



The Grapevine



N e w s l e t t e r

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FOR CULTURAL RESOURCES MANAGEMENT

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STATE NEWS

Alabama

Microfilm versions of Alabama's HABS records and Sanborn Fire Insurance Maps can be ordered from Chadwyck-Healey Inc., 1101 King Street, Alexandria, Va 22314, ☎ 800-752-0515.

Connecticut

In celebration of the 25th anniversary of the National Historic Preservation Act of 1966, Connecticut Preservation Action recognized 25 individuals and organizations who have played outstanding roles in preserving the state's cultural heritage. The award winners include three who have significantly contributed to the preservation of Connecticut's archaeological heritage: Edmund K. Swigart, co-founder of the American Indian Archaeological Institute in Washington, CT; Public Archaeology Survey Team, Inc., a non-profit research organization, which, since its founding in 1976, has maintained a determined commitment to the identification and protection of Connecticut's archaeological heritage; and the Mashantucket Pequot Tribal Council, under the chairmanship of Richard Hayward, which has vigorously pursued the task of researching and documenting the Mashantucket Pequot history both before and after the arrival of Europeans in what is now Connecticut.

Missouri

The Missouri Historic Preservation Program anticipates having around \$50,000 in Historic Preservation Fund grant monies for awards to projects involving the stabilization or restoration of

Missouri resources related to transportation themes. Eligible properties must be listed in the National Register of Historic Places and meet the priority criterion of transportation significance. For further information contact Nancy Faerber, program secretary, ☎ 314-751-7858.

Ohio

The Ohio Historic Preservation Office's "Building Doctor" program is celebrating fourteen years of house calls across the state. Every month from April to October two experts travel the state holding two-day Building Doctor Clinics that are cosponsored by local groups. First, the experts present a program on preserving and rehabilitating older buildings, including tips on recognizing and solving common old-building problems. This program is followed by an inspection tour of up to ten buildings, during which the Building Doctors prescribe 'cures'. For further information contact Ohio Historic Preservation Office, Ohio Historical Center, 1982 Velma Ave., Columbus, OH 43211-2497, or call 614-297-2470.

Virginia

CONGRESSMAN GEORGE ALLEN (R-VA) INTRODUCES BILL TO CHANGE HISTORIC PRESERVATION REVIEW PROCESS

On April 9, 1992, Virginia Congressman, George Allen (Republican) introduced HR 4849 in the U.S. Congress. This bill would amend the National Historic Preservation Act in the following ways:

It would take the responsibility for determining whether a property is "eligible" for the National Register of Historic Places out of the hands of the National Park Service and put it solely in the hands of the Secretary of the Interior (a presidential appointee).

For parcels of five acres or larger, local governments would have the opportunity to concur in or object to a determination of eligibility for the National Register. If a simple majority of the local governing body objects to the determination, the Secretary **cannot** determine that a property is eligible until the objection is withdrawn.

Under this bill, local governments could halt the Section 106 process of determining eligibility of historic properties. Several arguments have been put forth in support of this bill, including the need to ensure local government participation and the affect of the determination on property rights.

SENATE BILL 514, COMMONWEALTH OF VIRGINIA

In a recent similar state fight lead by "property rights" groups and in particular, the law firm of Hazel & Thomas, a bill was passed in the Virginia General Assembly that will permit the retroactive delisting of properties on the *Virginia Landmarks Register*. The bill was sponsored by Senator Charles Colgan with 27 co-patrons. The companion bill, House Bill 1029, was patroned by Delegate Harry Parrish with 35 co-patrons. Both Senator Colgan and Delegate Parrish represent Manassas in Prince William County. A couple of years ago, the National Park Service, through a "taking", obtained a large parcel of land, under development by John "Til" Hazel, Jr., adjacent to Manassas National Battlefield. There certainly is no coincidence that the legislation was drafted by a lawyer working for Hazel & Thomas.

As passed by the General Assembly and signed by Governor L. Douglas Wilder, this legislation does the following:

Provides that "objections" from a majority of property owners in a historic district or from a majority of owners of an individual landmark, building, or site can block historic designation on the Virginia Landmarks Register;

Directs the Board of Historic Resources (BHR) to reconsider its earlier state landmark designation of the Brandy Station and Bristoe Station Civil War Battlefields under the new provisions of the law;

Requires the Virginia Department of Historic Resources (VDHR) to conduct an evaluation of the possible impact of historic designations on the two localities where reconsideration is to take place;

Directs the VDHR to develop regulations for designating districts, buildings, sites, and objects as landmarks;

Expands the notification requirements for designation to include adjacent property owners;

And, requires that public hearings be held on all historic district designations.

Aspects of the bill, such as the requirement for regulations, were positive steps that will strengthen Virginia's preservation program. However, any process that allows political expediency to block historic designation is not a constructive one.

The bill passed overwhelmingly in both houses. Clearly, "property rights" groups have the upper hand in lobbying support for their cause. The lesson from this bill is that preservationists in Virginia have much to learn about the political process and about teaching their constituency to be more vocal. Other States need to be aware that "property rights" groups are politically powerful and are able to sway politicians to vote for their cause.

By: J. Mark Wittkofski
Mid-Atlantic Regional Office
Gray & Pape, Inc.

PUBLICATIONS

The National Trust for Historic Preservation has released *The Economic Benefits of Preserving Community Character: A Practical Methodology*. This publication is a guide to examining the effects of preservation regulation and incentives on a community's economy and fiscal condition. Results of two case studies implementing this methodology also are available: *A case Study: Galveston, Texas* and *A Case Study: Fredericksburg, Virginia*. For More information contact Center for Preservation Policy Studies, National Trust for Historic preservation, 1785 Massachusetts Avenue NW, Washington, DC 20036, ☎ 202-673-4255.

THE SOCIETY FOR HISTORICAL ARCHAEOLOGY announces the publication of a special issue of the journal *Historical Archaeology* entitled *Meanings and Uses of Material Goods*. Edited by Dr. Barbara Little and Dr. Paul Shackle, Volume 26, Number 3 will be available in September. Contact: SHA, PO Box 30446, Tucson, AZ 85751-0446.

WORKSHOPS/CONFERENCES

NEW PROCEDURES FROM THE PENNSYLVANIA D.O.T.

By: Ruth G. Myers

The Pennsylvania Department of Transportation (PDOT) has recently drafted a revised set of procedures for activities related to Section 106 compliance within their project planning process. This document,

Strike-Off Letter (SOL) 430-92-29
Archaeological Procedures for Highway Project Development
March 18, 1992

replaces an SOL in force since 1985 (430-85-89). The revisions of PDOT's procedures and policy presented in this document are intended to reduce the time involved in the

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Managing Editor: W. Kevin Pape

Newsletter Editor: E. Jeanne Harris

Graphics Editor: Cathy Cunningham

Copy Editor: Marlesa A. Gray

Editorial address:

The Grapevine Newsletter
1318 Main Street
Cincinnati, OH 45210
☎ 513-287-7700
FAX 513-287-7703

CALENDAR OF MEETINGS

October, 1992 - The Florida Archaeology and Historical Conservancy, Ortona, FL. This annual meeting commemorates the opening of a new archaeology museum exhibit at Ortona Indian Mound Park in Glades County. This meeting is open to the public. For further information, contact: the Conservancy at 813-325-0789.

October 21-24 - Southeastern Archaeological Conference, Little Rock, AR. Deadline for proposals August 1, 1992. Contact John House, PO Box 136, UAPB, Pine Bluff, AR 71601, ☎ 501-535-4509.

Nov 5-8 - Eastern States Archaeological Federation, Annual Meeting, Pittsburgh, PA. Contact Richard George, Carnegie Museum Annex, 5800 Baum Blvd, Pittsburgh, PA 15206-3076, ☎ 412-665-2600, FAX 412-665-2751.

November 20-21 - First Discovery of America: A Conference on Ohio's Early Inhabitants, Columbus, OH. Sponsored by The Ohio Archaeological Council, the conference will be held at the Ohio Historical Center. The theme will be research on the Paleo-Indian and Early and Middle Archaic periods. Contact: Bill Dancey, OAC Conference Coordinator, Dept. of Anthropology, The Ohio State University, 245 Lord Hall, 124 W. 17th Avenue, Columbus, OH 43210-1364.

If you have a meeting you would like include on our calendar, The Grapevine will be glad to list it for you. Please remember to submit your listing by the 10th of each month.

review process, as well as to update PDOT's compliance with current Federal and State regulations.

Consultants from the many industries involved in PDOT projects were invited to attend a briefing on the new SOL and the procedures it encodes. This briefing was held at the William Penn Museum in Harrisburg, on August 3, 1992, and was well attended. The presentation was made by David C. Bachman (PDOT Staff Archaeologist), with the assistance of Deborah L. Suci (PDOT Historic Resource Specialist).

Prior to discussion of the new procedures, a capsule overview of cultural resource classes was presented, highlighting resources which might be encountered during a Transportation project in Pennsylvania. This discussion was aimed at those in the audience lacking a background in cultural resource management. A Fact Sheet outlining the Section 106 process was also provided for participants (*A Five-Minute Look at Section 106 Review*, Advisory Council for Historic Preservation, revised September 1986).

The primary changes instituted by the new SOL are: 1) a redefinition of the criteria for exempted projects, 2) expansion of investigations to include adjacent or proximate resources, 3) inclusion of non-archaeological resources in the archaeological review process, 4) introduction of the Preliminary Cultural Resources Review Form (PCRRF), 5) provisions for the combination of Phase I and II reports, and 6) an explicit consultation process to be carried out during cultural resources investigations.

PDOT projects must now meet all of the following three criteria to be considered exempt from the Section 106 process: 1) all planned earth disturbance is within an existing right-of-way, 2) no known or possible listed, eligible or potentially eligible cultural resources are located within the proposed project area, and 3) the project area is not adjacent to or in close proximity to any listed, eligible or potentially eligible cultural resource.

PDOT is especially concerned with significant cultural resources located in the vicinity of their projects because of the strong visual and physical effects of roads on their surroundings (*i.e.* vibration, noise and air quality, increased access...). No specific sphere of inclusion has been defined, allowing definitions of proximity to depend on local conditions and the nature of resources and effects. Related to this, Mr. Bachman and Ms. Suci expressed their approval of approaching the evaluation of resources from a perspective of landscape and context, rather than as isolated objects. In their experience, this point of view allows a better understanding of both the significance of resources, and the effects of projects on them.

Although PDOT has been dealing with structural and other non-archaeological resources for some time, there was no formal description of the process by which they were to be managed prior to the new SOL. The new document places them under the same set of procedures used for archaeological resources. PDOT's new PCRRF "pik-rii" form therefore provides specifically for the consideration of non-archaeological resources, as well as for more detail in resource description (replaces the former Preliminary Archaeological Resource Form, PARF). Although some District Offices complete this form in-house, others prefer to hire outside contractors. These forms are reviewed by the PDOT cultural resources staff and the PHMC/SHPO, and provide some of the bases for creating Phase I or II scopes of work.

PDOT also is concerned with expediting the review process, which is a notorious cause of project delays. To this end, they have made provisions for combining Phase I and II results into a single report. At the end of Phase I fieldwork, a meeting is held to discuss results and Phase II requirements, based on a short summary prepared by the consultant. The contract may then be modified to allow the consultant to proceed with Phase II fieldwork almost immediately. As a result, all consultants submitting proposals

for Phase I projects will also be asked to include generic technical and cost proposals for possible Phase II work.

Composite Phase I/II reports will include the usual descriptions of background, methods, results and recommendations, plus full evaluations of all sites found to be significant, identification of proposed effects on those sites, and proposed data recovery plans, along with Section 4(f) and/or Section 2002 (State-only funds) evaluations and draft Memoranda of Agreement when appropriate. Time spent on the review process will be reduced to that needed for a single document, hopefully facilitating negotiations over recommendations and planning for Phase III work.

This compression of the phased investigation process has great potential for saving time and confusion over documents. However, it is, as yet untried, and some revisions may be necessary. In order to reduce the potential for a failure to communicate, a schedule of conference calls and meetings is outlined in the new SOL. These consultations occur within each phase of the process, and involve consultants, PDOT planning and cultural resources personnel, and representatives from the Federal Highway Authority and the Pennsylvania Historical and Museum Commission (PHMC) when appropriate. The specific individual within PDOT with the responsibility for arranging each consultation is identified.

As an aside, the presenters mentioned that PDOT hopes to further expedite Pennsylvania's review of their projects by providing funds for additional personnel in the SHPO's office, people specifically intended to review PDOT projects. PDOT is also working with the PHMC to provide computerized data bases for information on sites and previous cultural resources investigations.

GLOBAL POSITIONING SYSTEMS

INDIANA JONES MEETS MR. SPOCK: USING GPS IN ARCHAEOLOGICAL FIELD WORK

By: Mark Druss

Introduction

This article is written in response to *The Grapevine's* request for comments from professionals on their experience with GPS in resource studies. Preliminary information on this topic is available in introductory articles by Farmer (1992) and myself (Druss 1992). The following comments result from an ongoing cooperative pilot study between Idaho Power Company and Trimble Navigation, Ltd. The study is designed to test the effectiveness of resource grade GPS for navigation and mapping in steep canyons. We are also assessing the integration of Pathfinder Professional™ GPS measurements

and ARC/INFO® GIS and the use of a barcode reader to record ecological and archaeological site attributes (Druss *et al* 1991).

Because my experience has been limited largely to the Pathfinder™, the following observations and suggestions are confined to 6 channel resource grade GPS receivers, such as the Pathfinder, capable of achieving 2 to 5 m accuracy with postprocessing of the field data. More expensive survey and geodetic grade GPS receivers can achieve sub-centimeter accuracy, sometimes with errors as small as 1 in 5,000,000 (Equinox, Inc. 1992). These units are not subject to the Selective Availability (SA) problems discussed below.

GPS technology is revolutionizing map making for archaeologists and other resource specialists, under the right circumstances. In briefly describing those circumstances I will address these issues: when you should use GPS, which GPS should you use, sources of error and how can you attempt to correct them, levels of accuracy you can expect, and the importance of good dealer support.

When Should You Use GPS?

The most important GPS question for any archaeologist is whether or not to use GPS at all. If you can always determine the location of archaeological site datum points and boundaries to within ± 10 m on the ground and then rapidly and accurately make a publishable map, you don't need GPS. If you cannot justify an expenditure of \$16,000 to \$32,000, you cannot afford to purchase the equipment. On the other hand, if you are working in an area with few landmarks, or if weather conditions prevent you from seeing landmarks, or if map production for publication is time-consuming, and if you can either afford the investment or if you can contract for GPS services, then GPS should be considered.

Which GPS Should You Use?

The second GPS question is which GPS to buy or stipulate that your sub-contracted GPS surveyor use. The GPS receivers and software you use should be capable of calculating differential correction, the postprocessing routines which remove sources of GPS errors, particularly SA (Hurn 1989:58 ff, Kruczynski 1990). Differential correction is performed on field data uploaded from the field receiver (called the remote or rover) to your office computer. The rover under consideration must be compatible with an existing base station whose data you have access to for differential correction. If you have access to data from an existing base station within 300 miles of your rover, you only need to purchase or contract for one field unit, costing about \$16,000. If no base station is available, you need to purchase or contract for two receivers, one of which must be capable of being used as a base station for differential correction. This

will cost an additional \$12,500 to \$16,000, depending upon your base station configuration.

In addition to the above, your rover must be capable of: (1) calculating positions in UTM and state plane coordinates as well as in Lat/Long.; (2) in-field monitoring of satellite health, signal strength, azimuth, elevation above the horizon, and User Range Accuracy (URA) [a relative measurement of the extent to which Selective Availability (SA) is in effect]; (3) masking signals from individual satellites according to user-set values for signal strength, elevation above the horizon, and satellite position geometry (PDOP); (4) allowing the user to choose the datum (WGS-84, NAD-27, etc.) for recording positions; and (5) allowing the user to set the rover for Manual 3-D data collecting in order ensure optimum data accuracy.

The software that comes with the receivers should be capable of: (1) performing differential correction; (2) providing mission planning information on PDOP's for the time and place of your data collection efforts; (2) providing mission planning information by means of a map of the satellite trajectories for the time and place of your data collection efforts; and (3) enabling healthy and disabling unhealthy satellites for mission planning purposes.

All of these features are available on the Pathfinder Professional™ and accompanying software, and they are all essential to accurate GPS positioning. Don't settle for receivers with fewer features unless you can vouch for their accuracy as the result of intensive field testing in your project area, regardless of the apparent cost saving.

GPS Errors and Corrections

Selective Availability

Apart from user error, which will disappear with a bit of practice, the most troublesome problem everyone encounters while using resource grade GPS receivers is caused by Selective Availability (SA). Hurn (1989) defines SA as the degradation of the code used by survey grade receivers. SA is under the control of the Department of Defense (DoD) which developed and currently operates GPS.

SA can be invoked at various levels and in different ways. When SA is off, GPS accuracy of less than 30 m can be achieved, even without differential correction. Also, when SA is causing only timing errors in satellite signals, differential correction programs could correct for the errors and return accuracies of less than 3 to 5 m. On the other hand, last winter, when SA created what seemed to have been errors in ephemeris, that is information about satellite position (Hurn 1989: 34), chaos resulted for resource grade GPS users until software engineers could create algorithms to compensate for the problem. My own position readings returned errors of scores and even hundreds of meters, even after differential correction.

Despite an extended clamor from the burgeoning civilian GPS user community to suspend SA, one must assume for time being that SA will be with us for some time. Fortunately, one can learn to live with SA. The user should monitor and record the URA levels prior to and during data collection. Ideally, the URA level on the Trimble Pathfinder should be between 2-3. On the other hand, if you turn on your receiver one morning before field work and URA is 30 or above, beware. Don't even try to navigate back to a known point with your resource grade equipment.

You may be able to get good position data after differential correction under high URA levels, but you should check your GPS system's accuracy. An easy way to do this is to take repeated GPS measurements on a point with precisely measured coordinates. After differential correction, all readings should be within acceptable accuracy limits. Ideally, at least 50% of the readings for any given point should generally be within ± 10 m of each other.

Also, there are corrections for SA induced problems. Trimble Navigation, Ltd. software developers have caught up with current SA signal degradation, which is still at high levels. Now differential correction returns reasonably high orders of accuracy, within 2 to 5 m, even with SA on.

Multipathing

Multipathing occurs when the GPS signal bounces off a canyon, building wall, or some other obstruction, such as your field vehicle, before hitting your receiver antenna. This causes the signal to be misinterpreted by the receiver as representing a longer than true distance from the satellite to the antenna.

Multipathing is difficult to correct. It cannot be removed by differential correction. However, its effects may be viewed on your computer monitor as a distortion of the plotted image of your GPS data. This distortion may be edited. For example, let's say that you have just mapped an archaeological site near a canyon wall with GPS. You know that the site has an oval shape roughly 75 m NE-SW by 50 m NW-SE. However, your differentially corrected GPS data generates a plot with a few long projections coming out of the side of the site away from the canyon wall. This may be multipathing and you can edit the plot in your GPS software, AutoCAD®, ARC/INFO®, or some other program into which you have translated your plot.

The GPS user may also predict when multipathing may occur and set his/her GPS rover accordingly in an attempt to prevent multipathing. Trimble's Pathfinder Professional™ software generates a "Skyplot" of individual satellite trajectories. Canyon walls can be modelled as "curtains". The user notes when certain satellites will fall behind the curtain in the project area. The problematic satellite can be "disabled" so that no readings are taken from it. This should prevent data collection from satellites which are sufficiently

close to canyon walls to cause signal multipathing. Getting this right will take practice. One should keep track of which satellites were disabled and at which time of day. These data can be compared to the plots of the GPS data to see the extent to which multipathing spikes have been prevented by disabling specific satellites.

Levels of Accuracy

In general, one can expect to achieve 2 to 5 m accuracy with resource grade GPS receivers if (1) differential correction is used involving a base station with known coordinates, (2) at least 3 minutes is spent on each station, (3) the PDOP is always below 8 and the majority of time PDOP is below 6, and (4) checkpoints with known coordinates are regularly revisited once every hour if possible or other methods of checking coordinate measurement repeatability are used (Lee 1991:2-3).

An accuracy of less than 25 m is achievable with one resource grade GPS unit, that is without differential correction, as long as SA is off and PDOPs are below 6 for most of the session (Lee 1991:3). Even higher orders of accuracy have been reported using one GPS unit for real time navigation on lakes in open country.

The accuracies mentioned above are in Circular Probable Error (CPE) levels. CPE for 5 m accuracy means that at least 50% of the coordinates measured will fall within a circle of 5 m radius (Lee 1991:3).

The Importance of Good Dealer Support

I cannot over stress the importance of good dealer support. While GPS is easy for a field worker to learn and use (Druss 1992), its concepts are extremely complex. A knowledgeable dealer will be able to guide you through training and use of resource grade GPS. A good dealer will also keep you abreast of such critical and ever-changing GPS factors as software bugs and revisions, satellite health, SA levels, and so forth. Without good dealer support you will have serious GPS problems.

Conclusion

Because 2 to 5 m accuracy is possible even under current SA levels, if you can demonstrate the cost-effectiveness of either purchasing resource grade GPS or contracting with a surveying firm that uses this technology, go for it! Just be careful to track the various GPS parameters such as URA and PDOP levels mentioned above.

Acknowledgments

The preceding comments are based on experience gained with the Trimble Navigation, Ltd. Pathfinder®, the Trimble Community Base Station® and discussions with Chuck Gilbert and Art Lang, Trimble; David Dean and Joan Eldredge, Electronic Data Solutions, Jerome, Idaho; Mark Luther, North Dakota Geological Survey; Roger Brink, Equinox, Inc., Hailey, Idaho; and Jerry Knight, Pete VanWyhe, and Jeff Lee, Idaho State Office and Burley District, U. S. Bureau of Land Management. I would also like to thank David Meyers, Manager, and Allan Ansell, Environmental Coordinator; and Nancy Cole and A.M.A. Holthuijzen, Biologists, Environmental Affairs Department, Idaho Power Company as well as Chuck Gilbert and Art Lang, Trimble Navigation, for supporting the pilot project.

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- Mark Druss, Ph.D., Archaeologist/GIS Coordinator, Environmental Affairs Department, Idaho Power Company, P. O. Box 70, Boise, ID 83707.

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☛ JOB ANNOUNCEMENTS

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Gray & Pape, Inc., 1318 Main Street, Cincinnati, OH 45210

☛ POSITIONS WANTED

Full-time Project Archaeologist, currently with the William and Mary Center for Archaeological Research, Williamsburg, VA, seeking to relocate to the intermountain west or southwest by

11/92. Have MA with specialization in historical archaeology and ethnohistory. Three years experience in a supervisory role with duties including proposal-writing and timely completion of archaeological survey, site evaluation, and data recovery projects on both prehistoric and historic sites throughout Virginia. I am interested in equivalent employment opportunities, preferably long-term, in the intermountain or southwest regions (AZ, NM, CO, ID, MT, WY, or UT). Joe B. Jones, 609 Penniman Road, Williamsburg, VA 23185, ☎ 804-220-8822.

☛ REQUESTS FOR INFORMATION

MONITORING PLANS

Does anyone have a monitoring plan for cultural resources in recreation areas? Jan Balsom, Grand Canyon National Park archaeologist, is setting up a monitoring plan for sites along the Colorado River. Her plan will pertain both to erosion from fluctuating river flows as well as visitation impacts. Anyone with information to share can reach Jan directly at ☎ 602-635-7758.



Teri Cleeland, Kaibab National Forest, is also interested in monitoring plans for visitation impacts to sites along recreational trails. Contact Teri at ☎ 602-635-2681.

☛ FOR YOUR INFORMATION

On August 10, 1992, Orloff G. Miller joined the staff of Gray & Pape's Cincinnati office, in the capacity of Principal Investigator.



Debra Hull-Walski (former of National Park Service's Mid-Atlantic Regional Storage Facility (MARS) in Washington, DC) recently joined the staff of the Smithsonian Institution, as Manager of Anthropological Collections.



Congratulations to Wayne Wood and Chrissie Curry, who exchanged wedding vows July 25th near their home town of Grafton, WV.

Z ENVIRONMENTAL SERVICES

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