8. Defining the Site by Subsurface Tests

Phase II tests identified site boundaries and activity areas within an eighteenth-century house and homelot site.

Phase II fieldwork began September 12, 1994, when Mr. Hurd returned to disk the eastern and western well-drained areas. Because of the heavy weed cover, it was necessary to disk twice. Cultivation created an open site, punctuated by an unplowed space around the two original test pits, where "camp headquarters" was established (Plate 15 page 107). The grid was staked, and chemical sampling began.

Rain finally came over the night of September 17–18, rendering the site available for detailed surface collection.

A ten-foot grid was laid over the western part of the property. Grid axes were numbered from west to east, and lettered from south to north. Each ten-foot square was identified by the coordinates of its northwest (map upper left) corner (Figure 28, page 116). The beginning points of the grid were sited outside the property so that there would never be any negative unit numbers.

Plate 13

Subsurface testing

Phase II tests were five feet square. The topsoil of all excavated units was sifted through quarter-inch hardware cloth screens. Here Aaron Jones throws soil into a sifter manned by George Keeler.

A traditional notation system, using letters in one direction and numbers in the other, was chosen for two reasons. First, and most important, it is consistent with computer spreadsheet programs that are used in modern spatial analysis. The second reason is clarity; the method eliminates potential confusion inherent in a coordinate system that uses numerical designators on both axes.

Each unit was identified in the records in terms of its ten-foot grid coordinate location. When five-foot squares were opened they were described as quadrants of the parent square. The surface collection from each ten-foot square was assigned a whole number in the Excavation Register. Whole numbers without letter suffixes indicate unstratified material throughout the system. Excavated quadrants of the plowsoil, and all features subsequently discovered, were assigned sequentially, as dug, without regard to stratigraphic relationship. Artifacts with suffix "d" might therefore come from a deeper context than artifacts with the suffix "m" or vice versa, depending entirely on accident of field sequence (Noël Hume 1968: 89). In order to accommodate the excavation register system to more recent ideas of stratification, notably the Harris matrix, all observed layers were assigned a letter, regardless of the presence or absence of artifacts.

In order to establish the internal geography of the site, it was necessary to plot artifacts, soil drainage, and chemical residues. All site components were plotted on the ten-foot grid for mapping purposes. The MacGridzo™ system from Rockware was used to map chemistry on rectangular site maps that encompassed all the culturally significant parts of the site (Figure 20). Later, in the Phase III work, the computer was used for detailed analysis

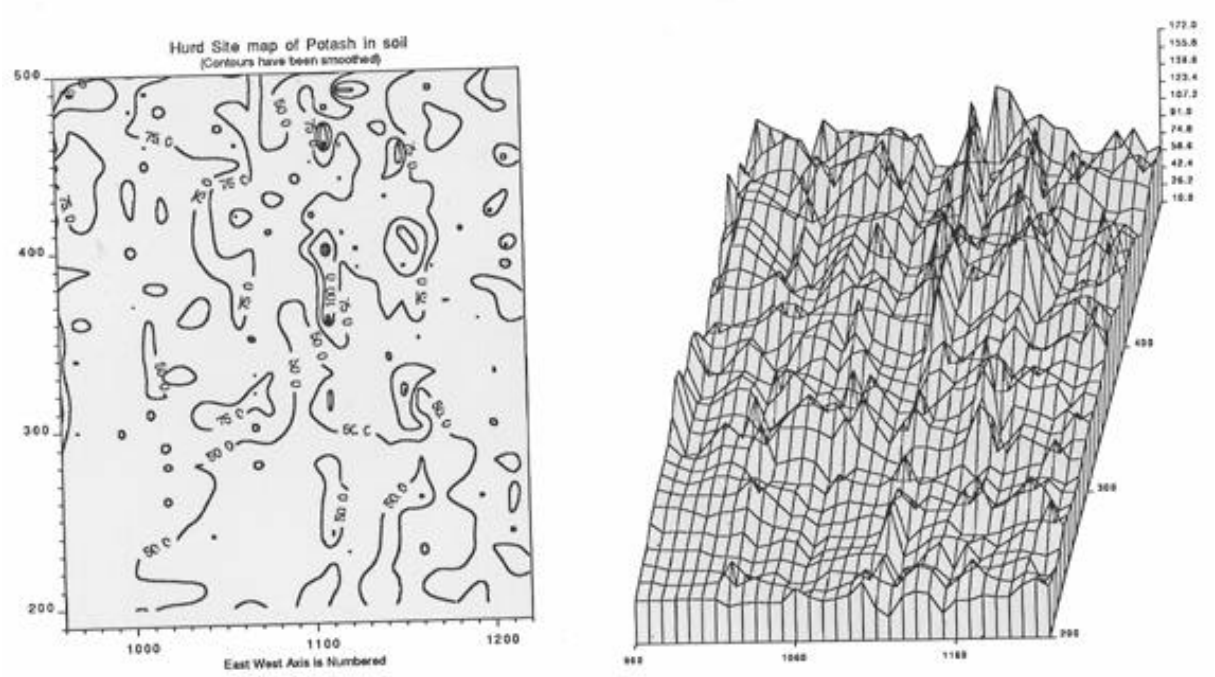

Figure 20
Legibility

Maps of the raw data for potash, derived from University of Delaware soil laboratory data for samples at a ten-foot interval. On the left is a "topo map" style diagram, while the wire frame diagram on the right shows the data interpreted as three-dimensional information. Both methods produced exceptionally "busy" and confusing distribution maps that did not clearly identify concentrations. The solution to this problem was a smoothing facility of the software that produced more eloquent maps (Figure 21).

mapping of the site core.

Artifacts were flagged but not immediately picked up. The array of yellow crop flags on the site allowed the investigators to visualize site limits and display the concentration for visitors. When the artifacts were harvested, the flags were left in place for a time. The "core" of the site, not cultivated, could not be surface collected.

The core was left uncultivated in September because it contained two open units that would be damaged by plowing, and because it was expected to be hand-excavated during a Phase III that already was being anticipated.

PHASE II TEST UNITS (5' x 5')

Grid Coordinates	*ER number*	*notes*
1120E (NW)	59A	
1130F (SE)	66A	Reddened soil
1150H (NW)	80A	Tractor track examined
1130I (SE)	69A	
1120K (NW)	64A	Feature, brick chips
1100L (SE)	49A	Clear tractor track
1090N (NW)	124A	
1120N (NW)	141A	Small postmold
1150K (NW)	175A	Reddened soil
1130L (SE)	174A	Edge of a feature seen
1150N (NW)	176A	Feature, possibly root
1160 O (SE)	177A	
1160L (SE)	178A	
1150M (NE)	179A	
1140M (NW)	181A	More of same feature
1130M (SE)	180A	Feature observed
1130M (NW)	180B	More of same feature
	180C	Feature primary fill
	180D	Feature primary fill
	180H	Brown fill of center
	180I	Feature primary fill
1130M (NE)	180E	Feature observed
1130 O (SE)	146A	Feature observed1100 O
1100(SE)	131A	

There was no need to derive distribution evidence from the known central nexus of the site's artifact concentration during an exercise designed primarily to identify its outer edges and broad configuration.

Surface finds were mapped by ten-foot unit, and entered in the excavation register. The data was then transferred to a hand-drawn map (Figure 26, page 114) which distinguished between units where a single artifact was recovered, and units where multiple artifacts were recovered. The resulting "quick and dirty" pattern diagram confirmed the impressionistic findings of the original surface survey, and provided tentative working dimensions for the observed site. Multiple-artifact units clustered around the initial test squares, with an outer ring of single-artifact squares.

This surface collection would later be studied to identify artifact concentrations that might have meaning for the interpretation of activity areas.

Computer-generated maps of specific artifact classes confirmed deductions based upon the impressionistic map. The map of fire-cracked rocks is particularly revealing. The maps of rocks and of the brick fragments, when overlaid, indicated a strong correlation. The obvious inference is that a hearth or hearths of mixed stone and brick construction existed on the site.

Soil drainage, an important factor in site definition, was assessed by a straight-forward approach. After heavy rains had saturated the soils, the investigators walked across the site, while setting stakes and flagging artifacts. There was a remarkable difference, sometimes obvious within one or two paces, between well-drained and poorly-drained soils. By noting the grid coordinates at which the workers' footprints became deeper, it was possible to map the ridge of well-drained soil. It should be noted that the well-drained soil is not exactly congruent with the highest (20-foot contour) part of the site. This discontinuity was attributed to the vagaries of automated ærial contour mapping. Since the shape and dimensions of the well-drained soils were identical to the highest ground as represented on the map, the principal investigator resolved to distrust the received topography.

Plate 14

Kent County Archaeological Society volunteers on the site:
Linda Horstick, Walker Miffline, and Dick Gardner

Soil chemicals were sampled at ten-foot intervals, at the base of the plowzone as prescribed in the state survey manual. A standard agricultural analysis was made by the soil laboratory at the University of Delaware College of Agriculture. The resulting maps (Figures21-23) would be used to interpret findings at the Phase II level. For the moment, however, suspicious eaks" were used to spot selected test units (Figure 27).

Phase II test units, each five feet square, were positioned to provide maximum coverage of the various parts of the site. Topsoil from each five-foot test square was shovelled and then sifted through a quarter-inch hardware cloth screen.

Two outlying units (1200U and 1070I) were situated at places with high peaks of calcium and phosphate, both of which proved to be virtually devoid of artifacts. Tests near potash concentrations, on the other hand, proved to be close to features and heavy artifact concentrations (Figure 27).

Starting from the north, an array of test pits was opened across the site along diagonal lines. The pits were 25 feet apart along the grid, but only about 14 feet apart on the diagonal, providing a smaller interval between tests than would have been possible if the usual gridded test pattern had been employed. In fact, it can be shown that have almost any systematic arrangement of staggered test squares is better than the traditional checkerboard pattern of tests on the corners of grid intersections (Kintigh 1988). The 14-foot interval was considered satisfactory, since any house is likely to a footprint at least this long on at least one side.

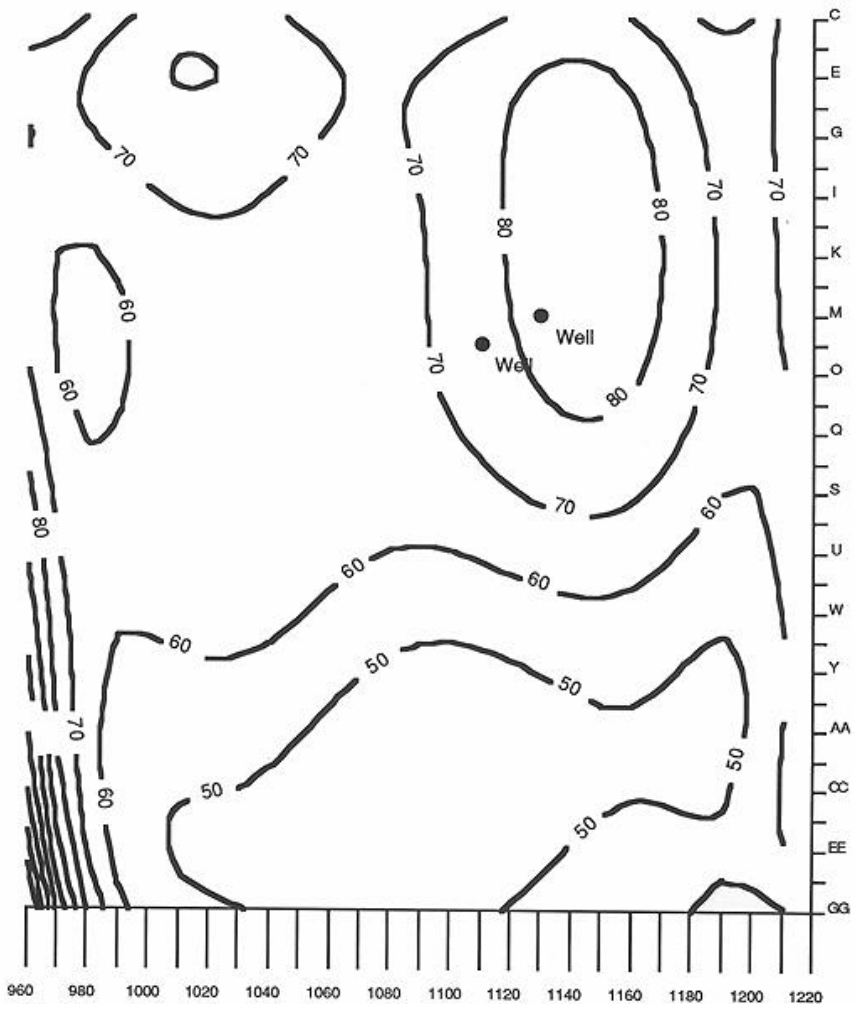

Figure 21

Refined map of the potash distribution detected along the ten-foot grid, processed through the trend surface module of the MacGridzo program. The site area, surrounding the two wells (large dots) was clearly delineated by the refined potash concentration.

The Kent County Archeological Society chapter of the Archeological Society of Delaware visited the site on a sunny November Saturday and opened three test squares in the southern part of the artifact concentration. Two of these units contained features. A third feature had already been identified nearby, close to the original two test squares and near the two highest potash peaks. The presence of these features helped confirm the original conclusion that the site center lay in the vicinity originally identified during the first tests. Both were tentatively (and, it turned out, correctly) identified as wells.

This brown area was interpreted as a robbed out well-shaft, for it became narrower and better defined as one went deeper.

At about two feet below grade, the central core became a well-defined shaft about two or three feet in diameter. A ring of brick chips in the surrounding fill was interpreted as spalled bricks from a robbed-out well lining.

Only one of the three features was

Plate 15

Ærial view of the site, after cultivation, October 5, 1994. The uncultivated area in center occupies the site core. In foreground is the drainage ditch that currently divides the property; the original seventeenth-century western property boundary of the patent is the hedgerow in background.

immediately uncovered. It proved to be a shaft, probably a well.

The overall feature was about seven or eight feet in diameter. This was filled with clods of yellow soil, trash, and brick chips, surrounding a uniform-colored brown central area.

The other two features were also filled with cloddy backfill material with trash inclusions. They were opened only in the isolated test squares where they were found, which means that their description was deferred for Phase III analysis.

Discovery of these features fulfilled a Phase II objective of demonstrating that subsurface features exist on the site.

Identification of at least one of these features as a well was sufficient evidence to conclude that the primary domestic part of the homelot would be found in the vicinity of grid locations 1100 to 1170 east and K through N south, an area roughly centered on the original two test squares.

Across the modern ditch in the eastern field, the procedures were more typical of Phase I than of Phase II. The field was plowed and the artifacts were flagged, but no grid was imposed on the field. A test square was located near the eastern property line, near several flagged artifacts (ER 169), but no features or artifact concentration could be identified.

Plate 16

View of the eastern well as first uncovered.
The brown slump of the shaft itself was obvious early in the process.

A second test, in the middle of the east field, proved to be more productive and more puzzling. It, too, was sited near a cluster of flagged artifacts.

The five-foot square revealed a deep disturbance, which proved to be a ditch. There were some historic artifacts in the topsoil, but the ditch fill contained only fire-

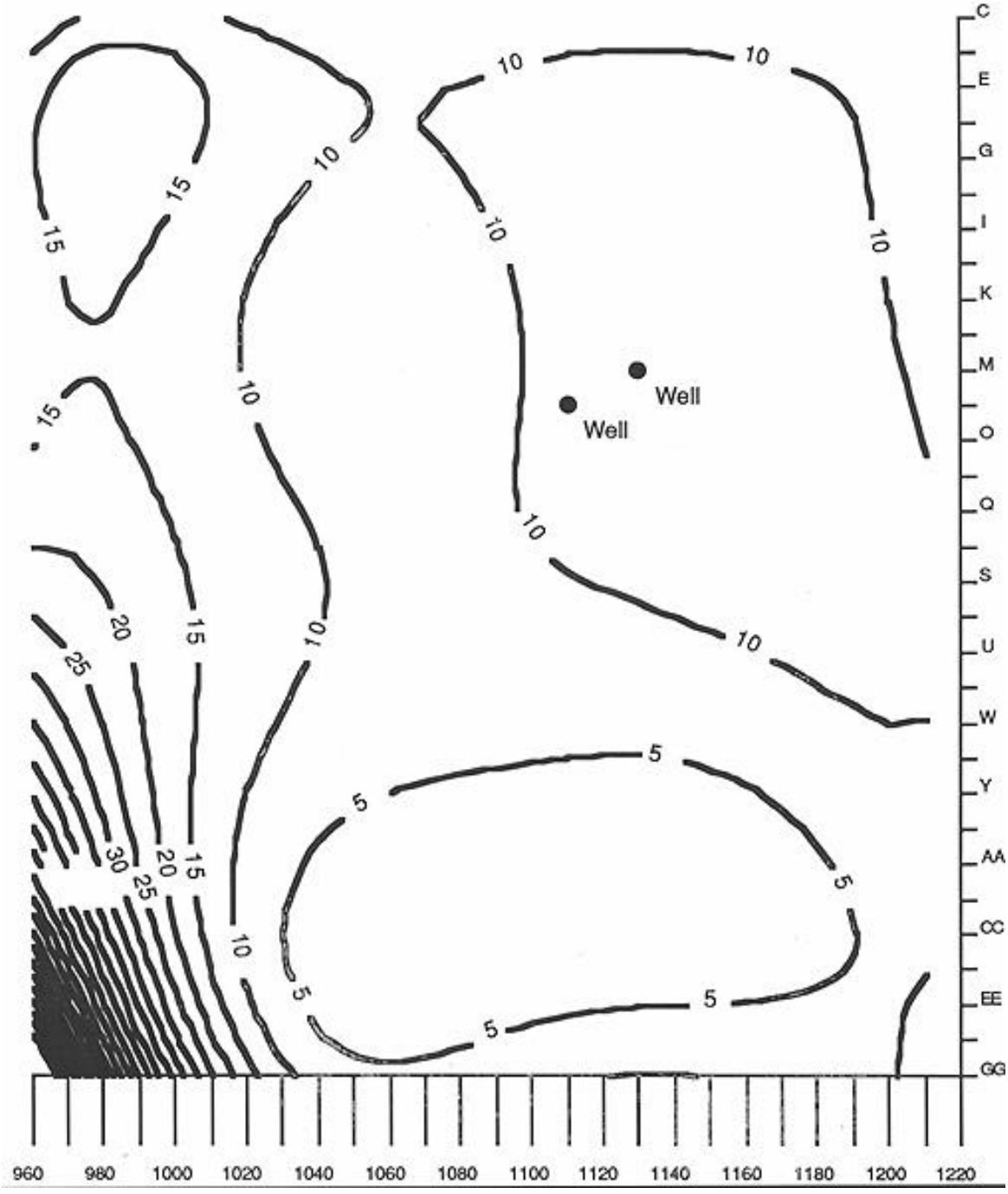

Figure 22
Phosphate survey at ten-foot intervals

Elevated phosphate around the wlels was interpreted as indicating the site location. The elevated phosphate level along the fence, upper left, northwest of the site core, could indicate the presence of an animal pen that was not betrayed by any artifact of feature finds.

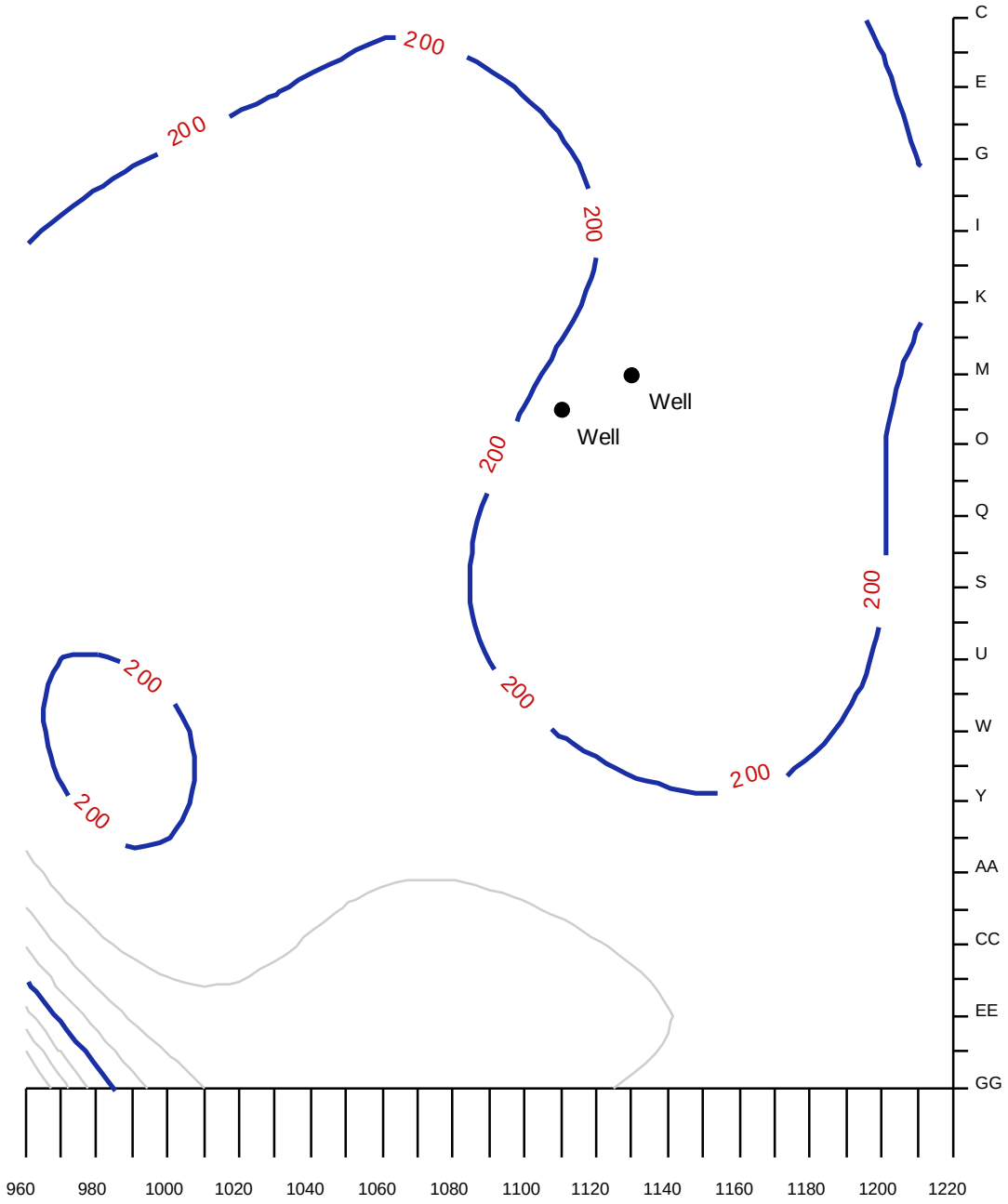

Figure 23

Magnesium survey at ten-foot intervals

Like the phosphate survey, the initial magnesium survey identified a peak at the wall location and elvated quantities in the northwest

cracked rocks.

This ditch was interpreted as the 1771 division line. The fill layers indicated that the ditch also had a drainage function and that it had been cleaned repeatedly.

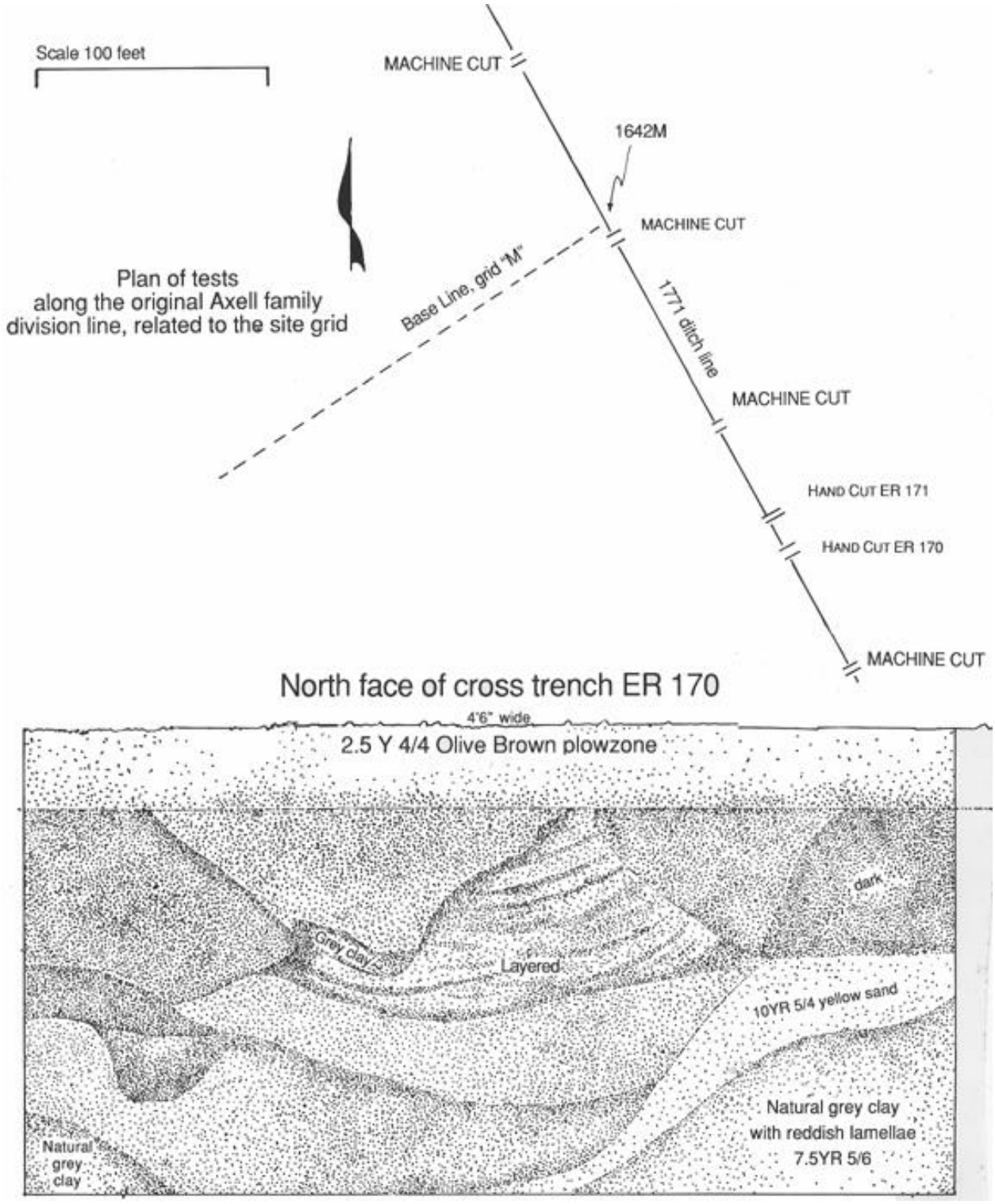

Figure 24

Plan and profile of the 1771 boundary ditch found in the eastern field

The ditch was five feet across, and about two and a half feet deep from probable original grade. The profile (Figure 24) clearly showed that the ditch had been cleaned several times, the last time as a very shallow v-shaped structure.

In order to assess the ditch, another test was sited to the north, along a line parallel to the sides of the original test. This trench was ten feet by two and a half feet, with the express purpose of identifying the ditchline.

As it turned out, the ditch lay exactly in the center of this test, and was five feet wide. Again, the only artifacts were fire-cracked rocks from the ditch fill.

Plate 17
Phase II begins

View northeast over the site October 5, 1994. Dashed lines roughly delineate the Axell division lines as ordered by the Orphans Court. The corner in extreme foreground center is the survey point that was disputed. Barren Hope is the tract to the left. Compare to Plate 68. page 334. The ditch shown in Figure 24 was found along the dashed line that indicates the boundary between the central and western shares.

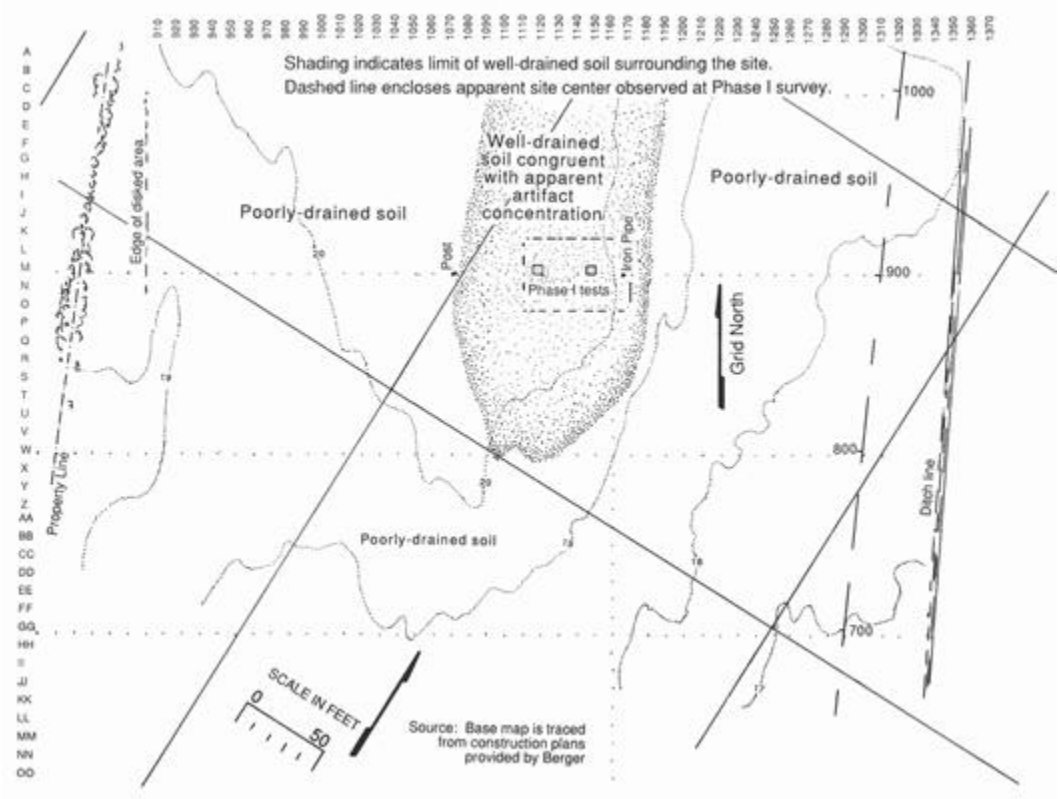

Figure 25

Site plan, showing initial tests, grid, and soil drainage characteristics.

The rocks from the second test could be refitted into the original two parent rock fragments, indicating that they were burned in a fire very near, if not in, the ditch.

Examination of the profile in these two tests revealed that the ditch had been re-dug several times,with a final profile that was much shallower than the original.

The location and bearing of this ditch was suspiciously close to the location of the 1771 property line between the western and central portions of the Axell estate. When surveyors from Century Engineering visited the site, they measured its location and superimposed the location on a copy of the base map. Sure enough, the ditch was on the boundary location, even though the archæological test had not been intentionally sited. A five-foot width may be significant.

Subsequently the investigators visited other boundaries of the property and found that the present ditch along the south boundary is five feet wide, and that part of the seventeenth-century boundary on the northwest also is marked today by a ditch five feet wide.

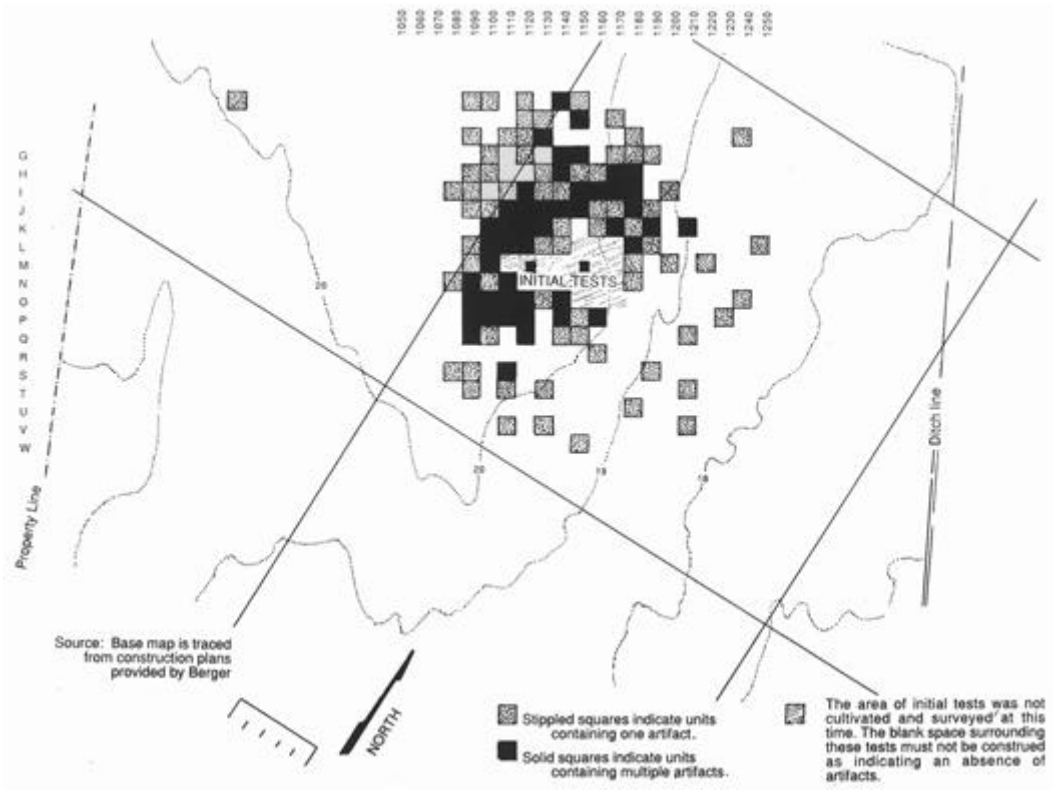

Figure 26

Surface collection results over all the site, as initially interpreted.

PHASE II ACCOMPLISHMENTS

The Phase II investigation attained its stated objectives of locating buried features and delineating the apparent site boundaries. In fact, three boundaries were identified for further study.

First of these was the boundary of the house site itself, called the "core" in the working shorthand. This core area was later defined as surrounding one, and possibly two, wells. Because it was expected to contain the most revealing and the most delicate remains, the core was identified for hand-excavation.

The second boundary identified was the boundary of the probable eighteenth-century homelot. Since most household activities normally take place on well-drained soil, common sense would indicate that the homelot would include well-drained soil plus surrounding areas that might serve as animal pens or other ancillary purposes. The larger homelot area, where features will be sparse and mostly architectural in nature, can most profitably be dug by machine.

When the artifact distribution was analysed, the homelot area became obvious. In the field, a cluster of yellow crop flags indicated places where artifacts had been found. These flags exhibited a dramatic pattern congruent with the well-drained soil. Further refinement of the surface-collection results allowed the creation of maps that demonstrated the existence of internal structure that might eventually be used to interpret the site (Figures 26).

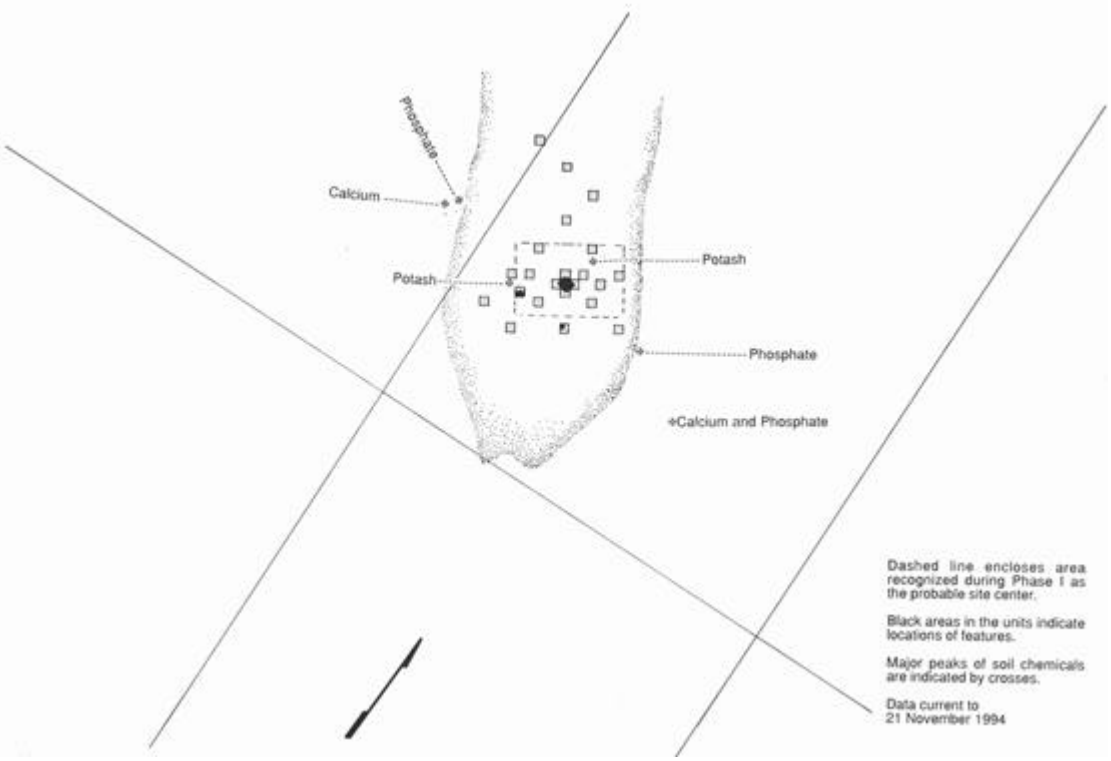

Figure 27

Plan of Phase II excavation units, with features highlighted.

By Thanksgiving, the site area had been tested with five-foot squares, arrayed over the artifact concentrations in an effort to define site boundaries more precisely. Chemical concentrations are identified rom the ten-foot interval tests shown in figures 21-23.

However, the Phase II test square array across the homelot did not reveal features north of the core area. (Figure 27) Artifacts recovered from these five-foot plowsoil tests repeated the patterning observed in the surface collection. The only subsurface features were tractor tire impressions, which were recorded for future interpretation as artifacts of a more recent agricultural phase.

Phase II testing of the homelot therefore confirmed the earlier finding that this area should be mechanically stripped in an effort to discover the few features that could be expected there.

Third of the boundaries was the eighteenth-century property line between the western and center thirds of the Exell property division. This unexpected find raised a series of related questions. If it should prove to be the 1771 boundary ditch, it is a valuable piece of evidence with which to interpret other such features elsewhere. Boundary ditches therefore enter the picture as a proper area of archæological research on this site. A few boundary ditches have survived in Delaware as visible property monuments from the seventeenth and eighteenth centuries, but the have not received the attention they deserve.

Boundary ditches generally do not follow drainage contours, which ordinarily makes it possible to distinguish between a boundary and a drain. In this case, the property line happened to trend down toward the branch.

1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190	1200
C	29	36		50		65	72						
D				51	58		73		83	89	97		
E	30		44	52	59					90			
F		37		53		66	74		84		98		
G	31	38	48		60	67	75	79	85	91			
H	32	39	45	54	61	68	76	80	86	92			
I 183	33	40	46	55	62	69	77	81	87	198*			
J		41	47	56	63	70	78	82	88	199	99		
K	34	42		57	64	71	209	175		95	100		
L	35	43	49	13	204	174	12	210	178	207**	208	102	
M	117	123	129	182	201	180	181	179		157	158		161
N	118	124	130	136	141	145	211	176					
O	119	125	131	137	200	146	149	151	177				
P	120	126	132	138	142	147	150		153		202		
Q		127		139				152					
R	121		133	140									
S	203												

Figure 28
Grid plan of units with register numbers shown inside squares

* Squares with ER numbers 93 and 94 also were numbered 198 and 199 in error.
** Squares with ER numbers 96 and 101 also were marked 207 and 208