map can be used during a site survey to document landscape characteristics and associated features.

Aerial photogrammetry is an alternative technique for obtaining topographic information through the use of ortho-rectified (horizontally and vertically georeferenced), aerial photographs. (See Figure 3.) However, because the topographic informa-

tion is derived from a specialized photograph taken above ground level, the information is less refined than the information based on a traditional topographic survey. Aerial photogrammetry may be used to derive the overall topography of a large landscape, whereas a traditional topographic survey may be performed in landscape areas with a greater density of features. (See *Landscape Lines 5: Graphic Documentation*.)

The need and scope of a topographic survey and its scale depend on the type and size of the landscape, and the density of existing features. Also influencing the survey's scale are the

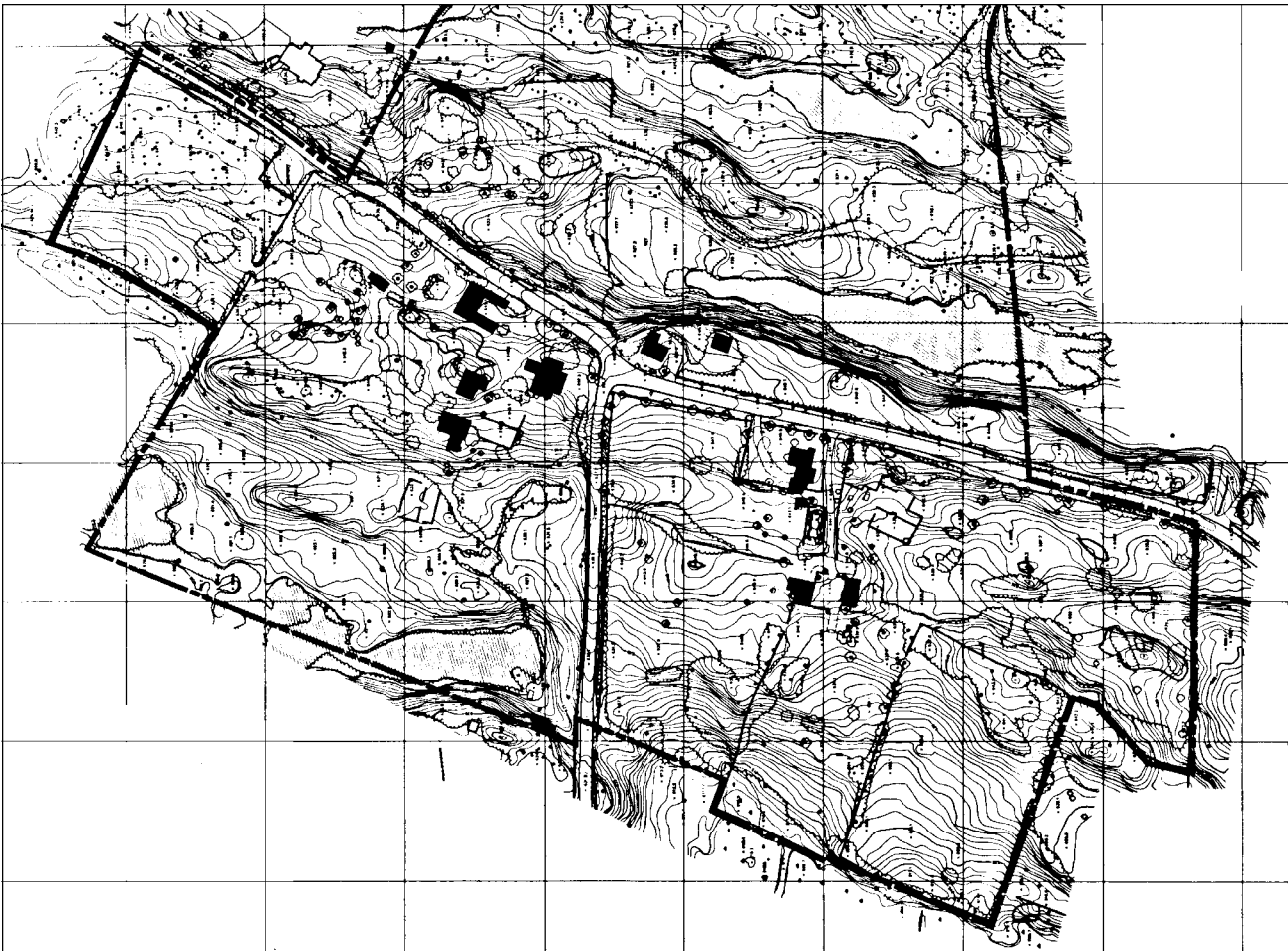


Figure 3. Topographic survey generated using computer aerial photogrammetry. Weir Farm National Historic Site. (NPS, 1992)

management objectives and the level of investigation for the CLR. Typically the scale of resolution of a USGS topographic quadrangle map at 1 : 2400 is too small to accurately depict topographic contours on a 1 : 200 base plan. For larger landscapes, a survey derived from aerial photogrammetry may be satisfactory and less expensive than a traditional topographic survey for obtaining landscape topographic data. If traditional methods are used to record the topography of an entire landscape, the costs can be reduced by using a larger contour interval for the overall landscape and a smaller (more detailed) contour interval for areas with a greater density of features.

Topographic information may be delivered as either a print document or electronic files (on disk). If the graphic documentation of a CLR is produced using computer aided design (CAD), it is best to receive that information from the surveyor as electronic files saved as a specified CAD format. This will make it easier to create a CAD base plan.

GROUND CONTROL SURVEY

A ground control survey establishes geographic control points, or benchmarks, to which all surveyed coordinates relate. The survey records horizontal and vertical ground control monuments already in place, or positions new ground control monuments where none exist.

A ground control survey is performed concurrently with other types of surveys to provide points of reference. If no benchmarks exist or

their coordinates are unknown, establishing a ground control may be necessary before topographic, utility, or hydrographic surveys are conducted. Traditional survey equipment, such as a transit, theodolite, electronic distance meter, level, and measuring tape is used in this technique. (See Figure 4.) A survey grid is established from either the ground control monument or benchmark.

UTILITY SURVEY

A utility survey identifies and locates existing or abandoned utilities, above and below ground, and documents their horizontal and vertical positions relative to a ground control. A utility

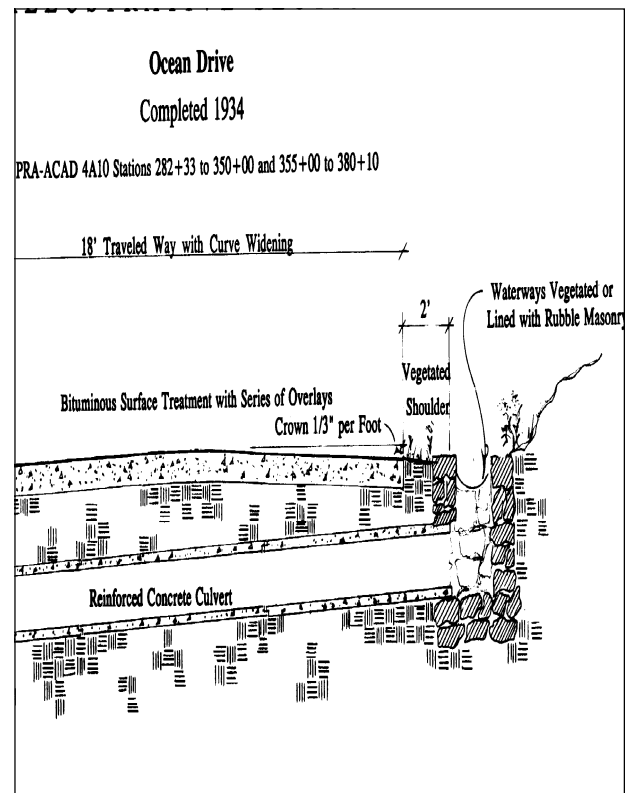


Figure 4. Surveyors using laser transits to perform a topographic survey. San Juan National Historical Park. (NPS, 1987)

survey is performed by a certified geophysical survey contractor and may involve identifying all utilities or just specified utilities.

Types of information recorded during a utility survey may include the type of utility, line diameter and location, materials of construction, and related structures or mechanical features. Geophysical survey equipment, such as ground penetrating radar, is used to detect the utilities. A utility survey also requires collection of all existing documentation from utility companies, although the documentation does not always include all site improvements that have occurred over time, such as the installation of, or modifications to, drainage, irrigation, and lighting systems.

Utility surveys contribute information to the development of the site history of a landscape, but the information is more likely to be useful in preparing construction drawings for work to be done as a result of a treatment plan. It may be more efficient to combine a utility survey with a topographic survey rather than contracting the two surveys separately.

CADASTRAL SURVEY

A cadastral survey, which can include and may be referred to as a property title search, involves researching the legal description of a property, including easements, former surveys and permits, and all other legal records related to the property through successive ownership. Such documents are found at the local courthouse, recorder of deeds office, tax assessors office, and any other jurisdictional offices.

The product of a cadastral survey may be a reference file containing copies of all legal documents related to the property, or a composite map that graphically presents legal information about the property. The survey may include a narrative or graphic description of the property in metes and bounds, a copy of the property plat, deeds, previous plats, permits or easements (such as utility easements), and ground control monuments. This information can be used to understand the historic and contemporary legal status of the property, to date certain features of the landscape shown or described in legal documents, and to identify any legal restrictions associated with the preservation and management of the landscape. (See Figure 5.) A historian, historical landscape architect, or other technical staff members can perform the survey.

BOUNDARY SURVEY

A boundary survey establishes legal property lines by locating and identifying coordinates for the boundaries of a cultural landscape. Knowledge of property boundaries is important for performing other kinds of surveys, such as topographic and utility surveys. Ideally, the location of property boundaries should be known before a site survey is performed.

A registered land surveyor or civil engineer will conduct a boundary survey when no record of property lines exists, or when no legal boundary markers are found on the property. Boundary surveys are performed using traditional survey equipment and they are often conducted with topographic and cadastral

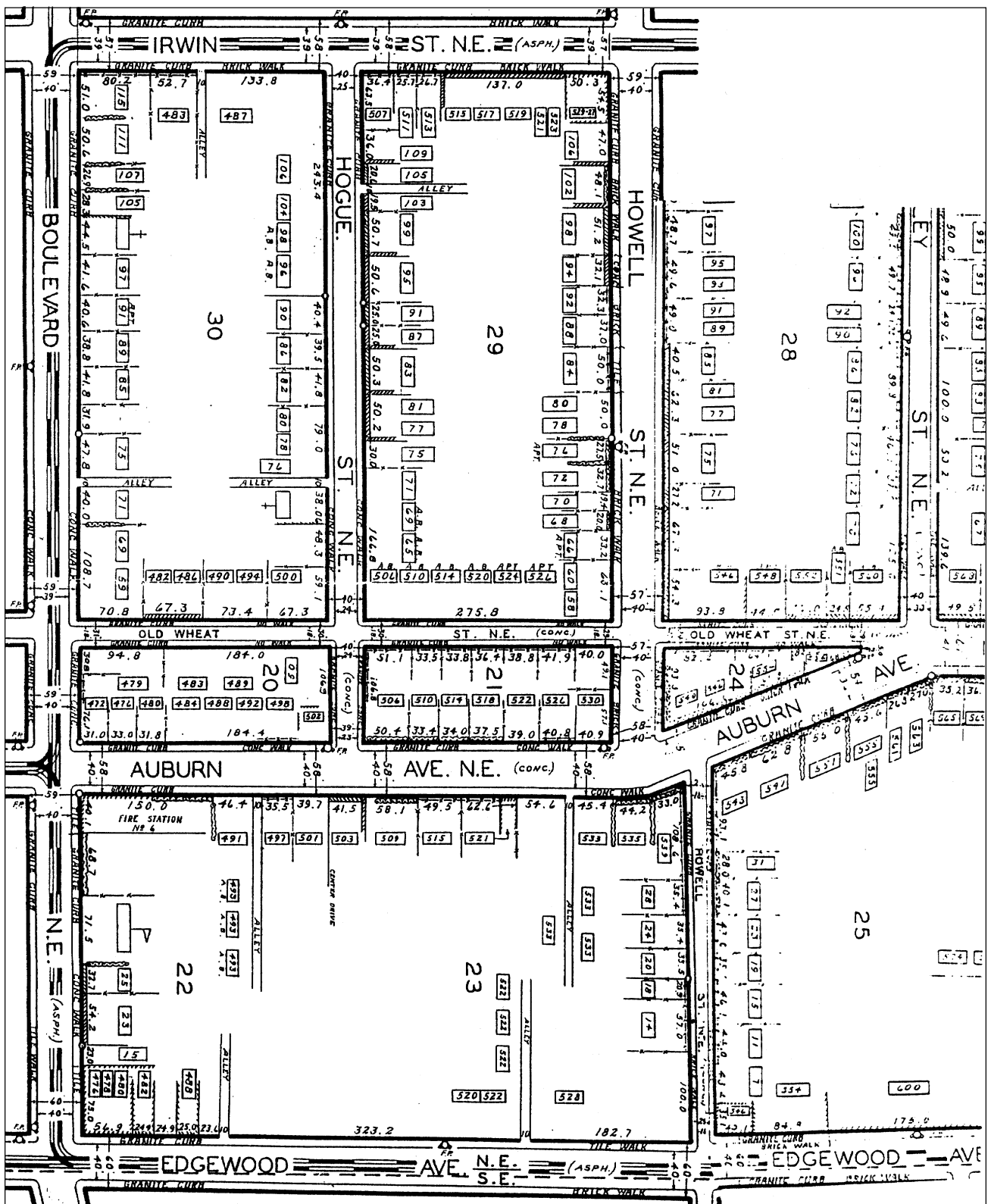


Figure 5. A historic cadastral survey map, performed by the Works Progress Administration in Atlanta. Map indicates the dwellings, property frontage, street width and alignment, and sidewalk conditions along Auburn Avenue. Martin Luther King, Jr., National Historic Site. (NPS, 1937)

surveys. The boundary survey may locate boundary markers and produce a narrative or graphic description of the property boundaries.

HYDROGRAPHIC SURVEY

A hydrographic survey maps the submerged topography and configuration of natural or constructed water features and locates and identifies underwater objects. A certified geophysicist contractor often performs this survey with an archeologist.

Geophysical survey equipment mounted on a floating vessel is used to conduct the soundings of a hydrographic survey. A side scan sonar uses reflected acoustic energy to record topography and locate submerged objects. Soundings are taken at regular intervals along survey lines perpendicular to the shore line. Supplementary soundings are taken of objects or features of particular interest, which may include sewer outfalls, sedimentation areas, spillways, dams, and rock outcroppings. The horizontal and vertical location of soundings is based on established ground control points.

Topographic and location information is received by a recorder and can be printed as a survey map or stored as an electronic file.

A hydrographic survey may be limited to investigating to a specified depth of sediment or surface geology beneath certain water features. Sediment cores or rock samples are taken from the bottom of the water feature using boring equipment. Archeologists, geologists, geophysicists, and archeobotanists may analyze the samples to better understand the cultural and natural history of the water feature and its environment.

A hydrographic survey may be necessary as part of an existing conditions investigation to better understand the underwater qualities of a water feature. This may be particularly important when a water feature contributes to the significance of a landscape, when the presence of submerged cultural artifacts is suspected, and when the size, shape, or depth of a water feature has changed since a historic period and the cause or effect of this change needs to be understood.

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to tribes.



**U.S. Department of the Interior
National Park Service
Cultural Resources**

Park Historic Structures & Cultural Landscapes