Research Questions: Concentration Analysis

The persistent assumption among archaeologists is that archaeological sites and artifacts that exist or that they encounter within a plowzone have little research value. Archaeologist who voice this opinion attempt to justify this conclusion by noting that these artifacts are no longer in situ in their original depositional context. Research has shown that artifacts within the plowzone have a tendency to move vertically but show little lateral horizontal movement. Lewarch and O'Brien (1981) identified two types of movement caused by the plow: longitudinal, going in the direction of the plow movement, and transverse, perpendicular to plow movement (being thrown off to a side). Longitudinal movement was found to be less than 3 m. while the average transverse movement was only 40 cm (Lewarch and O'Brien 1981: 27). Other researchers found mean displacement of 2-4 m (Roper 1976: 374) and 1.6 m for surface displacement of experimentally placed tiles (Trubowitz 1978). When an undisturbed site is plowed the plow lifts the artifacts, turns them over, and drops them back in near to their original depositional location. The plow drags the occasional piece further afield by being attached to the plow, but most of the material originally deposited at a site remains close to where it is found. It must be noted that researchers have found that in situ concentrations of artifacts do tend to get slightly spread out. As a result a deposit which may have originally been circular and covered and area of one by one meter, may be spread to cover an area of one and one half meters by one meter as a result of plowing, now having an oval shape versus its original round shape. Overall, it has been found that plowing does not produce a random pattern of artifact displacement, it moved artifacts a greater distance along the plow line but much less perpendicular to it. This is the result of the affect of drag and displacement from plowing. Plowing does affect concentrations, distorting their original shapes and diffusing the concentration, but it does not completely destroy their integrity or value (Sterud et al. 1978:102). Plowing was found to have differential effects on artifacts of different sizes: plowing carried larger artifacts farther than small ones, and was also found to be less reliable in predicting small subsoil anomalies such as post molds versus larger ones such as middens or concentrations (Lewarch and O'Brien 1981: 36 , Riodan 1988: 3-4).

As a result, an examination of concentrations identified within a plowzone context has the potential to add to our knowledge of implement manufacture, refuse disposal, and the predictability of identifying other activity areas and features preserved in the subsoil through a careful examination of the plowzone concentrations. Hoffman (1982) found that plowzones hold the potential "for reflecting the contents of primary contexts that lie beneath them" (Hoffman 1982: 305). Riordan summarizes the more positive attitude towards plow zone studies "While specific, point provenience has been lost on plow zone materials, the overall pattern of the site will be preserved. The plow zone data can provide important behavioral insights on the site's occupants. the data are not 'ruined', they are just slightly out of focus." (Riordan 1988: 4).

Large sites with multiple overlapping occupations, even if they are unplowed, provide a challenge to interpretation due to the mixing and overlap that occurred prehistorically by the multiplicity of the occupations (Sterud et al. 1978:94). These sites, even when plowed, benefit the least from systematic plowzone concentration studies. Smaller sites that show evidence of limited occupation or of extensive one time occupation spread out over a wide area, provide more favorable conditions for this sort of concentration analysis. Small, shallow sites with short-term occupations have the potential to provide information to more accurately define specific activity areas (their spatial and industrial characteristics), to build up a repertoire of discrete activity loci, and to use the refined understanding to

sort out and explicate the varied activities occurring at larger, more complex sites (Sterud et al. 1978: 95).

Examining the lithic debitage recovered from a single short-term activity site in New York State, Sterud et al. were able to show that plowzone concentrations retained enough research potential to make at least one of the site, a site which exists only in the plowzone, eligible for inclusion on the National Register of Historic Places (Sterud et al. 1978: 116). The researchers used distribution plots to graphically present the extent of the distributions and their composition. The examined the lithic assemblage in terms of what stages of manufacture they represented and thus the types of activities and nature of the occupation that occurred at the site.

Archaeologists evaluated the lithic assemblage from the concentrations identified in the plowzone using a three stage lithic tool manufacture (Table 1).

Table 1. Manufacturing process (after Sterud et al. 1978: 106)

Raw Material Nodule

	A. Production of flakes to be modified into bifaces and unifaces	**B.** Production of bifaces from nodule itself
Stage I:	**Cores**	**Byproducts**
	a. Large blocks b. Primary decortification flakes c. Small amounts of debitage d. Large percentage of pieces with cortex	**Large, thick bifaces**
Stage II:	**Regular-Shaped flakes**	**Byproducts**
	a. Expended cores b. Irregular flakes c. Smaller Blocks	**Small, thin bifaces**
Stage III:	**Bifaces, unifaces recognized tool types**	**Byproducts**
	a. Smaller flakes b. Large amount of debitage c. Few blocks	**Bifaces and recognized tool types**

Stage I consists of the core or the rough biface or thick primary flake depending on which trajectory tool manufacture was going to take. Stage II includes the preform shape while Stage III includes the finished tool. The three stage manufacturing process was originally developed by McManamon (1976) in a study on the potential of the plowzone in cultural resource management studies in Massachusetts. Matthew Rose tested this manufacture process on three loci at the Osterhoudt site. Rose used simple length to width measurements for each artifact class from three Lamoka settlement sites in New York (Sterud et al. 1978: 107). He found a recurring gap between the measurements for the rough bifaces and cores and the preforms and a close overlap between the preforms and finished projectile points, with preforms being slightly larger. These patterns appear to be consistent to assemblages associated with all three Lamoka occupations and are not site specific. At one site, only a single core and no rough bifaces were present, indicating a low occurrence of Stage I activity. Preforms on the other hand

were present and showed evidence of breakage and discard during manufacture. At another Lamoka site used for comparative purposes (the Loder site) archaeologists recovered few small flakes, indicating a strong emphasis on Stage II manufacturing and less of an emphasis on other stages (Sterud et al. 1978:111). At the Osterhoudt site, testing recovered many small flakes and 87.5% of the projectile points recovered showed evidence of having been broken in the course of use versus manufacture. The overall conclusion regarding this site was that three of the loci represented a limited activity locations associated with hunting and fishing associated with the adjacent watercourse, a place where hunters replaced and repaired tools broken during the hunt (Sterud et al. 1978:111). The authors concluded this based on the following reasoning:

-projectile points broken in the hunt were removed and discarded
Evidence: heavy preponderance of basal elements and a low occurrence of tips
-preforms that had been reduced elsewhere were used to replace the discarded points
Evidence: preforms present
absence of larger trim flakes and cores/ blanks
presence of fine retouch flakes
broken preforms
broken in progress projectile points (tips and bases with manufacture breaks)
-processing of prey occurred elsewhere, short term task specific camp
Evidence: low occurrence of FCR, lack of cutting and scraping tools or utilized flakes

The fourth locus, located distant from the other three, was less well-defined but contained 10-20 times as much fire cracked rock, larger flakes, a larger biface (possible knife), and a couple of well-utilized large flakes (Sterud et al. 1978:111, 116). While the loci can not be cross-dated, it appears that at this fourth locus people carried out different types of activities.

Mcmanamon 's 1979-1981 survey of the Cape Cod National Seashore presented a four class classification for archaeological deposits (concentrations) encountered (Mcmannamon 1984: 365). Examining the densities of lithics, the occurrences of faunal remains (mainly shellfish) and fire-cracked rock and the diversity of the lithic assemblage, he argued that concentrations with dense remains and a high diversity of lithic artifacts constituted secondary deposits (middens composed of waste from activities occurring elsewhere on the site and deposited or redeposited in a mixed assemblage). In contrast to this were concentrations without dense remains and a low diversity of lithic artifact types, classified as primary deposits (deposits resulting from singular activity specific activities such as biface reduction). Between these two extremes, he identified two other gradients of density and diversity The four general deposit/ concentration categories developed were:

1) **Primary Deposits, limited activities-** characterized by low density and diversity and a narrow range of types of materials
2) **Primary Deposits, wide range of activities-** characterized by higher diversity of artifact types and a wider range of types of remains than the first but less dense than the third or fourth
3) **Secondary Deposit, shell midden-** characterized by high densities of shell, but relatively low densities of other remains with the range of types of remains being not as wide or diverse as type four

4) **Secondary Deposit, general midden-** characterized high densities of two or three kinds of remains, a wide range of kinds of remains and a relatively high diversity of artifact types (Mcmanamon 1984: 369).

McManamon carried out deposit analysis and comparisons on deposits containing >100 pieces, with a total of 81 concentrations being examined (Mcmanamon 1984:365). Archaeologists identified several trends regarding the nature of the concentrations and their cultural implications. In concentrations with low occurrences of fire-cracked rock, they concluded that cooking activities were less frequent or more concentrated spatially (Mcmanamon 1984: 369). Archaeologists concluded that higher occurrences of fish remains indicate that fish procurement and/ or processing was more intensively practiced at some locations than at others (Mcmanamon 1984:772). General midden concentrations were found to have high concentrations of pottery, faunal remains and FCR with the co-occurrence of a limited amount of floral remains (Mcmanamon 1984:372). Researchers interpreted concentrations with substantial amounts of pottery, faunal remains and FCR as being the result of sites where a variety of subsistence and cooking activities occurred (Mcmanamon 1984:372). They classified concentrations with a high density of lithic debris and little else as primary deposits resulting solely from lithic manufacturing consisting of the reduction and thinning of general purpose biface blanks related to the procurement of lithic raw materials from the immediate vicinity (Mcmanamon 1984:374, 377). High densities of lithics and FCR and the near absence of faunal remains and features indicate that the concentration was the result of a short-term occupation by a small group of people (Mcmanamon 1984: 377, 380). Large concentrations of lithics and FCR, to the absence of other classes of materials, that show spatial grouping of FCR and lithic artifacts were the result of repeated use of a location for short-term occupations by small groups (Mcmanamon 1984: 380). Generally, the longer that people occupied the site, the greater the variety of activities represented in the concentrations and the greater the likelihood that created artifacts will be lost (Mcmanamon 1984: 385). This last point relates to the fact that as the length of occupation increases, so does the variety of lithic raw materials used (Binford 1979). Overall, based on the analysis, most concentrations consisted of a combination of lithic, pottery, FCR and faunal remains, indicative of a variety of activities being carried out near the concentrations. Special purpose activity locations were rare or "archaeologically invisible" in the sense that they left insufficient evidence of the occupation to be identified by conventional field methods of sampling and survey (Mcmanamon 1984: 387).

Mcmanamon found that the concentrations datable to the Late Archaic consistently consisted of primary deposits associated with a range of activities and only 6% were secondary deposits (Mcmanamon 1984: 401). Early Woodland concentrations were difficult to identify individually, and as a result, no conclusions could be drawn regarding the nature of Early Woodland deposits. Middle Woodland deposits were general midden deposits while primary deposits were missing. This indicates that activities were spatially more consolidated during the Middle Woodland than the Late Archaic, supporting the increase in sedentism assumed for this period. late Woodland concentrations followed the same pattern as the preceding Middle Woodland with more general midden secondary deposits versus primary deposits (Mcmanamon 1984:404). The density and diversity of remains in the Middle to Late Woodland concentrations indicate sedentary, longer-term occupations when compared with the Late Archaic concentrations. They also showed a high diversity in floral and faunal remains, indicating the use of a wider variety of micro-environments than during earlier occupations and the processing of these resources at a single base camp near to the secondary deposits identified (Mcmanamon 1984:

409). Among all the concentrations, regardless of temporal association, the lithic technology employed was comparable (Mcmanamon 1984: 405).

Archaeologists at the Muttock-Pauwating Site identified 27 concentrations of prehistoric artifacts during plowzone sampling across the project area (Table 2).

Table 2. Concentrations identified across the project area

Concentration	Location	Size	Area (sq m)	Orientation	Artifact Count	Density (per sq m)
1	L1H	6 x 2.5 m	15	E-W	165	11
2	L1H	3.5 x 2.5 m	8.75	E-W	138	15.8
3	L1H	6 x 3.5 m	18	N-S	137	7.6
4	L1S	3.5 x 1.5 m	5.25	E-W	14	2.7
5	L1S	1.5 x 1.5 m	2.25	NA	59	26.2
6	L1S	2.5 x 2.5 m	6.25	NA	91	14.6
7	L2H	8 x 7 m	56	E-W	1336	23.9
7A	L2H	8 x 7 m	56	E-W	274	4.9
8	L2H	4.5 x 3.5 m	15.75	E-W	142	9
9	L2S	3.5 x 2 m	7	E-W	68	9.7
10	L4H	1.5 x 2 m	3	E-W	99	33
11	L4H	6.5 x 1.5 m	9.75	N-S	222	22.8
12	L4H	5.5 x 3 m	16.5	N-S	264	16.5
13	L4H	3.5 x 3.5 m	12.25	NA	412	33.6
14	L4H	1.5 x 1 m	1.5	N-S	21	14
15	L4S	9.5 x 9.5 m	85.5	NA	6317	73.9
16	L5H	5.5 x 4 m	22	N-S	502	22.8
17	L5H	7 x 7.5 m	52.5	N-S	1214	23.1
18	L5H	3.5 x 3.5 m	12.25	NA	370	30.2
19	L5H	1.5 x 1.5 m	2.25	NA	124	56.4
20	L6H	1 x 1.5 m	1.5	E-W	46	30.7
21	L6H	5.5 x 3.5 m	19.25	N-S	178	9.3
22	L6H	3.5 x 2 m	7	E-W	123	17.6
23	L6H	7.5 x 4 m	30	N-S	414	13.8
24	L6S	3.5 x 3.5 m	12.25	NA	285	23.3
25	L6S	2 x 2 m	4	NA	102	25.5
26	L7S	1 x .5 m	.5	E-W	11	5.5

Archaeologists interpreted most of these concentrations (51.9%) as representing McManamon's Type 4 deposits, those with a wide range of activities represented, a wide diversity of artifact types and

generally a wider range of lithic raw materials being represented (Table 3). Type 4 concentrations

Table 3. Artifact classes and deposit types by concentration

Concentration	Debitage	Pottery (Grit/ Shell)	Bone	FCR	Tools	Deposit Type
1	157	3 Grit	3	1	Quartz Biface	1
2	133	2 Grit	2	1	Chert Biface Quartz Scraper	1
3	130	1 Shell	0	1	Quartz Biface Mudstone Levanna	1
4	35	0	0	3	Rhyolite Small Stemmed	2
5	49	0	0	7	Pestle Quartz Small Stemmed Preform	2
6	88	0	0	0	Rhyolite Biface Rhyolite Point Tip Quartz Squibnocket Triangle	1
7	827	128 Grit/ 2 Shell	205	143	Rhyolite Uniface 5 Quartz Unifaces Quartz Point Tip Rhyolite Biface Quartz Squibnocket Triangle Rhyolite Stark Base	4
7A	238	0	0	9	3 Argilllite Biface Argillite Preform 2 Argillite Unifaces 3 Quartz Bifaces Quartzite Preform 3 Rhyolite Bifaces 2 Rhyolite Preforms 2 Rhyolite Unifaces Argillite Neville Drill 2 Argillite Nevilles 4 Rhyolite Stark Quartzite Stark 3 Rhyolite Nevilles Rhyolite Orient Fishtail Rhyolite Susquehanna Broad	2
8	128	7 Grit	12	2	Chert Point Tip Quartz Uniface Rhyolite Biface Rhyolite Rossville	4
9	35	0	3	7	Quartz Small Stemmed	2
10	81	10 Grit/ 2 Shell	10	1	Quartz Biface Quartz Squibnocket Triangle	4
11	158	24 Grit/ 3 Shell	24	16	Rhyolite Point Tip Quartz Squibnocket Triangle	4
12	196	36 Grit/ 1 Shell	36	11	Quartz Biface	4

					Quartz Uniface Quartz Levanna Rhyolite Levanna Rhyolite Bare Island Rhyolite Stark	
13	343	33 Grit/ 2 Shell	29	15	Chert Biface 2 Quartz Bifaces 2Rhyolite Biface Rhyolite Drill Quartz Squibnocket Triangle Quartz Fox Creek Hornfels Levanna	4
10	81	10 Grit/ 2 Shell	10	1	Quartz Biface Quartz Squibnocket Triangle	4
11	158	24 Grit/ 3 Shell	24	16	Rhyolite Point Tip Quartz Squibnocket Triangle	4
Concentration	**Debitage**	**Pottery (Grit/ Shell)**	**Bone**	**FCR**	**Tools**	**Deposit Type**
12	196	36 Grit/ 1 Shell	36	11	Quartz Biface Quartz Uniface Quartz Levanna Rhyolite Levanna Rhyolite Bare Island Rhyolite Stark	4
13	343	33 Grit/ 2 Shell	29	15	Chert Biface 2 Quartz Bifaces 2Rhyolite Biface Rhyolite Drill Quartz Squibnocket Triangle Quartz Fox Creek Hornfels Levanna	4
14	13	6 Grit	6	1		2
15	5617	218 Grit/ 65 Shell	218	58	Pennsylvania Jasper Biface 21 Quartz Bifaces 2 Rhyolite Bifaces Quartz Drill Steatite Pipe Blank 4 Quartz Unifaces Rhyolite Uniface 3 Rhyolite Point Fragments Quartz Point Fragment Quartzite Point Fragment Attleboro Red Felsite Point Fragment Slate Atlatll Weight Argillite Neville Drill 3 Rhyolite Starks Quartzite Stark 2 Rhyolite Wayland Notched	4

					Quartzite Orient Fishtail 3 Quartz Small Stemmed 5 Rhyolite Small Stemmed 21 Quartz Squibnocket Triangles 2 Rhyolite Squibnocket Triangles Rhyolite Rossville Chert Greene Quartz Levanna	
16	447	7 Grit/ 4 Shell	7	12	Argillite Point Tip Chert Scraper 2 Quartz Bifaces Quartz Point Tip Quartz Utilized Flake Slate Gorget Quartz Levanna	4

Table 3. (Cont.)

Concentration	Debitage	Pottery (Grit/ Shell)	Bone	FCR	Tools	Deposit Type
17	1032	65 Grit/ 5 Shell	65	27	Argillite Biface Chert Point Fragment 2 Quartz Bifaces 2 Quartz Unifaces Rhyolite Adze? Rhyolite Biface Rhyolite Core Rhyolite Drill Rhyolite Point Midsection 2 Quartz Levannas Quartzite Stark 2 Rhyolite Base Island Rhyolite Stark	4
18	300	15 grit/ 9 Shell	14	10	2 Chert Bifaces Chert Point Tip 3 Quartz Bifaces Quartz Bare Island Rhyolite Boats Rhyolite Levanna	4
19	101	14 Grit/ 5 Shell	14	0	Quartz Biface	4
20	41	0	2	1	Quartz Small Stemmed	1
21	149	6 Grit/ 4 Shell	8	1	Quartz Biface Rhyolite Point Tip Hornfels Wayland Rhyolite Wayland 2 Quartz Bare Island 2 Quartz Levannas Rhyolite Bifurcate	4
22	115	2 Shell	1	1	4 Quartz Unifaces	1
23	360	10 grit/ 11 Shell	21	4	Chert Point Tip Chert Uniface 3 Quartz Unifaces Saugus Jasper Uniface Quartz Levanna Rhyolite Wayland	4
24	237	14 Grit/ 2 Shell	5	7	3 Quartz Bifaces 2 Quartz Unifaces Rhyolite Biface Rhyolite Point Tip Argillite Wayland Chert Greene Quartz Levanna Quartz Levanna Saugus Jasper Wayland	4

Table 3. (Cont.)

Concentration	Debitage	Pottery (Grit/ Shell)	Bone	FCR	Tools	Deposit Type
25	98	1 Grit	0	0	Chert Uniface Rhyolite Uniface	1
26	10	1 Shell	0	0		1

were found to date to the Middle to Late Woodland period. Type 1 concentrations were the second commonest with 30.7% being identified. These concentrations overwhelmingly dated to the Late Archaic period and represent limited activities by small groups for short periods of time. Testing identified Type 2 concentrations in five (18.5%) instances. These concentrations had a wider range of materials and artifacts present than Type 1 but not as much as Type 4. In all cases except two, these dated to the Late Archaic period. One exception was the Middle Archaic deposit, Concentration 7a in L2H, while the other dated to the Woodland period. Archaeologists did not find any Type 3, shell midden, deposits indicating that this was an activity that took place elsewhere, probably at the shore to the south or east.

Plowzone concentrations ranged in size from .5 to 85.5 square meters with the average being 17.9 square meters. Nineteen of the plowzone concentrations were smaller than the average and eight were larger. The composition of these concentrations consisted primarily of lithic debitage. Archaeologists used a count of >10 lithic pieces in a test pit as the definition of a concentration, as well as Native pottery, calcined bone, fire-cracked rock fragments, projectile points, other stone tools, and other minor components. Various types of historic materials dating from the late eighteenth to twentieth centuries, were also found intermixed in the plowzone.

Six of the concentrations yielded no Native pottery remains (Concentrations 4, 5, 6, 7a, 9, and 20). In five of these concentrations, archaeologists recovered projectile points that dated to the Late Archaic periods, and in one case to the Middle Archaic. The Late Archaic concentrations were all small, ranging from 1.5 to 6.25 square meters, likely representing very short-term occupation of the site. The Middle Archaic concentration measured 56 square meters possibly indicating either longer term occupation or occupation by a larger number of people.

One concentration yielded only shell-tempered Native pottery and a Levanna point (Concentration 3) dating this 18 square meter concentration to the Late Woodland Period. One other concentration (Concentration 26), the smallest concentration encountered, yielded only shell-temper Native pottery, which would also date to the Late Woodland period.

Concentrations 1, 2, 8, 14 and 25 yielded no projectile points but did have fragments of grit-tempered pottery and in all but one instance, chert tools. Analysis found pottery vessels identified from the Middle Woodland period from concentrations 8 and 25 and identified fragments of Late Woodland vessels in Concentration 14. The fragments from concentrations 1 and 2 were small and uninformative as to period of manufacture. The presence of chert artifacts supports a Middle Woodland to early Late Woodland dating of the concentrations. The remaining concentrations consisted of a mixture of projectile point styles dating from the early Archaic to Late Woodland periods, both grit and shell-tempered pottery, and various tools. Due to the difficulty in attributing these concentrations to any one

period, they may be considered on limited research value, or at least of less research value than the concentrations with clear temporal attributions.

Concentration 1 was in the southwest half of the L1H impact area around test pits N310 E172 to 176 **(Figure 1)**. The calcined bone was identifiable only as mammal fragments, the pottery consisted on body shards with one piece retaining both the interior and exterior surfaces and measuring .75 cm thick. Archaeologists recovered one tear drop shaped quartz biface similar to the tear drop shaped rhyolite biface recovered from the L1H impact area. Testing recovered 153 pieces of quartz shatter (n=78), flakes (n=35) and flake fragments (n=40). Seven of the pieces retained cortex on at least one face. The presence of cortex and shatter indicates that people processed the quartz cobbles at this location. Flake size ranged from .5 to 3.7 cm in length with the average being 1.65 cm and most of the flakes clustering in the .9 to 1.7 cm range. The range in flake sizes indicates that reduction from cobble to finished biface took place at this concentration. Other lithic materials included three pieces of rhyolite (flake, flake fragment and shatter) and one small flake fragment of green chert. Analysis interpreted that this concentration represented the remains of activities related to short-term occupation of the site during the Woodland period, possibly the Middle Woodland due to the presence of chert and grit-tempered pottery. The limited presence of fire-cracked rock and bone indicates that cooking was likely conducted at the site, indicating it may have been a longer term occupation (over a day) where people cooked food and reduced local quartz cobbles. This concentration would represent Stage I to IV reduction. Archaeologists identified it as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration 2 was in the northwest quarter of the L1H impact area with the concentration core (the area of densest concentration of materials) being located 4.5 meters north of Concentration 1 **(Figure 1)**. Artifact classes recovered here consisted of fire-cracked rock (n=1), grit-tempered pottery (n=1), and lithic tools (n=2) and debitage (n=135). The pottery consisted of one body shard measuring .75 cm thick. Archaeologists recovered one modified quartz flake with a rounded edge and one burned chert biface fragment. Testing recovered 133 pieces of quartz shatter (n=71), flakes (n=26) and flake fragments (n=35). None of the pieces retained cortex but one piece of shatter did have crystals present. The presence of shatter indicates that people processed quartz cobbles here but the lack of cortex may indicate that it was a secondary processing location. Flake size ranged from .7 to 3 cm in length with the average being 1.4 cm and most of the flakes clustering in the .8 to 1.5 cm range. The range in flake sizes indicates that reduction from cobble to finished biface took place at this concentration. Other lithic materials included one of rhyolite flake and one green chert biface fragment. Analysis interpreted this concentration as representing the remains of activities related to short-term occupation of the site during the Woodland period, possibly the Middle Woodland due to the presence of chert and grit-tempered pottery. The limited presence of fire-cracked rock and the burned chert biface indicates that people used fire at the site, possibly indicating a slightly longer period of occupation where they reduced local quartz cobbles. This concentration would represent Stage II to IV reduction. Archaeologists identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration 3 was in the northeastern quarter of the L1H impact area around test pits N310 E180, N312 E182, and N314 E180 **(Figure 1)**. Artifact classes recovered here consisted of fire-cracked rock (n=1), shell-tempered pottery (n=1), and lithic tools (n=31) and debitage (n=135). The pottery

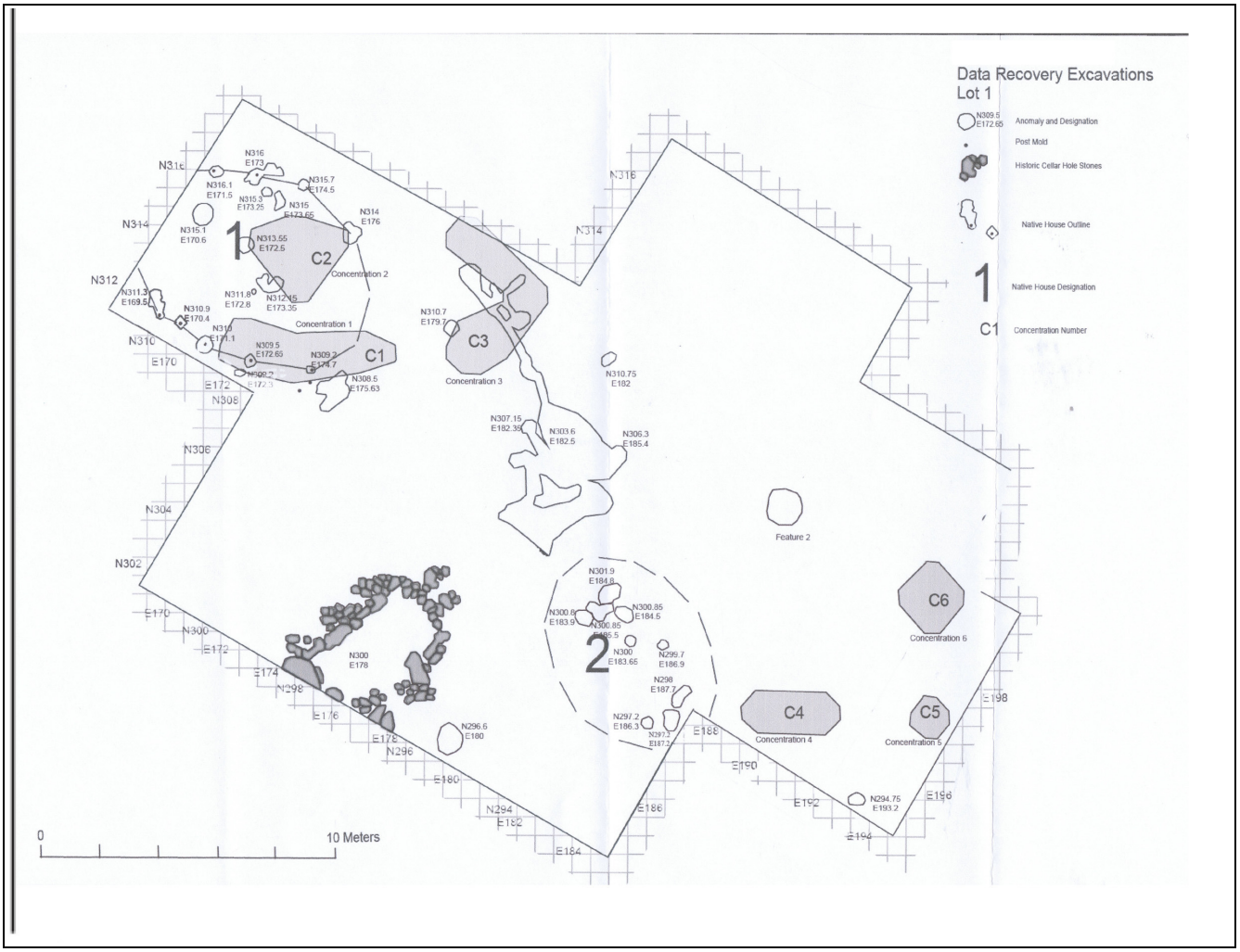

Figure 1. Lot 1 artifact concentrations

consisted of a body shard that was .6 cm thick and bore an incised rim, dating it to the Late Woodland period. Testing recovered one quartz uniface, one quartz biface, and one mudstone Levanna point and a total of 120 pieces of quartz shatter (n=75), flakes (n=29), flake fragments (n=14) and cores (n=2). Five of the pieces retained cortex on at least one face. The presence of cores, cortex and shatter indicates that people processed quartz cobbles here. Flake size ranged from .8 to 4.9 cm in length with the average being 1.8 cm and most clustering in the .9 to 2 cm range. The range indicates that reduction from cobble to finished biface took place at this concentration. Other lithic materials included eight pieces of rhyolite (flake [n=4] and flake fragments [n=4]). Rhyolite flakes ranged in size from .7 to 1.9 cm. Other lithic materials included two pieces of chert debitage, one flake and one flake fragment, both of green chert, and two quartzite pieces , one piece of shatter and one flake. This concentration is interpreted as representing the remains of activities related to short-term occupation of the site during the Late Woodland period. The limited presence of fire-cracked rock indicates that activities involving fire was conducted at the site, indicating it may have been a longer term occupation (over a day) where people cooked food and reduced locally obtained quartz cobbles. This concentration would represent Stage I to IV reduction. Analysis identified it as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

The three concentrations in the L1H impact area were very similar in content and reduction stages present. It is likely that they all represent the same occupation of the site during the Late Woodland period. Concentrations 1 and 3 contained more Stage I lithic reduction whereas concentration 2 had more evidence of Stage II reduction.

Concentration 4 was in the southwest quarter of the L1S impact area around test pits N298 E190 to 192. Artifact classes recovered here consisted of calcined bone (n=1), fire-cracked rock (n=3), lithic tools (n=2) and debitage (n=36) **(Figure 1)**. The calcined bone was identifiable only as a mammal fragment. One light purple gray rhyolite Small Stemmed point of the Wading River variety. Additionally archaeologists recovered one dark gray rhyolite point tip and midsection, which appeared to also be a Small Stemmed point. Testing found 33 pieces of quartz shatter (n=17), flakes (n=2), flake fragments (n=13) and one unmodified crystal. One flake fragment was from crystal quartz. None of the pieces retained cortex. The lack of cortex but the presence of shatter indicates that people processed quartz cobbles, possibly at secondary stage at this location. Flake size ranged from .8 to 1.7 cm in length. The one rhyolite flake recovered measured 2 cm in length. Also recovered was one rhyolite flake fragment and one black chert flake measuring .9 cm long. The range in flake sizes indicates that later stage reduction, at least Stage II, took place at this concentration with a limited amount of cobble shattering also occurring. This concentration is interpreted as representing the remains of activities related to short-term occupation of the site during the Late Archaic period. The limited presence of fire-cracked rock and bone indicates that cooking was likely conducted at the site, but the paucity of flaking evidence indicates possibly short-term, limited activity occupation. This concentration would represent Stage II reduction. Analysis identified it as a Type 2 deposit representing a wider range of activities by a small number of people over a short duration of time.

Concentration 5 was in the southeast quarter of the L1S impact area around test pit N298 E196 **(Figure 1).** Artifact classes recovered here consisted of fire-cracked rock (n=7), lithic tools (n=3) and debitage (n=49). Archaeologists recovered one quartz possible Small Stemmed point preform, a granite pestle/ hammerstone and a rhyolite uniface. Testing found 43 pieces of quartz shatter (n=22), flakes

(n=26) and flake fragments (n=4). One split quartz cobble retained cortex. The presence of cortex, the split cobble and shatter indicates that people processed quartz cobbles here for the production of Small Stemmed points. Flake size ranged from .9 to 5.2 cm in length with the average being 1.8 cm and most of the flakes clustering in the .9 to 1.35 cm range. The range indicates that reduction from cobble to finished biface took place at this concentration with an emphasis on late stage thinning. Other lithic materials included eight pieces of rhyolite (flake [n=6], flake fragment and uniface) and one small granite pestle with crushing, possibly evidence of secondary use as a hammerstone, on the ends. Rhyolite colors represented consisted on green gray, very dark purple gray, very dark gray and dark gray. Rhyolite flake size ranged from 1.2 to 2.7 cm in length with the average being 1.7 cm and most of the flakes clustering in the 1.2 to 1.5 cm range. This concentration is interpreted as representing the remains of activities related to short-term occupation of the site during the Late Archaic period. The limited presence of fire-cracked rock indicates that people used fire, possibly for cooking as a pestle was also recovered at the site, while the presence of quartz shatter, flakes and a preform indicate quartz reduction for the production of bifaces. This concentration would represent Stage II reduction and may be related to Concentration 4. Analysis identified this as a Type 2 deposit representing a wider range of activities by a small number of people over a short duration of time.

Concentration 6 was in the northeast quarter of the L1S impact area around test pit N302 E196 **(Figure 1).** Artifact classes recovered here were lithic tools (n=3) and debitage (n=88). Archaeologists recovered one quartz Squibnocket Triangle of the truncated variety, one rhyolite projectile point tip and midsection (possibly a Small Stemmed point) with a perverse (manufacturing) fracture and one rhyolite biface fragment as well as 79 pieces of quartz shatter (n=47), flakes (n=20) and flake fragments (n=12). Two of the pieces retained cortex on at least one face. The presence of cortex and shatter indicates that people processed quartz cobbles here. Flake size ranged from .7 to 4.2 cm in length with the average being 1.8 cm and most of the flakes clustering in the .7 to 1.4 cm range. The range indicates that reduction from cobble to finished biface took place at this concentration. Other lithic materials included eight pieces of rhyolite (flake [4], flake fragments [2] , one biface, one point tip and midsection) and one hornfels flake fragment, one Pennsylvania jasper flake (1.3 cm in length), and one 3 cm long quartzite flake. One small granite pestle with crushing, possibly evidence of secondary use as a hammerstone, on the ends. Rhyolite colors represented consisted of gray, maroon and very dark gray. Rhyolite flake size ranged from 1.1 to 1.7 cm in length with the average being 1.4 cm and most of the flakes clustering in the 1.1 to 1.5 cm range This concentration is interpreted as representing the remains of activities related to short-term occupation of the site during the Late Archaic period, with some slight evidence of possible Middle Woodland occupation in the form of the hornfels and jasper.. The lack of fire-cracked rock or bone indicates that fire was not used, possibly indicating a short-term occupation. Activities represented included the reduction of local quartz cobbles and the production of rhyolite tools. This concentration represents Stage II reduction and is a primary deposit with a limited range of activities. Analysis identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration 7 was in the southeast quarter of the L2H impact area around test pits N268 E214, N270 E214 to 218, N272 E214 to 218 and N274 E216 to 220 **(Figure 2)**. Artifact classes recovered here consisted of faunal remains (calcined bone n=26, shell n=1), fire-cracked rock (n=67), grit-tempered (n=128) and shell-tempered pottery (n=2), lithic tools (n=7) and debitage (n=834). None of the calcined faunal remains were identifiable beyond the gross identifications of mammal (n=29),

medium mammal (n=21), bird (n=1), and 14 were unidentifiable even to gross animal class. Excavation recovered one unburned woodchuck incisor, but this is considered intrusive from recent rodent activity. The overall abundance of faunal remains in comparison to other concentrations, may indicate either that the faunal remains were the result of a communal meal or meals (a.k.a a feast or celebration) or that this area served as a central midden for several households in the area.

Archaeologists recovered fragments from four grit-tempered vessel lots from this concentration (Vessel lots 5, 6, 8, and 13). Vessel 5 was cord-marked on the interior and exterior, traits commonly associated with Early Woodland pottery. Vessel lots 6, 8 and 13 were all identified as Middle Woodland vessels. Decorative styles consisted of dentate stamping (Vessel 6), scallop impression (Vessel 8), and fine rocker stamped (vessel 13). Analysis identified two shell-tempered vessel lots (Vessel lots 10 and 11). Based on the presence of shell tempering , these are tentatively dated to the Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 87.4% and 9.5%, respectively, of it. Shatter accounted for 73% of the quartz debitage. Testing recovered 93 flakes ranging in size from .4 to 4.5 cm in length with the average length being 1.6 cm. Sixty-three percent of the flakes were under 2 cm in length. Rhyolite flakes ranged in length from .8 to 6.8 cm with the average being 2.1 cm. Flakes under 2 cm in length accounted for 61% of the rhyolite flake assemblage. Other materials included the second highest concentration of hornfels in the entire project area, 2.1%, and traces of banded volcanics (.9%) and chert (.2%). Hornfels flakes ranged in size from .7 to 3.8 cm with the average being 2 cm. Flakes under 2 cm in length accounted for 63% of the hornfels flake assemblage. Cortex was present on 19% of the rhyolite debitage, 17.6% of the hornfels debitage and the Rossville point, and 2.4% of the quartz debitage, principally the shatter. Lithic tools recovered consisted of seven unifaces, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Testing recovered seven bifaces and preforms representing Stage II and II bifaces. One quartz biface was diamond-shaped while another was tear-drop-shaped. Three quartz and one rhyolite fragment made up the other bifaces. Two preform fragments were light gray green rhyolite and likely represent material from the lower Middle Archaic assemblage moved up to the 40 to 50 cmbgs level. Projectile points recovered included one heavily reworked Susquehanna Broad, recovered at the edge of the concentration, one hornfels Rossville, three quartz Squibnocket Triangles (two of the truncated form and one fragmentary), and one rhyolite possible Small Stemmed point. The Rossville, Squibnocket Triangles and possible Small Stemmed probably date to the Middle Woodland assemblage. A schist celt or ax head was also recovered from this concentration. One other tool recovered was a sandstone sharpening/ abrading stone. Concentration 7 represents a Middle Woodland type 4 deposit where knappers carried out stage II and III bifacial reduction. The large amount of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. This midden probably relates to the house form identified in the southeastern quarter of the impact area.

Concentration 7a was in the southeast quarter of the L2H impact area around test pits N268 E214, N270 E214 to 218, N272 E214 to 218 and N274 E216 to 220 **(Figure 2).** Artifact classes recovered here consisted of calcined bone (n=66), fire-cracked rock (n=85), lithic tools (n=31) and debitage (n=238). Three of the calcined faunal remains were unidentifiable to class, consisting of small highly fragmented pieces. Analysis identified two pieces as medium mammal and one as mammal. Bioturbation may have displaced these pieces from Concentration 7 into the lower occupation and may

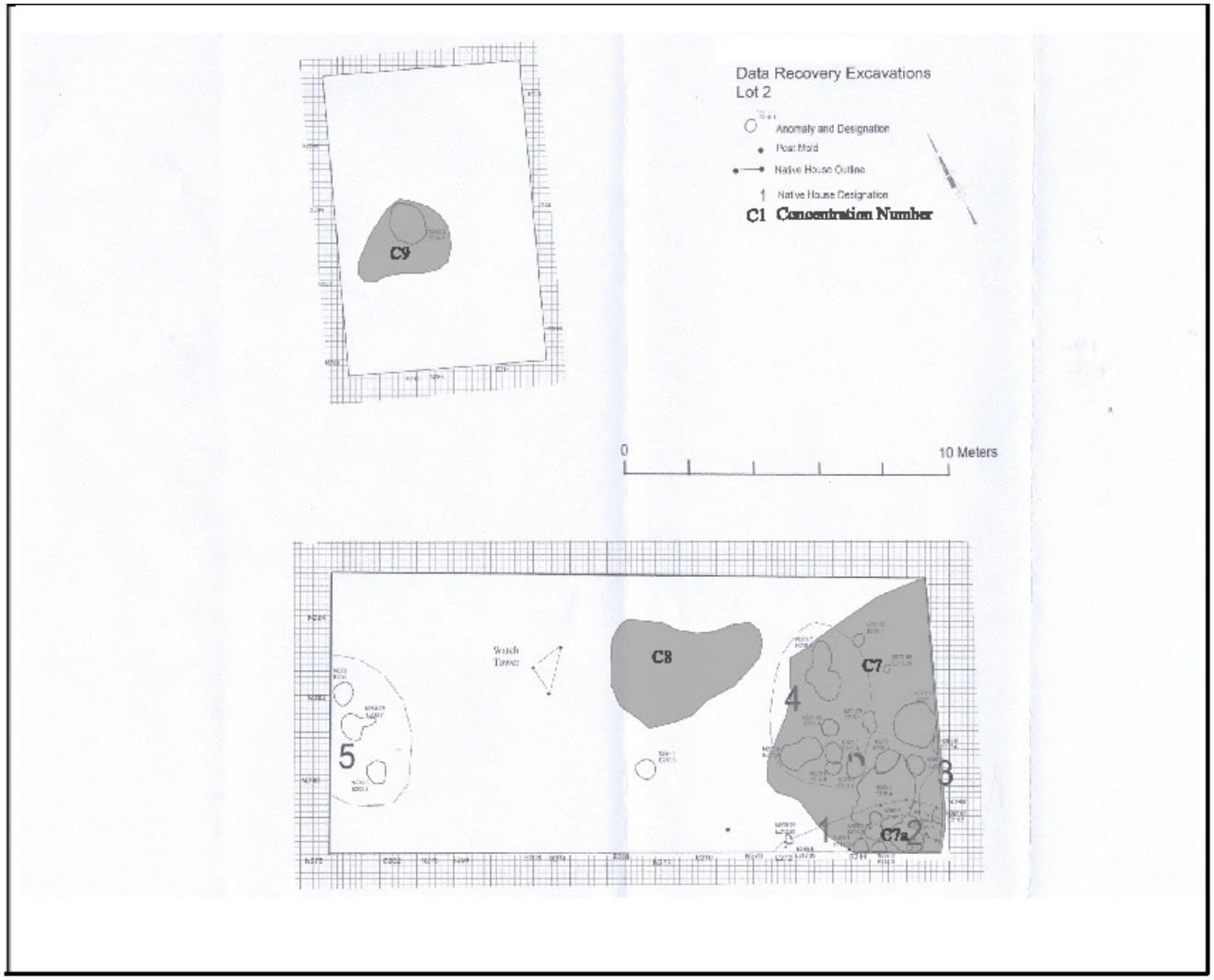

Figure 2. Concentrations in the Lot 2 impact area

not date to the Middle Archaic period. If they are associated with the earlier occupation, it can be stated that the people who occupied the site stayed long enough to build a fire and possibly cook food, although the bone fragments could represent waste from the production of bone tools from curated bone.

Excavation did not recover any pottery from Concentration 7a. Quartz and rhyolite composed most of the lithic debitage assemblage. Quartz and rhyolite made up 55% and 17.7% respectively, of the assemblage. Other materials included the highest concentration of hornfels in the entire project area, 14.7%%, and traces of volcanics (.8%) and Attleboro red felsite (1.3%) as well as higher occurrences of argillite (4.2%) and quartzite (6.3%). Analysis found 65% of the quartz assemblage composed of shatter with flakes and flake fragments making up the rest. Testing recovered 30 measurable flakes, ranging in size from .8 to 3.1 cm in length. Half of the flakes were under 2 cm in length while the other half were over 2 cm long. The average length was 1.8 cm. Cortex was present on one piece of shatter. Hornfels debitage consisted of mostly flake fragments with only three flakes present. This lithic material may have had its origin in the upper layer associated with the Middle Woodland occupation. Quartzite flakes ranged in length from .7 to 3.3 cm with the average being 1.9 cm. Half of the flakes were under 2 cm in length. Rhyolite flakes ranged in length from .6 to 6.9 cm with the average being 2.6 cm, indicative of a focus on earlier stage reduction. This correlates well with the rhyolite bifaces recovered and the cores. Fifty percent of the rhyolite flake assemblage was under 2 cm in length. Cortex was present on two rhyolite fragments.

Lithic tools recovered consisted of three unifaces (two argillite and one rhyolite), indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Excavation recovered nine bifaces and preforms representing Stage II, III and IV bifaces. Two quartz bifaces were triangular-shaped while another was an edge fragment. Other bifaces included a roughly shaped rhyolite and an Attleboro red felsite edge fragment. Two Neville point preforms, one of Attleboro red felsite and one of argillite, were present as well as an argillite and a rhyolite roughly shaped preform. Excavation recovered five Neville and four Stark projectile points. Also recovered was an argillite drill, possibly a reworked Neville point. Concentration 7a represents a Middle Archaic type 2 deposit where people carried out stage II and III bifacial reduction. The moderate amount of fire-cracked rock and the lack of faunal remains indicates that people used fire during the occupation but if they cooked food, bones were not deposited into the hearth to be calcined. The site represent a relatively brief encampment by a small number of people who brought rhyolite raw material and semi-finished quartzite and Attleboreo red felsite bifaces with them to be subsequently reduced to replace broken tools, most likely projectile points. The presence of unifaces and a drill may indicate that people carried out other activities such as hide or wood working here as well. If the quartz assemblage is associated with the Middle Archaic assemblage and is not just Middle Woodland material that has been pulled down, then it is likely that the Middle Archaic inhabitants were either processing locally obtained cobbles or were further processing local cobbles that had been initially processed elsewhere. The large average size of the rhyolite flakes is consistent with the reduction of cores that brought to the location from a quarry site possibly in the Blue Hills. The Middle Archaic people may have cached the cores at the site and subsequently never recovered. Analysis identified this as a Type 2 deposit representing a wider range of activities by a small number of people over a short duration of time.

Concentration 8 was in the northwest quarter of the L2H impact area around test pits N278 E212 and N276 E212 to 214 **(Figure 2).** Artifact classes recovered here consisted of calcined bone (n=2), fire-cracked rock (n=2), grit-tempered pottery (n=7), lithic tools (n=4) and debitage (n=130), and two calcined bone fragments. Analysis found that both calcined bone pieces were medium mammal, representing one flatbone and one longbone. Testing recovered fragments from two grit-tempered vessel lots (Vessel lots 6 and 13). Vessel 6 bore dentate stamping on the exterior, a trait commonly associated with Middle to early Late Woodland period vessels. Vessel 13 was extensively represented in concentration 7 and was also dated to the Middle Woodland period. The presence of a fragment from Vessel 13 links concentrations 7 and 8.

Quartz and rhyolite composed most of the lithic debitage assemblage, making up 92.9% and 6.3%, respectively, of the assemblage. Other materials included a trace amount of hornfels (.8%). Quartz flakes ranged in size from .3 to 3.7 cm with 65% being under 2 cm in length (average length 1.8 cm). Archaeologists recovered only three rhyolite flakes, ranging in length from .8 to 2.6 cm. Cortex was present on two pieces of quartz shatter. Lithic tools recovered consisted of one quartz uniface, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. One Stage IV rhyolite biface and one rhyolite Rossville point were also recovered as well as one chert broad bladed point midsection to tip. The Rossville consisted of a base and midsection with a perverse, manufacturing, fracture. Concentration 8 represents a Middle Woodland Type 4 deposit where people carried out stage II and III bifacial reduction. The moderate amount of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 9 was in the south half of the L2S impact area around test pit N284 E208 **(Figure 2)**. Artifact classes recovered here consisted of calcined bone (n=3), fire-cracked rock (n=7), lithic tools (n=1) and debitage (n=34). Testing recovered three calcined bone fragments identified as medium mammal, representing one flatbone and one longbone.

Excavation did not recover any pottery from this concentration. Quartz composed most of the lithic debitage assemblage at 94%. One rhyolite flake and one piece of hornfels shatter were also recovered. Lithic tools recovered were one quartz Small Stemmed point of the Squibnocket Stemmed variety. Concentration 8 represents a Late Archaic deposit where knappers carried out bifacial reduction at a short-term single occupation site. Analysis identified the site as a Type 2 deposit representing a wider range of activities by a small number of people over a short duration of time.

Concentration 10 was in the southwest quarter of the L4H impact area around test pit N140 E126 **(Figure 132).** Artifact classes recovered here consisted of calcined bone (n=3), fire-cracked rock (n=1), grit-tempered (n=10) and shell-tempered pottery (n=2), lithic tools (n=2) and debitage (n=81). Testing recovered three calcined bone fragments identified as medium mammal, representing one flatbone and one longbone.

Testing recovered fragments from grit-tempered vessel lot 17 from this concentration. Vessel 17 was dentate stamped, a trait which commonly associated with Middle Woodland pottery. Analysis identified one shell-tempered vessel lot, lot 21, decorated with incised lines. Based on the presence of shell

tempering and the incised lines, this vessel is tentatively dated to the Late Woodland period, or possibly the late Middle Woodland to early Late Woodland.

Quartz and rhyolite composed most of the lithic debitage assemblage. Quartz and rhyolite made up 75.3% and 22.2%, respectively, of the assemblage. Other materials included traces of Pennsylvania (1.2%) and Saugus jaspers (1.2%). No cortex was present on any of the lithic. Lithic tools recovered consisted of one truncated Squibnocket Triangle and one rounded quartz biface fragment. Concentration 10 represents a Middle Woodland to Late Woodland deposit where people carried out limited bifacial reduction and bifacial sharpening. The presence of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 11 was in the east half of the L4H impact area around test pits N144 to 150 E130 **(Figure 132)**. Artifact classes recovered here consisted of calcined bone (n=15), fire-cracked rock (n=16), grit-tempered (n=24) and shell-tempered pottery (n=3), lithic tools (n=2) and debitage (n=159). Testing recovered 15 calcined bone fragments, identified as medium mammal and representing flatbone and longbone fragments. One unburned piece of large mammal flatbone was also recovered. This fragment likely originated from the historic use of the project area.

Archaeologists recovered fragments from five grit-tempered vessel lots (Vessel lots 15, 16, 17, 18, and 26). Vessel 15 was cord-marked on the interior and exterior, traits commonly associated with Early Woodland pottery. Vessel lots 16 and 26 were all identified as Middle Woodland to Late Woodland vessels. No decoration was evident but the potter had smoothed the interiors and exteriors. Vessel 18 had smoothed interior and exterior surfaces and incised linear designs on the exterior, dating it from the late Middle Woodland to Late Woodland periods.

Quartz and rhyolite composed most of the lithic debitage assemblage, making up 84.3% and 14.4%, respectively, of the assemblage. Other materials included trace amounts of Pennsylvania and Saugus jaspers (.6% each). Quartz flakes ranged in length from .9 to 2.1 cm, the average being 1.2 cm with 77% being >/= 1.1 cm in length. Rhyolite flakes showed a similar trends towards small flakes. Rhyolite flakes measured .7 to 4.3 cm in length with the average being 1.6 cm. Eighty percent were >/+ 1 cm in length. Flake size indicates that later stage reduction took place. One quartz core was also recovered, indicating the manufacture of tools, such as the Squibnocket Triangle, from core struck flakes. No cortex was present. Lithic tools recovered were one quartz Squibnocket Triangle ear and one rhyolite broad bladed point tip and midsection. Concentration 11 represents a Middle Woodland deposit where knappers carried out stage III to IV bifacial reduction. The presence of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 12 was located in the west half of the L4H impact area around test pits N144 E124 to 126, N146 E126 an N148 E126 **(Figure 132).** Artifact classes recovered here consisted of calcined bone (n=11), fire-cracked rock (n=11), grit-tempered (n=36) and shell-tempered pottery (n=1), lithic tools (n=5) and debitage (n=197). Testing recovered 11 calcined bone fragments, identified as medium mammal and flatbone and longbone fragments. One piece was identified only as mammal.

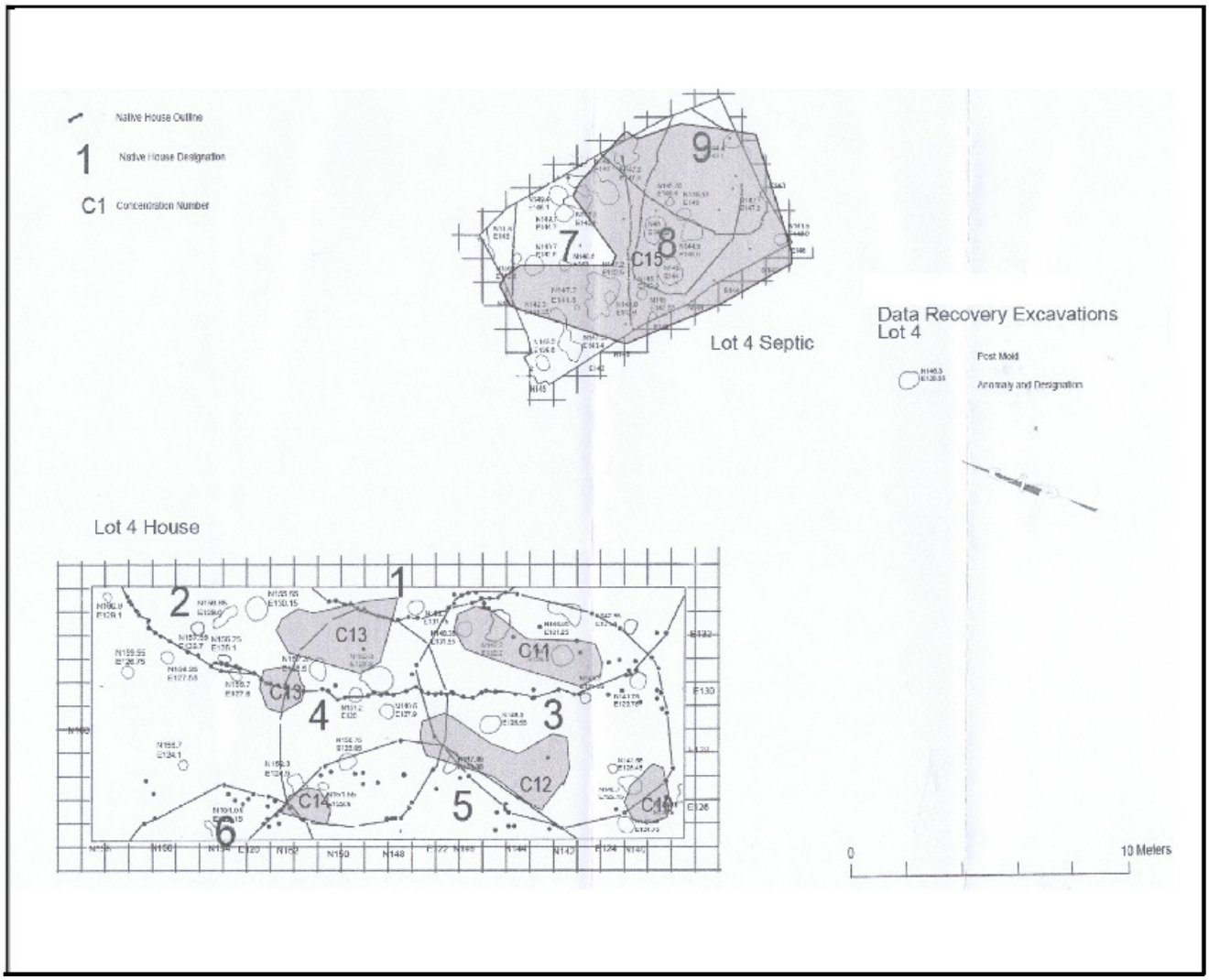

Figure 132. Concentrations in the Lot 4 impact area

Testing recovered fragments from two grit-tempered vessel lots (Vessel lots 16 and 18). Vessel lot 16 was as a Middle Woodland to Late Woodland vessel. No decoration was evident but the potter had smoothed the interior and exterior. Vessel 18 had smoothed interior and exterior surfaces and incised linear designs on the exterior, dating it from the late Middle Woodland to Late Woodland periods. Fragments of vessel lots 16 and 18 were also recovered from Concentration 11.

Quartz and rhyolite composed most of the lithic debitage assemblage, making up 82.2% and 14.2%, respectively, of the assemblage. Other materials included hornfels (2%), chert and quartzite, which each made up 1% of the total lithic debitage assemblage. Cortex was present on two piece of quartz and one piece of rhyolite. Quartz flake lengths ranged between 1 and 7.5 cm with the average being 2.3 cm. Fifty percent of flakes were >2 cm in length and 75% were >2.3 cm. Rhyolite flakes ranged in length from .7 to 5 cm in length with the average being 2.3 cm. Most, 58.3%, were >2 cm in length. Lithic tools recovered consisted of one quartz uniface, 1 shallow-based rhyolite Levanna, one quartz Levanna tip and midsection, one elongated Squibnocket Triangle, one quartz Small Stemmed point of the Bare Island variety, one rhyolite Rossville, and one rectangular quartz biface. The Levannas date to the late Middle Woodland to Late Woodland period. Concentration 12 represents a Middle Woodland deposit where knappers carried out stage II and III bifacial reduction. The fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 13 was in the northeast quarter of the L4H impact area around test pits N152 to 154 E128 to 130 **(Figure 132)**. Artifact classes recovered here consisted of calcined bone (n=6), fire-cracked rock (n=15), grit-tempered (n=33) and shell-tempered pottery (n=2), lithic tools (n=8) and debitage (n=345). Testing recovered six calcined bone fragments, identified as medium mammal and representing flatbone and longbone fragments. Analysis identified one piece of calcined bone only as mammal.

Testing recovered fragments from two grit-tempered vessel lots (Vessel lots 14 and 16). Vessel 14 bore a smooth interior and cord-marked exterior, possibly indicating a Middle Woodland date for this vessel. Vessel lot 16 was a Middle Woodland to Late Woodland vessel. No decoration was evident but the potter had smoothed the interior and exterior. Analysis identified one shell-tempered vessel lot (Vessel lot 21) which had exterior incised decoration. Based on the presence of shell tempering and incising, this vessel is tentatively dated to the late Middle Woodland to Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage, making up 88.9% and 10.7%, respectively, of the assemblage. The only other material recovered was a single flake fragment of chert, making up .3% of the lithic debitage assemblage. No cortex was present on any of the debitage but testing recovered two quartz core fragments. Quartz flakes ranged in length from .5 to 4.6 cm with the average being 1.8 cm and 65% being >2 cm in length. Rhyolite flakes on the other hand, ranged in size from 1 to 3.3 cm in length with the average being 2.4 cm and 62.5% being <2 cm in length. The reduction of the rhyolite appears to have focused on more earlier stage reduction, than the quartz, which included all stages. Lithic tools recovered consisted of two quartz bifaces with rounded bases, one dark grey rhyolite triangular point preform, one other rhyolite biface fragment, one shallow-based Levanna made from hornfels, a chert point tip reworked into a small steep-edged scraper, a rhyolite drill base (possible Susquehanna associated), one quartz elongated Squibnocket Triangle and one

quartz Fox Creek Stemmed point. The Squibnocket Triangle, Fox Creek, and Levanna points indicate a late Middle Woodland to early Late Woodland date for the assemblage. Concentration 13 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage II and III bifacial reduction. The large amount of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 14 was in the northwest quarter of the L4H impact area around test pits N152 E124 **(Figure 132)**. Artifact classes recovered here consisted of calcined bone (n=1), fire-cracked rock (n=1), grit-tempered pottery (n=6) and debitage (n=13). Testing recovered one calcined medium mammal longbone fragment.

Archaeologists recovered fragments of grit-tempered pottery but the fragments were too small to be assignable to a vessel lot. Quartz was the only lithic material recovered being limited to two flakes and 11 pieces of shatter. No cortex was present on any of the quartz and no lithic tools were recovered. Concentration 14 represents a Woodland deposit where stage limited lithic reduction and food preparation took place. Analysis identified this as a Type 2 deposit representing a wider range of activities by a small number of people over a short duration of time.

Concentration 15 spread across the L4S impact area **(Figure 132)**. Artifact classes recovered here consisted of faunal remains (calcined bone n=245, shell n=5), floral remains (hickory nuts n=2), fire-cracked rock (n=58), grit-tempered (n=283) and shell-tempered pottery (n=85), and lithic tools (n=80) and debitage (n=5617). Few of the calcined faunal remains were identifiable beyond the gross identifications of mammal (n=4), medium mammal longbone and flatbone (n=183), small to medium bird (n=20), bird (n=1), and 20 were unidentifiable even to gross animal class. Analysis identified three fragments as beaver phalange or possible beaver phalange fragments. Archaeologists recovered these from N145.5 E144, N146 E147.5 and N146 E150 within the Late Archaic sub-concentration. Excavation also recovered three box turtle carapace fragments from N145 E149, N145 E146 and N144 E146.5 in the Late Archaic sub-concentration. Also recovered from the Late Archaic sub-concentration were three fragments of deer phalanges and a molar fragment from N145.5 E144, N144 E146.5, and N144 E147. The diversity of faunal remains indicates longer term occupation associated with this concentration. Seasonality from the spring to fall is indicated by the species present.

To the east of House Form 1 in concentration 15, archaeologists recovered 215 pieces from the plowzone. Fifty-three (24.7%) of these fragments were shell-tempered and the remainder (75.3%) were grit-tempered. Vessel lots identified in Concentration 15 (Vessel lots 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 44, and 45) consisted of a mixture of Early Woodland (Vessel lot 35), Middle Woodland (Vessel lots 27, 28, 34) which bore dentate and punctate stamping, and Late Woodland (25, 26, 30, 31, 32, 33, 36, 37, 38, 39, 40, 41, 44, and 45) bearing incised lines, hatching and smoothed interior and exterior surfaces. Analysis identified four miniature pots as well as two pottery bowls. A total of 13 vessels were grit-tempered (72.2%) and five were shell-tempered (27.8%), which closely mirrors the sherd counts related above. Archaeologists recovered 35 fragments of Native pottery from anomalies associated with House Form 2 associated with concentration 15. Thirty-four of these fragments were grit-tempered and three (8.6%) were shell-tempered. Testing recovered sherds from nine vessel lots (Vessel lots 28, 29, 30, 32, 33, 34, 35, 39, and 41), to of which were shell-

tempered (Vessel lots 39 and 41), both dating to the Late Woodland period. The remaining lots included one Early Woodland vessel, three Middle Woodland vessels, and three Late Woodland vessels. The relative paucity of shell-tempered pottery in the anomalies may indicate that people here before Structure 1.

Testing recovered a tear drop shaped rhyolite biface and 153 pieces of quartz shatter (n=78), flakes (n=35) and flake fragments (n=40) from this concentration. Seven of the pieces retained cortex on at least one face. The presence of cortex and shatter indicates that people processed quartz cobbles at this location. Flake size ranged from .5 to 3.7 cm in length with the average being 1.65 cm and with most of the flakes clustering in the .9 to 1.7 cm range. The range indicates that reduction from cobble to finished biface took place at this concentration. Other lithic materials included three pieces of rhyolite (flake, flake fragment and shatter) and one small flake fragment of chert. This concentration is interpreted as representing the remains of activities related to short-term occupation of the site during the Woodland period, possibly the Middle Woodland due to the chert and grit-tempered pottery. The limited presence of fire-cracked rock and bone indicates that cooking was likely conducted at the site, indicating it may have been a longer term occupation (over a day) where people cooked food and reduced local quartz cobbles. This concentration would represent Stage I reduction. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 16 was in the southwest quarter of the L5H impact area around test pits N132 to 136 E176 and N134 E178 **(Figure 3).** Artifact classes recovered here consisted of calcined bone (n=19), fire-cracked rock (n=12), grit-tempered (n=7) and shell-tempered pottery (n=4), lithic tools (n=9) and debitage (n=446). Few of the calcined faunal remains were identifiable beyond the gross identifications of medium mammal longbone and flatbone (n=13), and four were unidentifiable even to gross animal class. Testing recovered one piece of unburned Canada goose coracoid, possibly representing a recent intrusion, Painted turtle carapace fragments from N136 E176.5 and a piece of turtle (species unknown but possibly Painted turtle) from N132 E175.5. Testing also recovered one fragment of a deer phalange from N131.5 E176. Faunal remains indicate occupation between the spring and fall with both terrestrial and aquatic species being taken.

Archaeologists recovered fragments from four grit-tempered vessel lots from this concentration (Vessel lots 51, 52, 53, and 54). Vessels 51 and 52 both bore dentate stamping and in the case of vessel lot 54, a well-executed checkerboard pattern. Based on the design elements these vessel lots are believed to date to the Middle Woodland period. Vessel lots 5 and 54 both bore incised decoration on a smooth exterior with a smooth interior being present as well. This design element may date to the late Middle Woodland to Late Woodland periods. One shell-tempered vessel (vessel lot 56) was also identified. This vessel bore a smooth interior and cord-marked exterior, possibly dating it to the late Middle Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 91.3% and 7.4%, respectively, of the assemblage. Other materials included argillite (.2%), hornfels (.2%), chert (.2%), quartzite (.2%), and Pennsylvania jasper (.4%). Cortex was present on 15.2% of the rhyolite debitage,and .7% of the quartz debitage, principally the shatter. Quartz flakes ranged in length from .7 to 3.3 cm with the average being 1.7 cm and 70% of them being >2 cm long. Rhyolite flakes ranged in

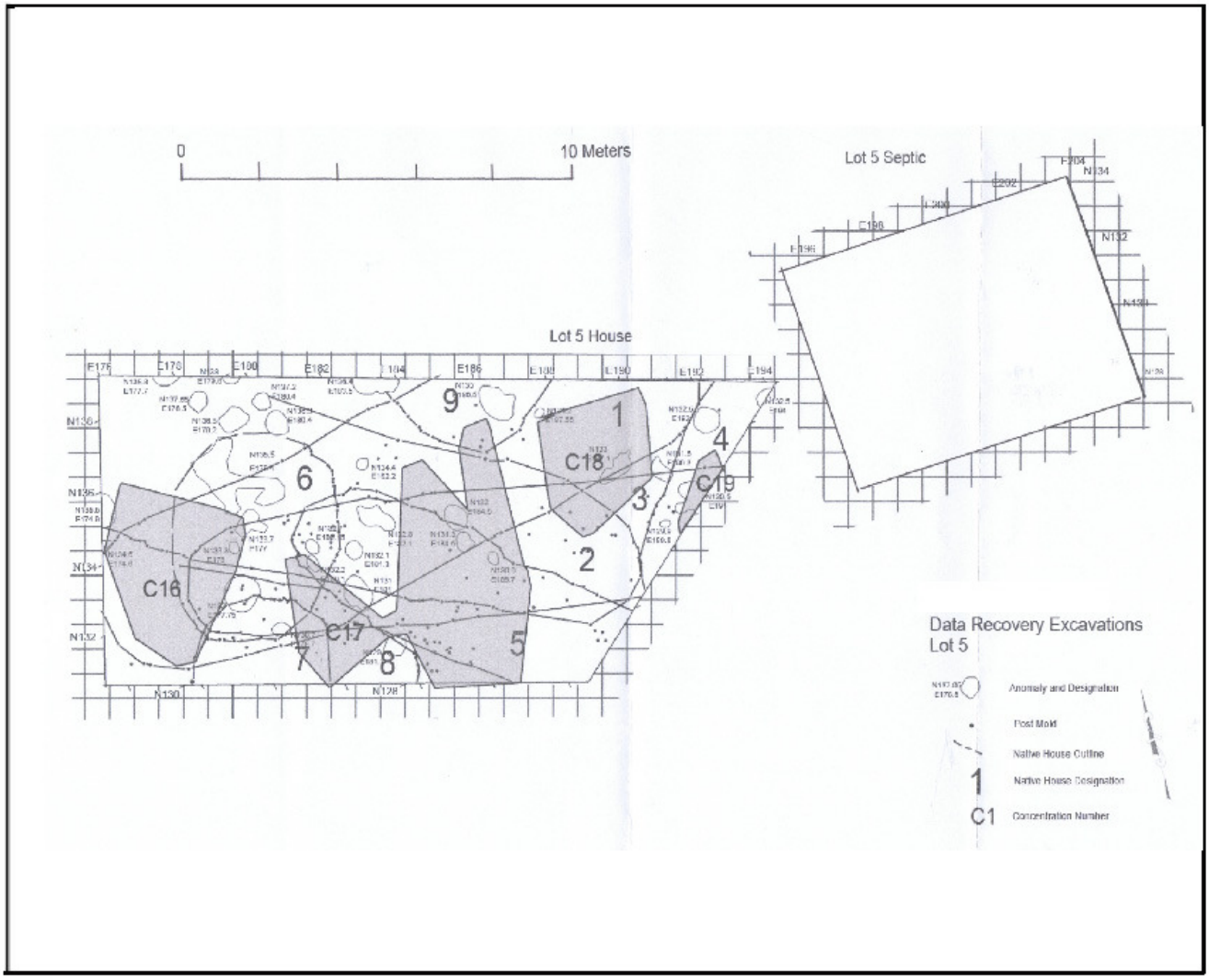

Figure 3. Lot 5 artifact concentrations

size from 1 to 2.6 cm,the average being 1.5 cm and 71.4% being >2 cm. Lithic tools recovered consisted of two quartz and one chert uniface, indicating the use of informal tools for tasks such as scraping and cutting, one two holed slate gorget, one quartz triangular point fragment, one quartz possible Levanna preform, one argillite tip and midsection, possibly from a Middle Archaic point, one quartz narrow bladed point tip and midsection and one quartz squared base biface fragment. Concentration 16 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage II and III bifacial reduction. The large amount of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 17 was in the center of the L5H impact area around test pits N130 to 132 E180, N130 E182, N128 to 134 E184, N130 E186, and N134 E186 **(Figure 3).** Artifact classes recovered here consisted of calcined bone (n=57), fire-cracked rock (n=27), grit-tempered (n=65) and shell-tempered pottery (n=5), lithic tools (n=12) and debitage (n=1034). Few of the calcined faunal remains were identifiable beyond the gross identifications of medium mammal longbone and flatbone (n=44), small to medium bird (n=2), small mammal (n=1), and four were unidentifiable even to gross animal class. Testing recovered one piece of calcined cattle phalange, representing the historic use of the site. Analysis identified box turtle (N130 E184.5) and deer (N130 E182.5 and N132 E184). Faunal remains indicate occupation between the spring and fall with both terrestrial and aquatic species being taken.

Testing recovered fragments from four grit-tempered vessel lots from this concentration (Vessel lots 49, 50, 51, and 52). Vessel lot 49 bore a smoothed interior and cord marked exterior, possibly dating it to the Middle Woodland period. Vessel 50 bore a scraped or brushed interior and smoothed exterior, possibly dating it to the Middle Woodland period. Vessels 51 and 52 both bore dentate designs, possibly dating them to the Middle Woodland period. Two shell-tempered vessel lots were also identified (vessel lots 56 and 57). Vessel 56 bore a smoothed interior and cord marked exterior possibly dating it to the late Middle Woodland to early Late Woodland period. Analysis found Vessel 57 represented by one fragment with a smoothed exterior, possibly dating it to the late Middle Woodland to early Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 75.3% and 23.2%, respectively, of the assemblage. Other materials included chert (1.4%), quartzite (.96%), Saugus jasper (.8%), argillite (.4%), Pennsylvania jasper (.3%), and hornfels (.2%). Cortex was present on five piece of quartz shatter, four piece of rhyolite, one piece of quartzite and one piece of Saugus jasper. Quartz flakes ranged in length from .5 to 3.9 cm with the average being 1.3 cm and 85.3% of the assemblage being > 2 cm in length. Rhyolite flakes ranged in length from .6 to 4.4 cm with the average being 1.8 cm and 68.3% of the flakes being >2 cm in length. Lithic tools recovered consisted of two quartz unifaces, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Archaeologists recovered one triangular-shaped quartz biface and one rounded base rhyolite biface, one chert and one rhyolite projectile point fragment, one argillite Greene point, one quartz deep-based Levanna, one quartz shallow-based Levanna, one rhyolite Rossville, two rhyolite Small Stemmed points of the Bare Island variety, one rhyolite hoe blade, and one rhyolite drill base. Concentration 17 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage II and III bifacial reduction as well as lithic replacement of broken bifaces, and woodworking using a drill. The large amount of fire-cracked rock and faunal remains indicates that hearth waste was

deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 18 was in the northeast quarter of the L5H impact area around test pits N132 to 134 E188 and N132 to 134 E190 **(Figure 3)**. Artifact classes recovered here consisted of calcined bone (n=25), fire-cracked rock (n=10), grit-tempered (n=15) and shell-tempered pottery (n=9), lithic tools (n=9) and debitage (n=300). Few of the calcined faunal remains were identifiable beyond the gross identifications of mammal (n=5), medium mammal longbone and flatbone (n=19) and one was unidentifiable even to gross animal class.

Testing recovered fragments from three grit-tempered vessel lots from this concentration (Vessel lots 50, 51, and 52). Vessel 50 bore a scraped or brushed interior and smoothed exterior, possibly dating it to the Middle Woodland period. Vessels 51 and 52 both bore dentate designs, possibly dating them to the Middle Woodland period. Two shell-tempered vessel lots were also identified (vessel lots 55 and 56). Vessel 55 had smooth interior and exterior surfaces and incised lines decoration on the exterior. Decorative styling dates this vessel to the late Middle Woodland to Late Woodland period. Vessel 56 bore a smoothed interior and cord marked exterior possibly dating it to the late Middle Woodland to early Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage at 77% and 18.7%, respectively, of the assemblage. Other materials included chert (3.3%), hornfels (.6%), and quartzite (.3%). Cortex was present on 5.3% of the rhyolite debitage and 2.3% of the quartz shatter. Quartz flakes ranged in length from .6 to 3.7 cm with the average being 1.5 cm and 78.5% of the flakes measuring <2 cm in length. Rhyolite flakes ranged in length from .6 to 3.2 cm, averaging 1.5 cm, with 78.5% of the flakes measuring <1.5 cm in length. The similarities between the quartz and rhyolite flakes indicates that knappers executed the same reduction stages on the bifaces being produced, essentially later stage reduction, thinning and sharpening. Lithic tools recovered consisted three roughly shaped quartz bifaces representing Stage II and III bifaces, two with crystal planer manufacturing breaks. One chert biface fragment was recovered, as was one moderately broad chert point tip and midsection fragment. The later point fragment bore a perverse manufacturing break. Projectile points recovered included one quartz Small Stemmed point base and midsection of the Squibnocket Stemmed variety bearing a perverse manufacturing break, one rhyolite possible Greene point tip and midsection with a possible impact fracture, and one rhyolite deep-based Levanna point. Concentration 18 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage III and IV bifacial reduction. The presence of fire-cracked rock and faunal remains indicates that hearth waste was deposited here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 19 was in the southeast quarter of the L5H impact area around test pit N130 E192 **(Figure 3)**. Artifact classes recovered here consisted of calcined bone (n=2), grit-tempered (n=14) and shell-tempered pottery (n=5), lithic tools (n=1) and debitage (n=101). Testing recovered two unidentifiable calcined bone fragments from N130.5 E192 and N132 E192.

Archaeologists recovered fragments from one grit-tempered and one shell-tempered vessel lot from this concentration (Vessel lots 51 and 56). Vessels 51 bore a dentate design, possibly dating it to the Middle

Woodland period. Vessel 56 bore a smoothed interior and cord marked exterior possibly dating it to the late Middle Woodland to early Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage at 77.2% and 19.8%, respectively, of the assemblage. Chert was the only other lithic material recovered, composing 3% of the assemblage. Quartz flakes measured between .6 and 2.7 cm in length, averaging 1.3 cm long, with 71.4% of the flake assemblage <1.2 cm. Rhyolite flakes ranged in length from .7 to 3.1 cm, averaging 1.3 cm as well, with 77.8% of the rhyolite flake assemblage measuring <1.4 cm in length. Cortex was present on one piece of rhyolite and two pieces of quartz. Lithic debitage indicates that later stage reduction, thinning and sharpening was the focus of the reduction activities in this assemblage, complementing the findings of Concentration 18. The single lithic tool recovered was a quartz biface edge fragment. Concentration 19 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage III and IV bifacial reduction. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 20 was in the northwest quarter of the L6H impact area around test pit N112 E228 **(Figure 4).** Artifact classes recovered here consisted of calcined bone (n=2), fire-cracked rock (n=1), lithic tools (n=1) and debitage (n=42). Testing recovered one calcined medium mammal flatbone fragment and one unidentifiable calcined bone fragment from N112 E228 and N111.5 E228. Archaeologists did not recover any pottery from this concentration. Quartz and rhyolite were the only lithic materials recovered from this concentration making up 90.2% and 9.8%, respectively, of the assemblage. Testing recovered three quartz flakes measuring between .9 and 1.7 cm in length while the single rhyolite flake measured 1.2 cm in length. No cortex was present. Testing also recovered one quartz projectile point, possibly a Small Stemmed. Concentration 20 represents a possible Late Archaic deposit where knappers carried out stage III and IV bifacial reduction. Analysis identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.
Figure 4. Concentrations in the Lot 6 impact area

Concentration 21 was in the southwest quarter of the L6H impact area around test pits N102 E234 and N104 to 106 E236 **(Figure 4)**. Artifact classes recovered here consisted of calcined bone (n=7), fire-cracked rock (n=1), grit-tempered (n=6) and shell-tempered pottery (n=4), lithic tools (n=8) and debitage (n=150). Few of the calcined faunal remains were identifiable beyond the gross identifications of mammal (n=2), medium mammal longbone and flatbone (n=5) and one was unidentifiable even to gross animal class.

Testing recovered fragments from two grit-tempered vessel lots (Vessel lots 62 and 66). Vessel 62 had smooth interior and exterior surfaces and exterior dentate stamping, dating it likely to the Middle to early Late Woodland period. Vessel 66 also had smooth surfaces but the pottery who made it decorated the exterior with scallop shell impression, also dating it to the Middle Woodland period. Analysis identified one shell-tempered vessel lot (Vessel lot 74). This vessel was a miniature vessel with a smooth interior and cord-marked exterior dating to the late Middle Woodland to Late Woodland period.

Quartz and rhyolite composed most of of the lithic debitage assemblage, making up 79.2% and 19.5%, respectively, of the assemblage. Argillite, quartzite and chert were all present in limited amounts (.7%

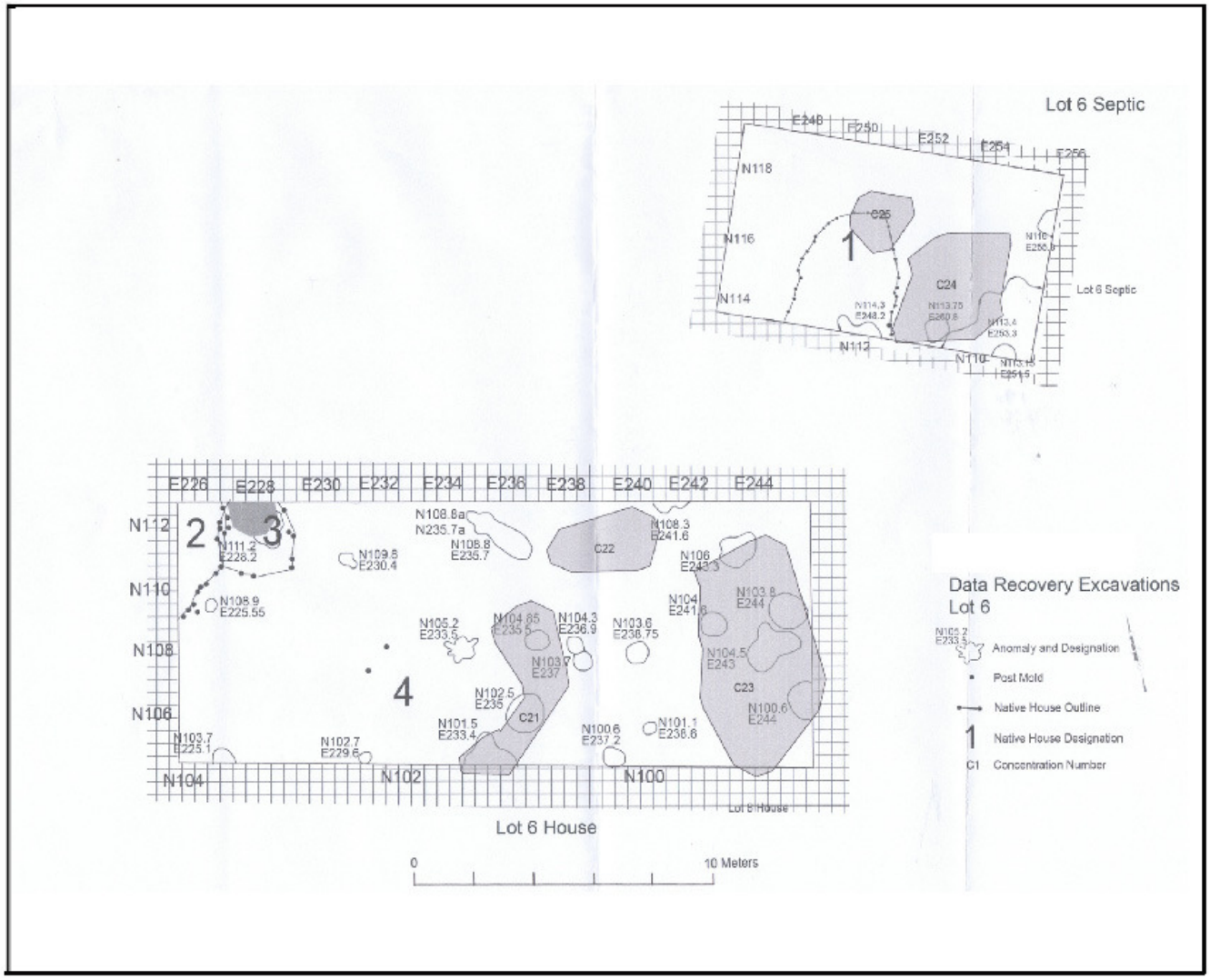

Figure 4. 11 x 17 sheet

in each case). Quartz flakes ranged in size from .6 to 5.1 cm with the average being 1.3 cm and 60% being <2 cm in length. Rhyolite flakes ranged in length from .7 to 5.7 cm with the average being 2.4 and 55.6% being <2 cm in length. One piece of rhyolite and one piece of quartz bore cortex. debitage recoveries indicate Stage II to IV reduction, with a focus on the later stages. Lithic tools recovered consisted of one uniface, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Testing recovered one quartz thick rounded biface. Projectile points recovered included rhyolite bifurcate with an impact break, one rhyolite and one hornfels Wayland Notched points, two quartz Small Stemmed points of the Squibnocket Stemmed variety, one quartz deep-based Levanna , and one rhyolite broad blade tip and midsection with a perverse manufacturing break. Small Stemmed points may date into the Middle Woodland period or may be contemporaneous with the Wayland Notched points. Concentration 21 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage II to IV bifacial reduction. The presence of fire-cracked rock and faunal remains indicates that people deposited hearth waste here. Earlier material dating to the Early and Late Archaic periods are also present. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 22 was in the northern central portion of the L6H impact area around test pits N108 E238 to 240 **(Figure 4).** Artifact classes recovered here consisted of calcined bone (n=1), fire-cracked rock (n=1), shell-tempered pottery (n=2), lithic tools (n=1) and debitage (n=107). Testing recovered one calcined medium mammal flatbone fragment from N108 E239.

Archaeologists recovered fragments from two shell-tempered vessel lots (Vessel lots 68 and 70). Vessel 68 bore a smooth interior and a cord-marked exterior, possibly indicating a late Middle Woodland to early Late Woodland association. Vessel 70 had smooth interior and exterior surfaces and bore incised oblique lines and hatching on the exterior, indicating a Late Woodland association.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 83.5% and 13.9%, respectively, of the assemblage. Other materials were quartzite (1.8%) and argillite (.9%). Lithic tools consisted of three quartz unifaces, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site, and one small triangle (possibly Squibnocket Triangle) preform. Concentration 22 represents a Middle Woodland deposit where knappers engaged in stage III and IV bifacial reduction. The limited amount of fire-cracked rock and faunal remains indicates that some hearth waste may have been deposited here. Analysis identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration 23 was in the southeast quarter of the L6H impact area around test pits N100 to 106 E242 and N102 to N106 E244 **(Figure 4)**. Artifact classes recovered here consisted of calcined bone (n=21), fire-cracked rock (n=4), grit-tempered (n=10) and shell-tempered pottery (n=11), lithic tools (n=8) and debitage (n=310). Few of the calcined faunal remains were identifiable beyond the gross identifications of mammal (n=3), medium mammal longbone and flatbone (n=6), small mammal (n=2), and one was unidentifiable even to gross animal class. Testing recovered six fragments of an unburned black bear mandible from N104 E244, just above an anomaly present in the subsoil, and one calcined deer phalange from N102 E242.5.

Archaeologists recovered fragments from five grit-tempered vessel lots (Vessel lots 59, 60, 62, 64, and 66). Vessel 59 was cord marked on the interior and exterior, a trait commonly associated with the Early Woodland period. Vessel 60 bore a smooth interior and a cord-marked exterior, possibly indicating a late Middle Woodland to early Late Woodland association. Vessel 62 had smooth interior and exterior surfaces and exterior dentate stamping, dating it likely to the Middle to early Late Woodland period. Vessel 64 had smooth interior and exterior surfaces and exterior incised lines, dating it to the late Middle Woodland to Late Woodland period. Vessel 66 also had smooth surfaces but the potter decorated it with scallop shell impression, also dating it to the Middle Woodland period. Analysis identified three shell-tempered vessel lots (Vessel lots 71, 74, and 77). Vessel 71 had a smooth interior and exterior and bore shell-impression decoration, dating it to the Middle woodland period. Vessel 74 was a miniature vessel with a smooth interior and cord-marked exterior. It dated to the late Middle Woodland to Late Woodland period. Vessel 77 had a scraped interior and smoothed exterior, possibly indicating a Middle to Late Woodland date.

Quartz and rhyolite composed most of the lithic debitage assemblage making 81.9% and 12.8%, respectively, of the assemblage. Other materials consisted of Saugus jasper (1.7%), chert (1.8%), argillite (.8%), quartzite (.8%), and hornfels (.3%). Lithic tools recovered consisted of five unifaces, three quartz, one chert and one Saugus jasper, indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Quartz flakes measured between .7 and 3.3 cm in length, averaging 1.4 cm with 64.7% being <2 cm in length. Rhyolite flakes measured between 1 and 2.7 cm in length, averaging 1.8 cm with 57% being <2 cm in length. Saugus jasper flakes measured between .9 and 3.9 cm in length, averaging 2 cm with 60% being <2 cm in length. Cortex was present on four pieces of rhyolite and two pieces of Saugus jasper. Flake debitage indicates that knappers carried out Stage II to III reduction. The minimal presence of cortex is consistent with second stage reduction. Projectile points recovered included Levanna point tip, one triangular point tip, and light gray rhyolite Wayland Notched point. Concentration 23 represents a late Middle to early Late Woodland deposit where knappers performed stage II and III bifacial reduction. The presence of fire-cracked rock and faunal remains indicates that people deposited hearth waste here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 24 was in the southeast quarter of the L6S impact area around test pits N112 to 114 E252 **(Figure 4)**. Artifact classes recovered here consisted of calcined bone (n=5), maize kernels (n=8), fire-cracked rock (n=7), grit-tempered (n=14) and shell-tempered pottery (n=2), lithic tools (n=12) and debitage (n=237). Testing recovered five fragments of calcined medium mammal longbone and flatbone.

Archaeologists recovered fragments from three grit-tempered vessel lots (Vessel lots 79, 81, and 82). Vessel 79 had smooth interior and exterior surfaces with incised triangles on the exterior. This style dates to the late Middle Woodland to Late Woodland period. Vessel 81 was a miniature vessel that bore smooth interior and exterior surfaces with rocker stamping on the exterior. The present study dates this vessel to the late Middle Woodland to early Late Woodland period. Vessel 82 was cord-marked on the exterior and interior, a trait usually associated with the Early Woodland period. Analysis identified one shell-tempered vessel lot (Vessel lot 84). This vessel bore a smooth interior and cord-marked exterior, possibly dating it to the late Middle Woodland to early Late Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 83.5% and 13.5%, respectively, of the assemblage. Other lithic materials present consisted of Saugus jasper (1.6%), hornfels (.8%), and quartzite (.4%). Quartz flakes measured between .6 to 5.9 cm in length, averaging 1.7 cm, with 78.9% of the flakes being < 2cm in length. Rhyolite flakes measured between 1 and 3 cm in length, averaging 1.8 cm, with 71.4% being <2 cm in length. Four pieces of quartz and one piece of rhyolite debitage bore cortex on their surfaces. The size of the flakes and presence of cortex indicates Stage II to IV reduction. Lithic tools recovered consisted of two quartz unifaces and one quartz scraper, indicating scraping and cutting activities utilizing expedient and formal tools were undertaken at the site. Archaeologists recovered two bifaces, one quartz and one rhyolite, representing Stage III and IV bifaces. Projectile point fragments consisted of one rhyolite tip and midsection with a perverse manufacturing break, and a quartz midsection fragment. Projectile points recovered included a chert Greene point base and midsection fragment with a perverse, manufacturing, fracture, one shallow-based and one deep-based quartz Levanna base and midsection, both with impact fractures, one quartz Levanna base and midsection fragment with a crystal planar fracture, and one Saugus jasper and one argillite possible Wayland Notched point. Concentration 24 represents a late Middle Woodland to early Late Woodland deposit where knappers carried out stage II to IV bifacial reduction to replace points broken during use. The presence of fire-cracked rock and faunal remains indicates that people deposited hearth waste here. Analysis identified this as a Type 4 secondary deposit representing a range of activities a larger number of people over a longer duration of time.

Concentration 25 was in the northwest quarter of the L6S impact area around test pit N116 E250 **(Figure 4)**. Artifact classes recovered here consisted of grit-tempered pottery (n=2), lithic tools (n=2) and debitage (n=98).

Testing recovered fragments from one grit-tempered vessel lot, Vessel lot 78. Vessel 78 had smooth exterior and interior surfaces with fabric impressed decoration on the exterior. The present study dates this vessel to date to the Middle Woodland period.

Quartz and rhyolite composed most of the lithic debitage assemblage making up 95.9% and 3%, respectively, of the assemblage. The only other material was hornfels, which made up 1% of the debitage assemblage. Quartz flakes measured between .9 and 2.7 cm in length, averaging 1.5 cm, with 80% of the flakes being <2cm in length. No cortex was present on any of the debitage. Lithic tools were one chert uniface and one rhyolite scraper indicating scraping and cutting activities utilizing expedient tools were undertaken at the site. Concentration 25 represents a Middle Woodland deposit where knappers carried out stage II and III bifacial reduction and people used unifaces to scrape and possibly cut. Analysis identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration 26 was in the L7S impact area around test pit N184 E248 **(Figure 5).** Artifact classes recovered here consisted of shell-tempered pottery (n=1) and debitage (n=10). Testing recovered fragments from one shell-tempered vessel lot (Vessel Lot 95). This vessel bore a scraped interior and smooth exterior, possibly dating it to the late Middle Woodland to early Late Woodland period.

Quartz made up 90% of the meager lithic assemblage with rhyolite composing the remaining 10%. Quartz flakes measured between .9 and 1.1 cm in length. Concentration 26 represents a late Middle

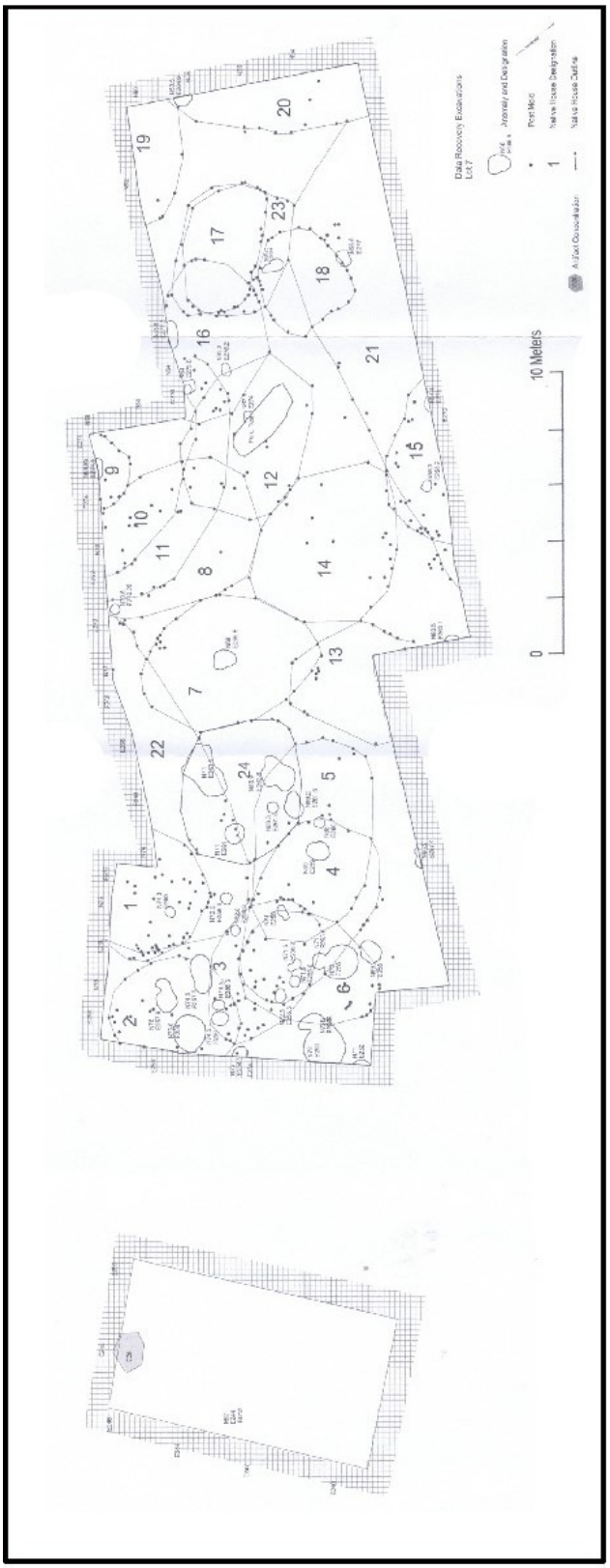

Figure 5. Lot 7 artifact concentrations

Woodland to early Late Woodland deposit where knappers carried out Stage III to IV bifacial reduction. Analysis identified this as a Type 1 deposit representing limited activity by a small number of people over a short duration of time.

Concentration Summary

By examining the concentrations of artifacts recovered from the plowzone contexts within each of the impact areas, conclusions can be drawn regarding the use of the project area over time and the similarity of different areas. The one extensive Middle Archaic deposit encountered indicates that populations were sporadicly using the project area during this period. The lack of widespread Middle Archaic finds and the apparent focus of Middle Archaic activity around a wetland that fed into the Nemasket River, indicates that Middle Archaic populations were not as riverine centered as later populations. Analysis found that people carried out a limited range of activities out at concentration 7a, mainly focusing on reduction of lithic raw materials quarried elsewhere for the production of bifaces. Knappers may have produced these to replace points broken during the hunt. Other activities included the use of scraping and cutting tools, possibly for the butchery of game or the collection of plant resources. Late Archaic populations appear to have used the project area as a short-term camp site were generally a few limited types of activities, chiefly those focused on lithic reduction and replacement of broken tools and to a lesser extent activities involving the use of fire, took place. Middle to Late Woodland populations are the best represented, occurring across the project area and leaving the most tangible and visible traces of their existence. Populations appear to have either occupied several portions of the project area at the same time or at least recurring occupations repeated the same types of activities across the project area. The recovery of the same lithic raw materials across the project area, especially in the southern half and especially in the case of Saugus and Pennsylvania jaspers, cherts and hornfels, indicates possible cultural and temporal connections across the project area. These populations had specific areas where they deposited refuse (dumps or middens) adjacent to their structures. The designation of specific dump areas indicates a population that spent an extended period of time at the site, as also evidenced by the variety of faunal remains and density of FCR and pottery associated with these middens.