

For the Record: The What, How and When of Stratigraphy

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Ontario archaeologists approach stratigraphy from a number of directions, a situation born from the adoption and adaptation of Canadian, American, and British field techniques. Each method is suitable for certain conditions, but we suggest that stratigraphic excavation must be used to understand site formation. Our technique focuses on the single stratigraphic unit and asks of it three questions: what is its nature? (fill, buried sod, or feature); how did it get there? (primary or secondary deposition); and when was it deposited? (the relationship to other layers and features). Posing these questions during excavation ensures that crucial information is not lost once the site is disturbed and allows the archaeologist to determine the site-wide sequence and phases of development later in the analysis. Detailed stratigraphic recording and analysis is often seen as time consuming, especially in mitigation excavations, but we will introduce methods currently in use at stratigraphically complex military sites in Ontario that effect rapid, thorough, and accurate recording.

Introduction

Archaeologists in Ontario approach stratigraphy in diverse ways. Some dig in arbitrary spits, then record and correlate the stratigraphic profile later in the analysis. Many excavate stratigraphically, removing each stratum in the reverse order of deposition while leaving baulks afterward drawn in profile. Still others use only the plan drawing as a basis for understanding the sequence. Finally, there are some who combine these techniques depending on field conditions. Methods for documenting stratigraphy are just as varied. Several use standardized, pre-printed forms up to four pages in length, while others keep a daily log of their findings in a notebook. Sometimes recording is the responsibility of a supervisor, while elsewhere each excavator chronicles the excavation.

A discussion of the historic factors that resulted in this situation is beyond this paper's scope, but it was at least partially born from the "cultural mosaic" of American, European, and Canadian scholars who created archaeological programs in Canada during the mid-to-late 1960s. However, all looked to the study of stratigraphy, regardless of method, to answer questions about what humans did on a site, how they lived, and when it all transpired.

The what, how, and when of archaeological deposits are certainly the basic questions asked by the Parks Canada Ontario Service Centre

Archaeological Services, Military Sites, a small group dedicated to cultural resource management of military National Historic Sites in Ontario. Over the past 24 years we have developed a system to help us answer these inquiries. We do not intend to argue that our method is more effective than any other, but merely want to present how it applies to our research.

Why Use Forms?

We began using recording forms to capture archaeological base data in 1981. Their adoption was not without deliberation. Left with the daunting task of making sense out of orphaned notebooks, penned in prose and often creatively disorganized, we felt that a systematic means of recording was necessary. The initial challenge was to bring some order to the data without stifling personal style and the inherent observations it brings to the endeavour. Our solution was, we hoped, to marry the best of both worlds. We needed a structured recording form that would encapsulate all the requisite information, while at the same time providing enough freedom to allow for in-depth description and interpretation.

Our recording form had to satisfy several other goals. Foremost, we wanted it to be a template or

aide-mémoire that would assist novice excavators to focus on the key and essential information required to document, and ultimately understand, the cultural resources under investigation. Second, it was to act as a frame of reference or ethic. Much of the recording form emphasises interpretation and site formation processes. Consequently, its accurate completion challenges our methods and demands thought and attention during excavation. The underlying premise is a steadfast belief in the importance of stratigraphic excavation and the obligation we have as archaeologists to understand the deposits exposed by our trowels.

Efficiency was our third concern. We believed that having specified data in a structured format would expedite data recovery, provide consistency in approach, and concentrate novices' attention on the essential elements of recording. This, we hoped, would streamline post-excavation analyses and report writing. Fortifications are characterized by modification and change in response to changing needs. As a result, their archaeological investigation can often involve identifying upwards of 100 stratigraphic deposits per excavation unit. Recording forms have greatly reduced the time required to compile layer correlations and site-wide stratigraphic analyses. They have also furnished unexpected benefits. Because of their structure, it is quite easy to review crew notes to see what essential information has been recorded and what observations are lacking before backfilling begins. The forms have proven their worth during emergency field mitigation, where time is a premium and distractions can unsettle even the most seasoned professional. The *aide-mémoire* aspects of the forms ensure that all pertinent data have been noted before services are laid and the heavy machinery gets down to business.

The initial influence for our forms came from the Winchester Research Unit (WRU), the academic environment that prompted Edward Harris to invent what came to be known as the Harris Matrix and develop the "single context sheet" with Lawrence Keen and Patrick Ottoway in the mid-1970s (Harris 1975, 1977, 1979a, 1979b). More recent, though similar, ideas have been adopted from techniques begun in the mid-1990s by the

Department of Urban Archaeology (DUA), now the Museum of London Archaeological Services (MoLAS) (Spence 1993).

The Lot Summary Form and the Primacy of Interpretation

Central to WRU, MoLAS, and our approach is the focus on the "stratigraphic unit." Generally defined, the "stratigraphic unit" represents "any single action...[that] leaves a positive or negative record within the sequence" (Westman 1994:1.2). These can have four kinds of temporal relationships to other stratigraphic units: earlier, later, equivalent, or unknown (Harris 1979a). The stratigraphic unit is referred to as a "context" under the MoLAS system (Westman 1994:1.2), but we call it "Lot," following Parks Canada conventions (DINA 1977).

A "Lot Summary Form" (Figure 1) is filled out when one of the following is encountered:

1. Recent sod;
2. Occupation level;
3. Fill;
4. Buried sod;
5. Interface;
6. Artifact or cluster of artifacts;
7. Intrusion;
8. Feature;
9. Natural Strata;
10. Lot extension/baulk;
11. Sample.

Finally, "Other," can be used when the recorder assigns a lot to a phenomenon he or she believes should receive individual analysis. For example, a 25 x 25 cm area within a larger deposit can be designated as a separate lot to keep the artifacts from this 25 cm square section together, thereby reducing the need to plot them individually.

Thus, the first task when filling out the Lot Summary Form is to define the nature of the lot and then in subsequent sections describe its soil type, spatial characteristics, mode of deposition, and relationship to other deposits. Generally, most recording forms seek similar information,



Parks Canada Ontario Service Centre
Archaeological Services

LOT SUMMARY

Date Began: 29.7.04	Crew: H. CARY	Site: 1314 FORT HENRY
Date Ended: 29.7.04		Lot No.: 131416L29

Nature of Lot:

<input type="checkbox"/> Recent Sod	<input type="checkbox"/> Buried Sod	<input type="checkbox"/> Intrusion	<input type="checkbox"/> Sample
<input type="checkbox"/> Occupation Level	<input type="checkbox"/> Interface	<input type="checkbox"/> Feature	<input type="checkbox"/> Lot Extension/Baulk
<input checked="" type="checkbox"/> Fill	<input type="checkbox"/> Artifact/Cluster	<input type="checkbox"/> Natural Strata	<input type="checkbox"/> Other

Brief Description: CHARCOAL, CLAY AND SAND OCCUPATION FILL

Soil Type:

Colour: DARK GREYISH BROWN (10YR4/2), YELLOWISH BROWN (10YR5/6) AND GREY (10YR6/1)

Composition: FRAGILE CLAY AND 10% GREY SAND

Compaction: MODERATE

Rock/ Particle Size (%): 10% ANGULAR LIMESTONE SPALL AVERAGING 17 x 5 x 5 cm

Spatial Characteristics:

Dimension/Shape and Extent: RECTANGULAR 1.05 m x 0.8 m.

Slope/Topography: GRADUAL SLOPE TO SOUTHWEST WITH HIGHLY UNDULATING TOP ELEVATION

Thickness and Range: 6-15 cm. THICKEST IN SOUTH AND THINS TO NORTH. AVERAGES 12 cm THICK.

Excavation Method:

<input checked="" type="checkbox"/> Hand Trowelled	<input type="checkbox"/> Shovelled	<input checked="" type="checkbox"/> Screened -4mm	<input type="checkbox"/> Floated
<input type="checkbox"/> Not Excavated	<input type="checkbox"/> Backhoe	<input type="checkbox"/> Other	

Mode of Deposition:

MODE: <input type="checkbox"/> Natural	<input type="checkbox"/> Primary	<input checked="" type="checkbox"/> Displaced	<input type="checkbox"/> Multiple Displaced	<input type="checkbox"/> Unknown	CONFIDENCE: <input checked="" type="checkbox"/> H <input type="checkbox"/> M <input type="checkbox"/> L
DURATION: <input checked="" type="checkbox"/> Discrete Event	<input type="checkbox"/> Accum. Over Time	<input type="checkbox"/> Unknown			<input type="checkbox"/> H <input checked="" type="checkbox"/> M <input type="checkbox"/> L
ARTEFACTS: <input type="checkbox"/> De facto	<input checked="" type="checkbox"/> Primary	<input type="checkbox"/> Secondary	<input type="checkbox"/> Unknown		<input checked="" type="checkbox"/> H <input type="checkbox"/> M <input type="checkbox"/> L

Interpretive Notes: MOTTLED CLAY, CHARCOAL AND SAND DEPOSIT PROBABLY DATING TO OFFICERS' BARRACKS OCCUPATION C. 1820-41. HIGH NUMBER OF ARTEFACTS IN GOOD CONDITION SUGGESTS DEPOSIT WAS NOT DISTURBED BY DEMOLITION. MANY HIGH END ITEMS, PERHAPS CLEAN-UP DURING INHABITATION. VERY SIMILAR TO MATERIAL UNCOVERED OVER BEDROCK IN 131416F.

Continued on additional page

Lot Relation:

Above: 33	28	26				
Below: 28, 26						
Equal:	29					
Cuts:						
Cut by:	33					

Diagnostic/ Important Finds: NEAR COMPLETE STEM GLASS, TUMBLER BASE, CREAMWARE CHAMBER POT RIM, WROUGHT NAILS, HIGH NUMBER OF FISH AND ANIMAL BONES (SOME CALCINED)

Figure 1. The Lot Summary Form (English version) used by Archaeological Services, Military Sites. Developed by J. Last and H. Cary.

but our emphasis on the nature of the lot and its associated formation process (or processes) reveals our philosophy that interpretation is fundamental to archaeological recording. All additional data are supporting evidence.

While many archaeologists prefer to describe a deposit solely by its physical characteristics—colour, composition, dimension/shape, and thickness—we have found such practice wanting for our needs. Simply listing a lot's physical traits lends little to hypothesis building about how and when it was deposited. Consequently, we include both natural and cultural site formation processes under the heading of “Nature of Lot” and provide an area entitled “Interpretive Notes” to capture our preliminary interpretations.

It is also in the latter section that we try to link the deposit to an event in the site's history, based on our understanding of the documentary

record. This is most often achieved by scrutinizing the relationship of each lot to those around it and constructing a Harris Matrix. As layers are discovered and added to the matrix, a relative chronology for the excavated unit emerges. Sometimes this leads to assigning absolute dates to a lot. For instance, a burn layer uncovered at Fort George is known to have been created on a single day—May 25, 1813—when a sustained bombardment by American hotshot batteries razed to the ground the buildings inside the fortification (Figure 2). Narrowing a deposit's origin to a specific moment in the past such as this can be achieved only through stratigraphic analysis.

By placing interpretation so prominently, we override the problem noted in the 1980s by DUA archaeologists, who found that the absence of preliminary interpretation in their field forms produced only a vague record of what had been



Figure 2. The American artillery bombardment of Fort George, Niagara-on-the-Lake, on 25 May, 1813, reduced the work to a smouldering ruin. Tangible remnants of this event are marked on the site's archaeology—even at considerable distances from the historic buildings—in the form of an ash and charcoal deposit. Top left photograph of re-enactment by David May (Upper Canada Provincial Marine, Amherstburg Division), bottom right photograph by Rachel Brooks (Parks Canada, Ontario Service Centre Collection).

unearthed and its significance to the excavation (Spence 1993:34). MoLAS partially addressed this with their redesigned forms in the early 1990s (Spence 1993:40), but our Lot Summary Forms give still more primacy to interpretation. Doing so, we believe, mitigates the commonly held view that *pro forma* sheets causes excavators to allow “the mechanics of the system to impair their intellectual method” (Spence 1993:44). By stressing the mental aspects of digging stratigraphy, we, like Dr. James Tuck—who has conducted extensive work at the seventeenth-century site of Ferryland, Newfoundland—“encourage the excavators to think about the process that could have been responsible for the deposit in which they are digging” (Tuck 1996:26).

We concede that in-the-field assessments can at times be speculative. For this reason, we added to the form a section for “Levels of Confidence,” as well as an “unknown” category, to help denote which interpretations should be reviewed. No conclusions we make during excavation are beyond question in the post-field work analysis, but who better to assign cultural activities than the excavator, at the time of excavation? It is far easier to interpret the nature of the lot and the means of its formation when other units are open and lots found in one unit can be correlated with those of another. While we stress to all crewmembers the importance of looking beyond their own excavation unit and advise them to note correlations in either “Interpretative Notes” or “Lot Relation” sections, commonly this task is left to site supervisors, who record their observations using supplementary excavation unit summary forms. Working out a relative site-wide chronology is also achievable at this stage, leading to more encompassing theories regarding how the site developed over time.

In-the-field interpretation also has pragmatic implications. Determining a stratum to be a fill or a buried sod, and making this explicit from the start, dictates how the lot will be excavated and studied. For example, fill deposits—because they are disturbed contexts—can be removed with greater speed than an in situ occupation level. Such an interpretation also provides Parks Canada engineers with data that can be immediately included into the planning process. If we cannot

tell an engineer or architect whether or not a deposit is significant or expendable while we are digging it, productivity and budgets suffer. Although there are occasions when post-excavation analyses are required to confirm or establish a deposit’s historic value, attempting to determine its mode of deposition and evaluate its significance during excavation helps us focus on problematic contexts.

After excavation, knowledge that a deposit is either a fill or an occupation is critical to the establishment of a Harris Matrix chart, temporal phasing, and the overall interpretation of the site. For instance, when dealing with fill, the most recent artifact recovered from it provides a *terminus post quem*, regardless of the number of earlier items found in association. However, the same cannot be said of an occupation layer. Since an occupation is a product of accumulation over time, the most recent object retrieved from it generally signifies the *terminus ante quem* of the stratum rather than its beginning. This also applies to whether a layer is a primary, displaced, or multiple-displaced deposit. Additionally, artifact studies are influenced. Regardless of how rare or interesting an artifact collection might be, an assemblage recovered from a fill will receive less attention than one found within a buried sod, by virtue of its limited interpretive value.

When the Lot Summary Form is completed, we have a combination of interpretation, sequence, and physical characteristics. Essentially, it is a marriage between Harris’ (1979a) focus on relationships and the American school of site formation (Rapp and Hill 1998; Schiffer 1976, 1987). Unlike Harris, we do not emphasize the importance of every lot’s interface; rather, it is the deposit’s physical composition and its stratigraphic position that helps us interpret whether it is a fill, a buried sod, and so forth, and to which temporal phase it belongs.

Never a Scheme Without a Plan

After writing the Lot Summary Form, the next step is to draw the lot’s boundaries in plan view (Figure 3). MoLAS uses 1:20 scale for this, but

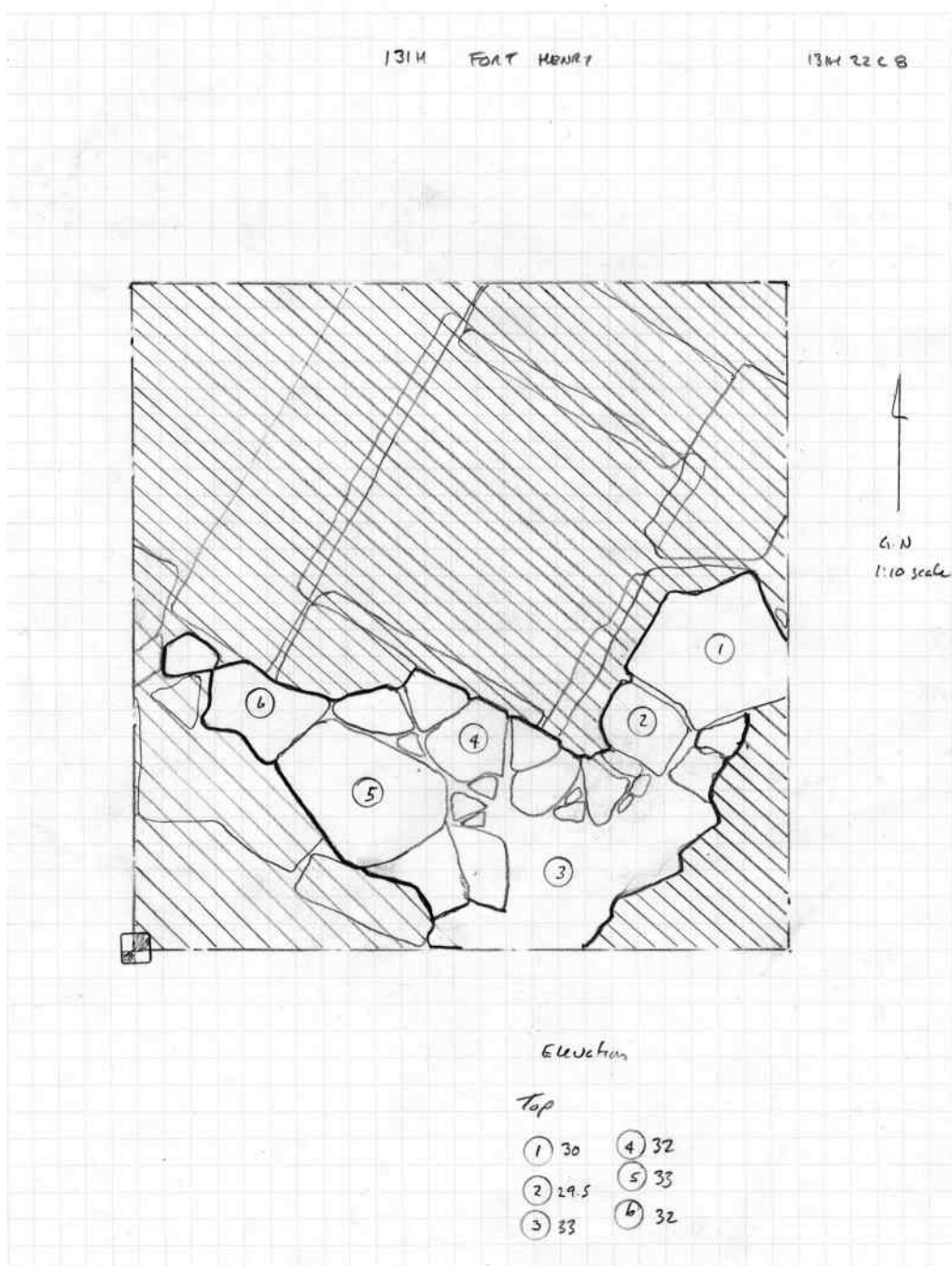


Figure 3. Example of a single-lot plan drawing from Fort Henry National Historic Site, Kingston. Drawn by J. Last.

we prefer 1:10 for smaller pits, as we find it more intuitive. Only the specific lot appears on the plan; this reduces confusion while emphasizing the stratigraphic unit as an individual entity. In order to capture superpositional relationships, we rely on abbreviated matrices that include all adjacent strata. Composite plans are rarely used, except when the excavation is completed. The unit walls are recorded in profile in 1:10, but if time is limited we may draw 1:1 by tracing the profile onto clear plastic sheet, then transferring it to paper in the lab. The selection of which wall, or walls, to draw is made on a case-by-case basis; however, we record as many as are necessary to document the overall stratigraphic sequence.

The practice of drawing profiles is non-negotiable, be it for test pits or open area excavations. Profiles are the best graphical representation of the site's formation, and they stand as the only tangible record of past depositional history. While a Harris Matrix illustrates the sequence, it misses the nuances of a layer's thickness, slope, and composition (Figure 4). Profiles are also useful for comparative analyses and for on-site presentations to visitors.

In open area excavations, a standing baulk can obscure relationships among lots from one unit to another. True to Murphy's Law, a baulk will invariably run across the feature you want to understand the most, but there are valid reasons to keep it, at least until an occupation level is reached and the baulk can be drawn and removed. Because the profile is a physical record, although partial, it survives even when a soil layer in the middle of the unit dries out and its boundaries become difficult to see. It also retains layers that were easier "read" in profile than in plan. With the profile, at least a remnant of a sometimes-crucial deposit will remain to be examined and preserved.

We maintain this full range of stratigraphic recording even when artifacts are not found. Regardless of whether artifacts were dropped in a given area, elements of the historic landscape usually survive to shed light on archaeological findings in other areas or at other sites. For example, our study of the fill levels at Fort Henry has provided a detailed picture of how the terrain has

evolved over the past 200 years (Cary and Last 2004:13-15). Here, the Royal Engineers successively deposited thick layers of rubble about the site in an attempt to protect and mask the ramparts of the fort. Other sites, such as Fort George, have provided insights into land modification since the British occupation and continuing after the 1930s restoration (Fox 1996).

Bringing Home the Stratigraphy

Once we are out of the field, a thorough site formation analysis can begin. For this we use the Lot Summary Forms, supplementary notes, profile drawings, and Harris Matrix to group the lots from excavated units into site-wide temporal phases. Phasing, like lot interpretation, is often tied to periods consistent with our understanding of the site's history. Commonly, it is established through the use of the documentary record, although occasionally we can identify phases of development previously unrecorded that, in turn, inform historic scholarship. This dialogue between the historical and archaeological record—begun with the individual lot and continued to include the site-wide sequence—attempts the "multi-directional approach" to historical archaeology favoured by Deetz (1993:158), and in doing so, we hope, contributes new insights to the study of British military life.

Military sites provide the conditions for a multi-directional approach, and they require it of us. Because British fortifications are blessed with a wealth of historical records, we can analyze the stratigraphic sequence on a much more fine-grained level than is achievable on less documented sites. But while we can narrow down a layer's deposition to within a few months, days, or even hours—such as the burn stratum of Fort George—only the sequence can give us this refinement, as the artifacts at best furnish dates to the nearest decade. Such detail allows us to identify strata associated with the reasons why a site was designated as a National Historic Site by the Government of Canada. These deposits, and what they represent, are of the highest importance and

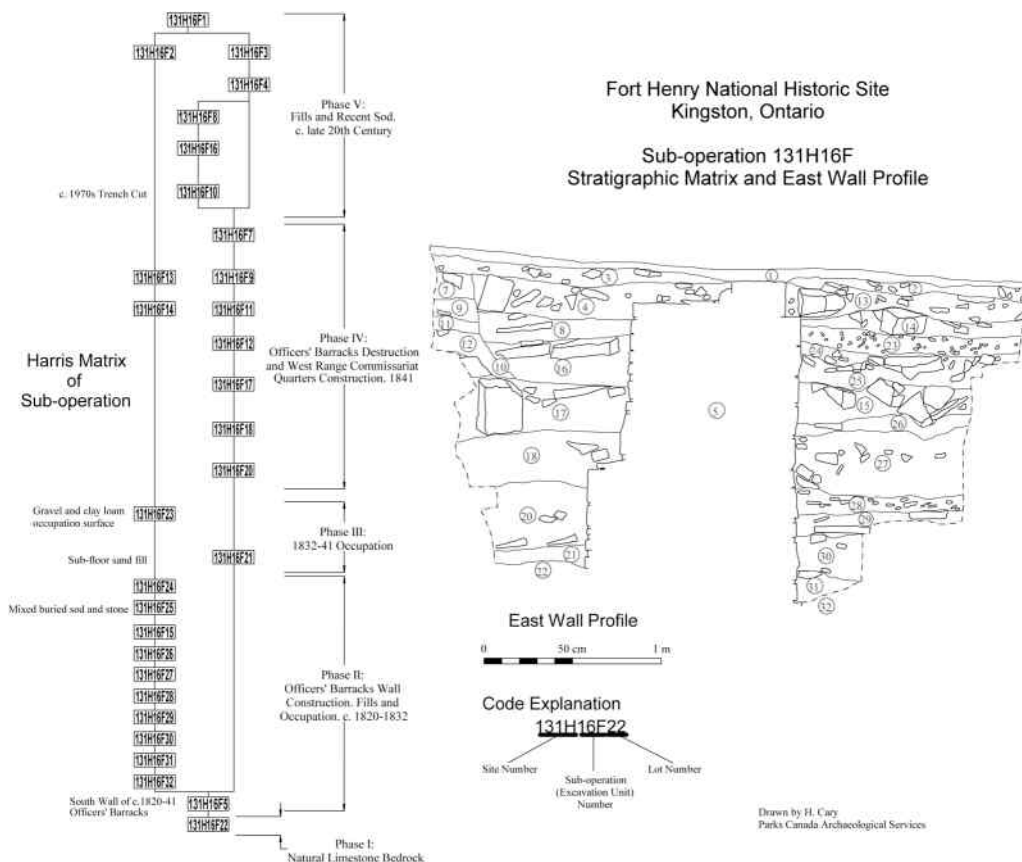


Figure 4. Example of a stratigraphic profile and accompanying Harris Matrix from Fort Henry National Historic Site, Kingston. Drawn by H. Cary.

must be protected and presented to the public. Determining which resources are of national or regional significance also has ramifications for our collections management strategy in that it provides guidelines for their future storage and study.

Phasing, like lot interpretation, is not a one-time exercise and can involve re-evaluation, refinement, and rethinking. Because we return to sites continually, sometimes in the same year, the stratigraphic intelligence we have gained at Ontario's military sites allows us to effectively and efficiently assess what is significant and important. In turn this often speeds excavation, recording, and subsequent interpretation, all of which are primary concerns to field archaeologists.

Conclusion: Benefits of the Lot Summary Form

Our level of recording is easily perceived as time-consuming and at times excessive, but we present that in most cases it is in fact faster and more consistent. The British model from which it came was specifically designed to speed up data recording without sacrificing accuracy (Spence 1993:26). The set of checked boxes on our Lot Summary Forms, like the reminder lists on the MoLAS forms, serve as mental prompts to ensure that the same information is recorded for all deposits, features, or cuts—regardless of how hot, cold, wet, frozen, or pressured the excavator might be.

Our single-lot method is also advantageous because it can be adapted to any site regardless of type, affiliation, or age. We do stress, however, that knowledge of site history, as discussed above, is mandatory for interpretations to be formulated with confidence. Expedience and precision are often achieved by making the excavator responsible for documentation. The well-trained field worker who removed the deposit is the most qualified to describe its characteristics, freeing up the supervisor to move among excavation areas with the knowledge that a standard set of data are being recorded. For large mitigations, this is particularly important, because a single principal investigator simply cannot record all of the recovered elements simultaneously.

Over the past two decades, the content and detail of our Lot Summary Forms have slowly evolved, but what has not changed is our underlying belief in the primacy of stratigraphic excavation, matrix analysis, and the interpretation of modes of deposition. Given our mandate and the complex nature of the sites under study, we have found that the use of Lot Summary Forms, beyond acting as an *aide-mémoire*, help to guide our interpretations in and out of the field. While we acknowledge that our Lot Summary Form is not the end-all for archaeological recording, it does provide an assurance that basic information is captured in a thorough, consistent manner.

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Puisque les archéologues ontariens pratiquent un mélange de techniques de chantier canadiennes, américaines, et britannique, ceux-ci approchent la stratigraphie de nombreuses directions. Même si chaque méthode convient à certaines conditions, nous présentons que l'excavation stratigraphique doit être pratiquée afin de comprendre la formation du site. Notre technique se concentre sur l'unité stratigraphique singulière et pose trois questions : quelle est sa nature? (remblai, gazon enterré, ou constituant archéologique); quelle est son origine? (dépôt primaire ou secondaire); quand fut-elle créée? (relation aux autres couches et constituants). Poser ces questions lors d'une fouille garantit que toute information importante ne soit pas perdue une fois que le site est dérangé, et permet aux archéologues de déterminer la séquence et les phases de développement à travers le site plus tard au stade d'analyse.

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