PHASE I AND II CULTURAL RESOURCES SURVEY FOR THE ADA-SR136-21.51 BRIDGE REPLACEMENT PROJECT LOCATED IN WINCHESTER TOWNSHIP, ADAMS COUNTY, OHIO (PID 12905).

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RESEARCH DESIGN/SURVEY METHODOLOGY

Report preparation and fieldwork methodology for the ADA SR 136 bridge project focused upon two major concerns:

1) The location and level of disturbance;
2) The possible existence of lowland sites ranging from lithic scatters to transient camps or possibly even base camps, which we expect to find on specific Till Plain habitats like some of those found in the project area.

The excavation strategy met or exceeded the minimum requirements as suggested by the Ohio Historic Preservation Office guidelines (OHPO 1994). These minimum requirements include: a review of literature and research for the cultural and environmental background; reconnaissance and/or locational survey involving surface collection with surface visibility greater than 50%, and subsurface testing conducted at fifteen meter intervals (requiring test unit dimensions of .5 meter square) with visibility of 50% or less to determine the existence of subsurface features and identify areas and extent of disturbance; and if artifacts are encountered, their tabulation, analysis, and categorization by artifact, cultural, and material types; artifact recordation on OAI forms; and artifact storage at ODOT’s Cultural Resource Lab, West Broad Street, Columbus. Artifacts were curated by project/site number. Each artifact was minimally processed and analyzed by project personnel. Analysis focused on segregating recovered remains into material groups and descriptive classes based on the nature of the material and the observed morphological characteristics of each artifact. Chert analysis was subjective but outlined by the Project Director and based on simple visual comparisons made to known or reported chert types commonly found in Ohio (see Converse 1994).

Cultural Setting

The cultural setting was designed to provide background information regarding the types of archaeological resources which are known to exist on glaciated areas in Ohio. This summary is focused on the various site types and the kinds of cultural activities conducted at these sites. This section should be considered a compendium to the literature search section of this report which will only discuss localized and previously known sites in and around the study area. This cultural setting is felt to be vitally important since the range of site types which might be found in the study area may not be expressed through previous localized archaeological investigations.

Settlement/subsistence data were summarized herein to determine, at least in a preliminary fashion, the potential for possible construction impact on known site types. This information is also necessary for determining potential significance and resolving other
This particular project is located within the glaciated Till Plains physiographic region, an area found across central and western Ohio. The name is derived from the glacial debris which generally blankets an area once smoothed by continental glaciation. The Till Plains of Ohio are composed of broad rolling flats of ground moraine which are bounded by more hummocky bands of glacial material called end and terminal moraines. Differential glacial melt also caused the accumulation of more sorted materials. Today, these other rolling features (i.e. kames, eskers, and drumlins) are sometime seen across the landscape.

This more expansive but varied environmental fabric is also broken by the formation of drainage ways and major streams. Many times these valleys reflect the re-entrenchment of older preglacial valleys. Streams generally drain away from more hummocky features. In fact, end moraines and eskers usually appear as divides or mark the margins of particular drainage basins. However, streams can be found to sometimes truncate end moraines either accentuating the marginal topography and, in some cases, erosion actually cross-cutting or eradicating a portion of the feature itself. Erosion or down cutting along stream valleys has caused the complex formation of fluvial features. Bluff features have formed along the margin of the till plains and overlooking stream valleys. Features found on wider valley floors include outwash terraces, cut terraces, and a variety of alluvial (floodplain) deposits. Glacial retreat and re-advancement sometimes blocked downstream waterways causing the formation of lacustrine deposits seen today as thin poorly drained flats and depressions across both upland and lowland expanses.

Varied relief and local soil conditions would have had an impact on the local drainage conditions at any particular location. Available environmental data clearly indicates the Till Plain physiographic region is composed of expansive poorly drained flats and a variety of better drained, more hummocky glacial features. Periodically these normal conditions are down cut by streams where a variety of formations have been found to occur. For the purposes of this model, the pronounced drainage dichotomy between broad imperfectly drained valley floors and upland flats versus a variety of differing but better drained habitats on glacial hummocks and along streams courses cannot be over-emphasized. It can be demonstrated that local drainage characteristics caused the development of differing canopies (i.e. for instance elm-ash swamp forests and wet beech forest across poorly drained areas versus mixed forest and oak/hickory forests types where improved drainage is found). Hypothetically this dichotomy would have directly impacted the development of sites and the types of activities conducted within each habitat.

In general terms, the Till Plain physiographic area can be broken down into ten individual habitats based on geomorphological deposition (end moraine, ground moraine, outwash, etc.) and local drainage characteristics (better-drained versus imperfectly drained). A summary of local conditions can be developed by analyzing the soils data from any particular location. The most
conspicuous well drained features throughout the region are the previously discussed end moraines, kanes, and eskers. However, intermittent features like bluff and terrace margins would have also afforded better conditions for travel and the establishment of habitation sites. The juxtaposition of various habitats along end moraines would have also provided a wider range of resources. These more diverse catchments seem to have been more commonly selected and utilized more intensively by aboriginal groups for hunting and collecting. Previous research simplistically built a case for the attractiveness of oak and oak/hickory trees for fall nut collection (Otto 1975: 2). However, a more pernicious biological system existed, since mast directly attracted both large and small animals as a food source. Various lesser carnivores would have been naturally attracted by the availability of smaller herbivores like mice and squirrel directly utilizing the canopy. Larger game species like deer, bear, and turkey would have equally favored the food supply afforded across these well drained deposits. As resources themselves, these larger herbivores would have attracted the greater carnivores including humans. One can then conclude that mast forests would have had a greater overall carrying capacity that some other less diverse canopies. Within the Till Plain physiographic region, the resources associated with these favorable oak/hickory canopies would have been sought out and holistically exploited by native peoples.

The potential habitats in this area, the previously reported site types, and where these two factors coexist are presented in Tables 3 and 4. These occurrences are based on the data previously offered in the cultural setting and the summary of cultural remains reported in the literature section of this report. The previously prepared setting is more regionally written and is a temporally organized, running narrative of the types of sites and temporal components that might be found in this physiographic region. Locally derived site data does not detract from these findings but tends to support the developed model. The following will focus on local conditions that influenced settlement and will make general predictions regarding the types of resources that may be found in the immediate project area.

A total of 21 temporally/functionally specific types of sites are known to be represented within the Till Plain physiographic region. No habitat excludes the occurrence of recorded sites since the current system of OAI recordation includes all forms of cultural data. Generally speaking, imperfect drainage conditions negatively affect the frequency and types of resources found in any particular habitat. More substantial resources (i.e. more permanent habitations, more functional diverse sites, more intensive utilized regions, and all identifiable ceremonial sites) are generally limited to better drained land forms. In contrast, less intensively used habitation types and more transient behaviors utilized a wider range of habitats. Sites with very low numerically frequent data sets, including isolated finds and lithic scatters, might be found on all land forms. This pattern has been recognized for many years (Baker 1976; 1977, and ODOT 1987).

Because of functional limitations imposed by poorer drainage, certain habitat types either have a lower or higher potential information yield. Isolated finds and lithic scatters (i.e. regardless of the period of origin) are thought to have no potential for the National Register.
Archaeological investigations at these site types should be limited to the recordation of a representative sample of these resources from an particular project. Transient behavior across a region might produce significant resources. However, this type of behavior is also represented by superficially deposited refuse which are easily disturbed by modern human activity. Post-depositional transforming events like cultivation easily render thin refuse deposits insignificant. The information yield from habitats where these limited site assemblages occur are felt to have low yields or only very low yield even if undisturbed deposits are found. These low yield areas include imperfectly drained, upland flats, terrace surfaces and minor floodplain. Field recordation of the position of these areas and documentation of a representative sample of the sites which occur in these situations are the only recommended investigation strategy. More care must be taken if undisturbed land forms are found (i.e. like uncultivated bluffs, etc.) making intact resources related to transient behavior potential significant.

Better drained upland rises and rolling to hummocky glacial features (end moraines, kames, and eskers) can contain evidence of a more substantive nature including complex habitation and other cultural resources of a ceremonial nature. Bluff margins, terrace margins, and better drained floodplain margins are situations in environmentally more complex catchments, possibly supporting the most diverse site types, repetitious human endeavors, and the most complex depositional scenarios found in this physiographic area. Stream valley catchments consistently produce intensive site evidence possibly because of the juxtaposition of complex environmental features, transportation corridors, and excellent living floors provided by improved drainage. Archaeological remains in these areas have been documented to be more intrusive in nature (i.e. having a greater impact on the subsoil).

Deposits extending below the plow zone have a potentially higher information yield than the superficially deposited resources previously described. At the very least, all sites having this potential complexity will have to be documented. Evaluation of any functionally diverse resource is however the recommended investigation strategy. The documentation of any undisturbed resource most commonly creates a situation where avoidance and mitigative measures must be taken. Predictively, where complex cultural/environmental scenarios are identified, these habitats will have the highest information yields. As a consequence, alignments that cross such high yield habitats have a higher potential impact, a situation which should be considered in the selection of any alignment.

This particular study area does not express every unique habitat but only a fraction of them from the Till Plains physiographic region. Local environmental condition have to be summarily reviewed in order to 1) clarify the site potential along an alignment and 2) define the types of resources which may be impacted. In the case which follows (i.e. the modeling ramifications section), it would appear that only limited types of sites might be found in the area. However, temporally related land-use strategies, which seems to vary through time, should also be considered as an aid in predicting the types of resources which may be impacted by a highway design.
Regional Exploitation Patterns/Settlement Systems

As indicated, habitation sites in the Till Plain physiographic have been found in both upland settings and in lowland areas associated with streams and rivers. Although not all site types by necessity have to be directly associated with permanent water sources, the topographic nature of lowland catchments exhibit greater diversity than typical upland till plain habitats where less diverse plant life is found. In fact, it can be demonstrated that certain types of nucleated settlements are only found where resource diversity is highest (along major rivers). Typical lowland resources (i.e. waterfowl, fish, mussel) would have been locally absent in upland settings. Although not all known sites are directly related to permanent water sources and some lowland resources may be absent across broad regions, the topographic and environmental diversity suggests that all portions of the region would have been conducive to at least limited types of prehistoric activities. Isolated remains have been found to occur on all upland flats regardless of drainage. Additionally, lithic scatters and sometimes dense accumulations of refuse have been found along ground moraine but more commonly on the better drained eminences and/or areas adjacent to flowing water. Based on typological data, all temporal periods are represented in the Till Plain region except for a very short hiatus reported at the end of the Protohistoric Period of which no representative sites are known.

Most commonly, prehistoric activities were apparently limited to functionally repetitive assemblages and a few temporally specific components which repetitiously occur at many different positions across the region. These lithic scatters and isolated artifacts can be commonly viewed as the product of a hunting and gathering subsistence pattern in operation from the Early Archaic through the Early Woodland periods. Activities during these periods would have included the establishment of temporary camp sites for the exploitation of local resources. However, other broad scatters of archeological materials and isolated tools seem to be related to less task specific sites or loci, reflecting small groups of people simply crossing the area to identify and extract local resources. However, it would appear that both foraging and collecting groups would have been tethered to selected habitation floors which were markedly well-drained and from which the immediate catchment or vicinity could have been exploited. The following sections were designed to more clearly elucidate the exploitation and settlement strategies once used in central and western Ohio.

Obviously, the limited scope of this research and the need for additional site evidence does not allow for the definition of cyclic hunting and gathering systems in their entirety. It is also beyond the scope of the work to determine if temporally distinct phases were fully nomadic, semi-nomadic, or semi-sedentary. Given the known but limited occurrence of semi-sedentary Late Woodland/Late Prehistoric villages, one can assume that later phases were probably practicing a collecting and not a foraging strategy. Later, horticultural activities seemed to have produced a seasonal surplus of food and there is evidence that such food reserves were stored. It would be hard to attribute the occasional occurrence of Late Prehistoric refuse found in uplands and along minor streams as related to a foraging pattern. This tactical change late in the prehistoric record will be discussed later in this section.
The generally documented refuse pattern (i.e. particularly early in the prehistoric record) clearly demonstrates that the hunting and gathering peoples practiced a foraging pattern. All available artifactual data seems to suggest an emphasis of hunting activities but not to the exclusion of other activities. One can assume that tool diversity is clearly indicative of multi-functional site activities. This opportunistic subsistence approach is clearly indicative of a foraging pattern. Previous highway related fieldwork has commonly identified two discrete types of sites in upland areas: isolated lithic artifacts and low-density lithic scatters. Analysis of this class of debris and the remains from small habitation sites on upland eminences has defined at least some functional diversity. The diffuse distribution of refuse is at least indirectly related to the infrequent, short-lived, but repetitious use of selected locales through time by small groups of people.

The archaeological data generated by regional highway investigations has suggested that both resource extraction loci and residential or transient campsites were once established in association with the headwater streams. These sites were once part of a network of settlements which complimented a seasonal exploitation cycle. Tool diversity might also suggest that bands inhabiting these residential sites were composed of entire families or extended family units. Residency was at least temporarily established in the area. The size and composition of the refuse, if correlated to a hunting and gathering strategy, would seem to suggest a pattern of "foragers moving consumers [the band] to goods [the resources] with frequent residential moves... (Binford 1980: 15).

Other lines of evidence also suggest some functional complexity at sites which is indicative of foraging. Although direct evidence of hide processing is not commonly reflected at many upland sites, moderate functional diversity is suggested since scraping tools do occur. The ratio of scraping tools versus projectiles in light of Judge's (1974) research would again suggest foraging. However, the rather infrequent occurrence of scraping tools, the absence of other tool and non-tool categories, and the moderately low functional diversity would seem to imply that the area was not occupied for any extended period of time. The site types commonly found along the upper reaches of most streams should not be considered intensively occupied base camps.

Chance resource encounters, which is a fundamental aspect of foraging, are indicated by the infrequent occurrence or a low frequency of chert cores in the many archaeological samples. Multiple chert types might also suggest that foraging groups were not logistically motivated. While the presence of only one chert type (i.e. selected of only one lithic source) might suggest another motivating pattern. The diverse array of flake types and cores typically recovered from many campsites suggests bifacial tools and flake tools were expeditiously manufactured and used. Such an archaeological pattern probably developed out of convenience and is evidence of a non-logistical orientation. In contrast, a collecting pattern would have either produced sites with chert pebbles, cores and decortication flakes in greater abundance or refuse deposits would have been relatively free of cores and decortication flakes. Again, the limited presence of one chert type might suggest that a selected resource was logistically moved from an extraction point to a residential setting for secondary processing.
Isolated remains and sites with only one class of artifacts (i.e. a flake scatter) were interpreted as foraging debris. Such sites have been previously reported in all areas of ground moraine. In contrast, lithic scatters showing multiple classes of debris (i.e. both flakes and bifaces) can be interpreted as camp site debris. Again, there seems to be a tendency for open campsites to be focused on well drained bluff margins and well-drained rises along end moraines which cross-cut the till plain landscape. Obviously, some less functionally diverse patterns of refuse may relate to either a short lived campsite or a broad region repetitiously used as a resource extraction loci. In some cases, these two classes of foraging sites cannot be confidently segregated by using the previously recovered sample.

Distributional data and manipulation of the statistical data suggest a much higher frequency of remains per unit across some habitations. Interpretively, small sites may represent a single occupation of a small or possibly a single family band. In contrast, assemblages with greater numeric frequencies might easily reflect multiple occupations and/or a larger band size with more widely placed activities or a repetitively used transient camp. Moderate artifact frequencies, the occurrence of both primary and secondary forms of debitage, and a moderately diversity tool assemblage suggest these sites are something greater than hunting loci. In contrast, low diversity and low frequency may be interpreted as more transient behavior at best and most indicative of either the establishment of individual camps or repetitious hunting across broad loci where actual residence may not have been established.

Functionally and spatially (i.e. artifact diversity and intensity per unit of area), upland sites stand in sharp contrast to major riverine base camps (Baker 1976, 1977; Baker and Genheimer 1977). Most likely, large lowland sites composed of nucleated multi-family bands amalgamated in the spring to exploit lowland and riverine faunal resources and emerging plant life available after the spring thaw. Simultaneously, uplands with lower productivity would have been less attractive, though hunters ranging from lowland areas like the Scioto may have ventured through upper watershed areas and along valleys in order to extract local resources as they were needed.

These low-land sites appear relatively large and/or were repetitiously occupied as indicated by the wealth of refuse and the occurrence of thick midden deposits. These "base camps" would have contained relatively large populations composed of several extended families. Activities at these large base camps would have focused on lowland game animals, spawning fish, and plant food resources available during the growing season. Interfluvial areas were probably more attractive during foul weather conditions when smaller bands and/or a single extended family groups focused their attention on more diffuse mast and upland game resources.

Once resources around the fair weather base camps were exhausted or unavailable because of changing climate conditions, base camps may have fissioned later to occupy more transient camps, particularly in the fall and winter months. Hunting at these camps may have intensified and exploitation of mast resources (i.e. fall nuts and fruits) may have been more
critically important. Again, exposed ridges along any end moraine would have answered these needs. The southern exposures and the well drained ridge would have provided a strategic position for hunter/gatherers to either extract resources or to more permanently camp.

The occurrence of late components across more selected portions of the regional was probably the result of a logistically oriented collecting strategy. As Binford (1980:15) states: "...collectors move goods to consumers with fewer residential moves..." The occurrence of projectile points and the apparent rarity of ceramic storage vessels indicates indigenous hunters were ranging from village sites and occupying functionally specific hunting stations to collect meat and hides. These activities were probably designed for the sole purpose of confronting dispersed mammalian species like white-tailed deer, bear, and elk ranging across either grassy or wooded areas found in the region. The infrequency and wide-spread nature of late diagnostic tools suggests that these hunting excursions were not focused on other meat producing species or particular floral resources specifically available there. However, previous investigations do suggest that small sites along lesser streams were complimented by fair weather sites established along major stream valleys like the Sandusky, Scioto and Great Miami rivers.

Local Environmental Conditions/ Modeling Ramifications

A detailed discussion of the local environmental has been previously discussed, though details specifically needed to address the predictive model will be repeated. Published physiographic data was reviewed to determine the potential for the establishment of prehistoric sites, particularly habitation and ceremonial sites, in the project area. However, the current resolution of published environmental/soil data may not delineate some smaller or unique environmental situations. Field review was required to more clearly identify what topographic features will be potentially impacted and to correlate this data to the Till Plain predictive settlement model.

The study area is located in northwestern Ohio well within the glaciated portion of the state. The study will generally incorporate a steep sided ravines (till deposits) along Little Tymochtee Creek and a nearby area of level upland till typically described as poorly drained. More importantly from a predictive point of view, the project area is isolated from a major valley like those found along the Sandusky River. However, a variety of lesser habitats associated with the valley along Little Tymochtee Creek are found along the study corridor. As defined, the most diverse habitat types are not located within the area of potential impact. In addition to rolling upland situations, the project will impact a bluff area associated with the valley wall and course of Tymochtee Creek. Local soils studies (Table 1) have defined the preponderance rather poorly drained silt loams (Bount and Penwamo) in upland areas. Side slopes exhibit two soil types (GwB2 and MrD2 soils) both of which are described as potentially eroded but well drained. Obviously, a varied potential exists for aboriginal remains as one crosses from one to another set of local conditions.
Cultural debris which is a clear reflection of habitation are nearly non-existent where either steep slopes (MrD2 soils) or where swampy (BoA) and hydric/muck soils (potentially MrD2 and Lk soils) formerly occurred (USDA/SCS 1987). The latter conditions are found to occur in the immediate impact area possibly in upland depressions (BoA soils), and definitely within lowland depressions on the floor of minor streams (Lk soils) or where local depression sometimes occur at the base of steep slopes (MrD2). However, isolated tools are sometimes found regardless of environmental conditions. Due to the level of post depositional disturbance (i.e. the development of the existing right-of-way) and other site degrading processes (i.e. farming activities, artifact collecting, natural soil erodibility, etc.), scattered remains are not considered to be particularly significant.

In general, site predictability criteria are not met across major portions of the project area. The chances of finding a well preserved prehistoric site, particularly a significant one within the potential impact area is doubtful except within one habitat. Simply, the bulk of the area appeared as either a steeply sloping ravine or a lowland areas where seasonally poor drainage occurred. Soils data would also suggest that portions of the surrounding region were once imperfectly drained. Though isolated finds and lithic scatters might be found on upland flats and along the Little Tymochtee Creek valley floor, it is unlikely that prehistoric campsites exist beyond local bluff edges where better drainage is known to occur. Obviously, the most diverse regional habitats only exist outside the study area. Ceremonial sites including isolated burials and earthen mounds all seem to be located in areas overlooking stream confluences or along bluff lines paralleling major stream valleys in the Till Plain region. Major habitation types are only known to exist within major valleys like the Sandusky River. It is unlikely, given the low incidence of these less prevalent site types and the local conditions known in the project area, that major ceremonial sites or extensive areas of habitation exist. Minor habitations, or sites of focal activity and of a less invasive nature, have been recorded in environmentally similar portions of Wyandot County, Ohio. So in conclusion, it is possible they may exist in the study area.

The occurrence of areas exhibiting improper drainage, the more conspicuous occurrence of steep slopes which are easily eroded, and the limited distribution of preferred habitation zones, all seem to suggest that the potential presence of significant prehistoric resources is quite low. It is unlikely that significant resources will be found unless the project crosses some unforeseen or better preserved habitat. At the least, the constructed model suggests 1) the recordation of local environmental factors and 2) a representative sample of all site types be collected. This information is required to satisfy section 106 requirements for any federal project. It is equally important that comparative information is gathered to test the model in order to refine our understanding of Till Plain settlement for future investigations.
Table 3: Aboriginal site types and their locations on the Till Plain physiographic region.

<table>
<thead>
<tr>
<th>SITE TYPES</th>
<th>SITE BEARING HABITATS</th>
<th>N.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(T. Period)</td>
<td>Upland End Truncated Kame/ Bluff Terrace Terrace Fld.- Wet flats**/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rise* mor. end mor. Esker margin flats plain depressions (potential)</td>
<td></td>
</tr>
<tr>
<td>IV Villages (LP-PH)</td>
<td>no no no no no common no yes no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Hamlets</td>
<td>I (MW-LW) no no yes yes no common no yes no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Base Camps</td>
<td>III (EA-EW) no no no no no common no yes no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Transient Camps</td>
<td>IV (MW) no no yes no no no no no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Isolated Finds</td>
<td>V (PI-EA) rare ------------------universally common------------------ no no no</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td>VI (LA-EW) ------------------universally common------------------ yes no yes</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>VII (MW-LW) no no yes no yes yes yes no yes no</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td>VIII (LP-PH) no no no no yes yes yes yes yes</td>
<td>LOW</td>
</tr>
<tr>
<td>Isolated Mounds</td>
<td>IX (PI-EA) no yes yes yes yes yes yes no no no(?)</td>
<td>NONE</td>
</tr>
<tr>
<td>Enclosures</td>
<td>X (LA-EW) ------------------universally common------------------ yes no yes</td>
<td>NONE</td>
</tr>
<tr>
<td>Earthworks</td>
<td>XI (MW-LW) no rare yes yes yes common yes yes yes yes yes</td>
<td>NONE</td>
</tr>
<tr>
<td>Isolated Burials</td>
<td>XII (LP-PH) no rare yes rare yes yes yes yes yes yes yes</td>
<td>NONE</td>
</tr>
<tr>
<td>Lithic Scatters</td>
<td>XIII (assign/unassign) ------------------universally common------------------ rare</td>
<td>NONE</td>
</tr>
<tr>
<td>Isolated Burials</td>
<td>XIV (EW) no yes yes yes yes yes no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Enclosures</td>
<td>XV (EW-MW) no no no no yes yes no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Earthworks</td>
<td>XVI (MW) no no no no yes yes no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Isolated Burials</td>
<td>XVII (LA) no yes yes no no no no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Isolated Burials</td>
<td>XVIII (W-LP) no no no no yes yes no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>Towns(EH)</td>
<td>XIX (assign/unassign) ------------------universally common------------------ no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>XX Camps (E/MH)</td>
<td>XX (assign/unassign) ------------------universally common------------------ no no no</td>
<td>HIGH</td>
</tr>
<tr>
<td>FARMS****</td>
<td>XXI (MH) no yes yes yes yes no no no no no</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

*ground moraine only;**and loess covered flats;***excludes burials at habitations;****north of Greenville Treaty Line only
Table 4: Estimated information yields and recommended investigation strategies found on the various habitats within the Till Plain physiographic region.

<table>
<thead>
<tr>
<th>Regional Habitates</th>
<th>Land-use Characteristics</th>
<th>Depositional Yield</th>
<th>Recommended Invest.Strat.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland Flats (improperly drained flats)</td>
<td>cultivated superficial</td>
<td>none</td>
<td>recoderation</td>
</tr>
<tr>
<td>(IX,XI,XII, XIII)</td>
<td>undisturbed superficial</td>
<td>low</td>
<td>recoderation</td>
</tr>
<tr>
<td>(better drained rises)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V,VI,X, XIII)</td>
<td>cultivated superficial</td>
<td>low</td>
<td>recodation</td>
</tr>
<tr>
<td>End Moraine (better drained)</td>
<td>cultivated superficial</td>
<td>low to high</td>
<td>evaluation</td>
</tr>
<tr>
<td>(V,VI,IX,X,XI,XII,XIII,XX)</td>
<td>undisturbed intrusive</td>
<td>high</td>
<td>avoid/mitigate</td>
</tr>
<tr>
<td>Truncated End Moraine (better drained)</td>
<td>cultivated superficial</td>
<td>low to high</td>
<td>evaluation</td>
</tr>
<tr>
<td>(II,IV,V,VI,VII,IX,X,XI,XII,XIII,XX)</td>
<td>undisturbed intrusive</td>
<td>high</td>
<td>avoid/mitigate</td>
</tr>
<tr>
<td>Kame/Eskers (better drained)</td>
<td>cultivated subplowzone</td>
<td>low to high</td>
<td>evaluation</td>
</tr>
<tr>
<td>(II,VI,XI,XI,XII,XIII,XIV,XX,XXI)</td>
<td>undisturbed intrusive</td>
<td>high</td>
<td>avoid/mitigate</td>
</tr>
<tr>
<td>Bluff Margins (better drained)*</td>
<td>cultivated subplowzone</td>
<td>low to high</td>
<td>evaluation</td>
</tr>
<tr>
<td>(V,VI,II,IV,V,VI,VII,IX,X,XI,XII,XIII,XX)</td>
<td>undisturbed intrusive</td>
<td>high</td>
<td>avoid/mitigate</td>
</tr>
<tr>
<td>Terrace margins (better drained)</td>
<td>(nearly all site cultivated subplowzone)</td>
<td>low to high</td>
<td>evaluation</td>
</tr>
<tr>
<td>(nearly all site cultivated subplowzone)</td>
<td>undisturbed intrusive</td>
<td>high</td>
<td>avoid/mitigate</td>
</tr>
<tr>
<td>Terrace surfaces (improperly drained)</td>
<td>(IX, XI, XII, XIII)</td>
<td>cultivated superficial</td>
<td>none recoderation</td>
</tr>
<tr>
<td>Floodplains (better drained margins)</td>
<td>(nearly all site cultivated buried)</td>
<td>low to high</td>
<td>poss.evaluation</td>
</tr>
<tr>
<td>(minor flats - improperly drained)</td>
<td>(X, XI, XII, XIII)</td>
<td>cultivated/ buried superficial/redeposited</td>
<td>low</td>
</tr>
</tbody>
</table>

*sites and higher densities of remains are particularly common overlooking confluences.
12). Established criteria suggest modern debris is not considered significant and no OAI forms will be completed on these remains. However, those sites appearing to be more than fifty years old and not associated with an OHI documented standing structure would require an inventory form.

A general itemization of the modern material expected to be found in this type of collection is as follows:

- Modern machine-made glass: i.e. refreshment bottle glass, plate glass and automotive glass
- Modern alloy metal: i.e. bottle caps, tin foil, auto parts
- Rubber, plastic, coal, cinders, modern machine bricks
- Identifiable 20th century ceramics
- Machine extruded drainage tile
- Modern electronic appliances: i.e. TV's, radios, washers, refrigerators, Mr. Coffee's, etc.
- Modern abandoned cars and farm equipment.

Again this type of collection would be considered non-significant only if the density and/or combination of particular artifacts did not suggest a function beyond road litter and/or modern refuse. These collections have to be associated with an existing road and/or mid-twentieth century structure. The results of the field work indicate the presence of such materials in nearly every surveyed field. Field tile is a very common artifact given that nearly every cultivated field within the project area is drained of water via field tile to excavated ditches or streams.

Although anthropological research can be directed at any distribution of material, the Advisory Council has suggested that not all resources are significant. Such research might contribute only to historically unimportant questions, or in the case of a modern manifestation, the research could more easily be undertaken in another manner (A.C.H.P. 1980:7). All other cultural materials were analyzed with respects to the functional, spatial, temporal, economic, and cultural variables that are thought to be appropriate for the project area. It should be pointed out however, that observations contained herein are presented more for descriptive purposes than for making any final/comparative statements. This conclusion was reached based on the disturbed nature of the archaeological deposit and the absence of diagnostic remains in the project area.

**Predictive Model**

A predictive site model was developed for this project as part of the research design. Prior to entering the field, it was felt that some understanding of where sites might be found or what types of sites might be impacted were critical research questions. Settlement research, that is developing a feeling for the site distribution phenomenon, should commence for several reasons. Obviously, modeling is pro-active. For instance, it might be used to develop better field strategies.
and be a help in answering scheduling problems. Theoretic situations should always be compared to what was actually found. Obviously, positive correlations between the expected and the encountered suggests the proper types of sampling procedures were implemented and that the sufficient levels of background investigations were conducted for proper site interpretation. The identification of unforeseen site types can also help us refine our research goals in future formulations and can only make our work more archaeologically sound.

Historically, predictive models were developed to better understand why prehistoric people located certain types of sites at particular locations. These models assumed that prehistoric peoples had inherent needs and that these needs were fulfilled at environmental specific but repetitious occurring points in the terrain (i.e. where beneficial goods or natural products and needed services or conditions occurred). Such models are based on a cultural ecological theory of minimal expense where sites are focused on areas of highest productive and/or habitats where key or critical resources were most commonly found. Again, site densities per unit of area have been expressed in an attempt to address more anthropological/sociological questions. Unlike previous predictive models, the following approach was neither designed to accurately predict the location and the absolute frequency of every prehistoric resource in a given region nor was it necessarily designed to answer the why question. However, questions like why is a site located in a particular location might be a valid research goals under other circumstances.

There are several valid and tactical reasons why we are reluctant to approach some of these questions. The following approach is designed to avoid certain interpretive problems which are related to the modeling reliability. When dealing with archaeological data, it is hard to test some cause and affect hypotheses. This is due to the: 1) inherent and sometimes frustrating nature of archeological data (lack of objective data, lack of diachronic/synchronic control, absence of single cause patterns, etc.); 2) or our inability to fully comprehend and interpret the meanings of style and typology in the artifact record; and/or 3) the difficulty to clearly elucidate the true functional nature of site assemblages which are typically found degraded. As a result, we need to be very specific in what the goals in ODOT’s CRM program are and what benefit modeling questions will bring to this program. The goals and limitations of previous investigations must govern how predictive models are formulated. Answerable research hypotheses must be generated so each element of the model can be directly evaluated before it can be used.

**Modeling Approach**

In order to develop a meaningful and exacting predictive model, the goals of the research must be addressed and well defined. In reality, there may be several broadly valid model types dependent on one’s desired goals. However, particular goals might never be met by the certain research approaches. Three models/approaches come to mind but potentially many others lines of questioning might exist. The first are anthropological models which question why sites are located where they are. Such models have been mentioned and can either be based on deductive
approaches (i.e. ethnographic analogy) or as in other cases by inductive examination of independently derived empiric correlates.

These common anthropological models appear to be different from preservation/CRM models which are more concerned with determining the likelihood of impacting cultural remains particularly significant resources. This type of model asks what types of resources might be found in a particular region. ODOT/FHWA is also interested in predictive models which are designed to compare and contrast the potential for one highway design corridor to have greater or more individual impacts on cultural resources than another corridor in the same region. Obviously, CRM models are more concerned with foreseeing the value of differing habitats in native terms prior to field documentation, rather than fully identifying all cause and affect aspects which may have occurred in aboriginal life.

ODOT/FHWA corridor models (later more simply called Corridor Models) should not only consider the presence/absence of resources but the conditions under which differing types of sites might be found. Differing types of sites, varying geomorphological nature of a strata, and differential land-use are also modeling issues. Resource preservation and the potential interpretability of each type of site must be considered to anticipate the nature of the impact, to demonstrate that impacts are minimal, and as an aid to design corridor alignments which will minimize impacts when they are found to occur.

As a result of these issues, all preservation related models need to consider and incorporate the following non-cultural conditions:

a) devising alignments to commonly avoid quality sites which may be eligible for inclusion to the National Register of Historic Places, are on the National Register or are a National Landmark.

b) examining or weighing differing impacted habitats to determine if a particular environmental strata is more likely to contain significant resources regardless of external temporal/synchronic settlement relationships.

c) identifying particular habitats that might have the potential to increase the frequency of significant resources and the occurrence of multiple site types. This condition would include the identification of habitats that might be used in a variety of ways through time.

d) defining modern land-use habits and post-depositional conditions that might directly impact the value of individual sites or functional classes of sites found in these areas. This would include identifying of uncultivated areas, determining the potential for naturally buried land forms (i.e. floodplains), determining what areas might be easily impacted or
degraded by farming activities, and locating areas disturbed by either natural or man-made means.

e) looking at the condition under which the sites were formed or what prehistoric functions created greater site visibility or which help protect the resource and sire good focus. Obviously, more intensive types of aboriginal land-use (house building, food storage, earthwork construction, etc.) can create situations which may be more easily interpreted or which might cause the artifact’s context to survive more readily.

Although most archaeologists have been interested in finding and interpreting important sites, existing anthropological models have not incorporated these important preservation concerns into their formulation.

Anthropological settlement models have taken one of two approaches either a deductive one usually based on ethnographic analogy or an inductive approach where possibly valid locational variables are “independently” derived. However, as abstract as these variable lists might look, they are not independent variables which have been blindly developed. Obviously they have been drawn from preconceived notions with regards to the nature of human activity (i.e. distance to water, soil productivity, etc.). The “more scientific” inductive approaches are thought to be bolstered by using statistical means including the development of mathematical coefficients, multi-variant analysis and the like to show abstracted arithmatic relations between environmental factors and a site’s position. However, true science is not the derived statistical data itself but the ability to test the behavioral value of each selected factor and rule out factors which are not behaviorally related. In many cases, hypothetical variables have neither been independently derived nor have they been frequently tested. As a result, most variability patterns have been typically mis-ascribed to some human motive.

Modeling in this case is more concerned with the likelihood to encounter sites and more importantly, determining the potential for the presence or absence of particular site types. Clearly, the magnitude of CRM investigations (large scale to small scale highway studies, sewer projects, and mining permits for example) have examined and studied all kinds of regional situations and diverse habitats. The charge that previous investigations only examined small scale areas is groundless. However, one should be mindful that previous investigations, regardless of scale, may never tell us how many sites might be found in a particular area. The negative aspect of urban development can hamper the identification of all the sites that may have once occurred in an area. Poor sampling strategies might negatively impact the recording of each and every site or site type. However, available evidence (the recovered archaeological data itself) can clearly demonstrate the types of habitats where specific types of sites have been found.

Empiric correlative models may be valid along some research lines. However, certain conditions obviously exist and several assumptions have been made which may seriously hamper the findings themselves. This may hinder the ultimate goal of site preservation in the long run.
These conditions were not explicitly addressed in models generated thus far, but are implied conditions known to negatively impact the results of many archaeological endeavors. For example, the presented test conditions assumed that optimum field conditions existed across the entire area as the data was being collected. They also assumed that preliminary surface collected data is totally compatible to data gathered from locational level testing (unit testing). The underlying question is: can the data set be replicated if the area were to be resurveyed? This has only been assumed and has not been tested before modeling conclusions were drawn. Again, the investigations only dealt with data generated from reconnaissance level survey. It has only been assumed that every known site was purely expressed in the sample and that adequate samples were taken from each site. However, can all site attributes be identified at the Phase I level of research? In reality, site definitions can and do change as more field data is gathered. The biased nature of a sample can only be dispelled by some method of comparative reinvestigation. Obviously criticism was raised regarding the adequacy of previous investigations. Adequate sampling is not accomplished just because a particular individual did the work themselves or levels of sampling adequacy were met just because the researcher said that these conditions were met. Previous investigations under similar habitat condition may in fact be a test in which to consider bias. Simply, we can not ignore well formulated more intensive survey (i.e. Phase II and Phase III) which would provide excellent sources of exacting and meaningful site locational data.

Model precision and behavioral interpretation is best maintained by partitioning the total site population into temporal and functional subsets. Survey accuracy can only be demonstrated when the data can be shown to be replicable. In a worst case scenario, a new project area, or selected portions of an entire project, might be totally disturbed providing nothing to generate a data set. More insidiously, the derived sample from these new and unbiased universes are assumed not to have been negatively affected by 1) preliminary nature of the work itself; and 2) the unavailability of diagnostic material in specific cases (i.e. when phase II and phase III information is not available or when the component it degraded). Although proper sampling has been advocated in the previous example and other models, the preliminary nature of much of these derived samples have been hampered by the near total absence of temporal and functional factors being incorporated into the study.

For settlement models to reach some level of accuracy, they must focus on functional complexity or look at function thresholds as they become apparent from the field work. This might entail multiple seasons of work or the use of multiple data recovery strategies being used across a site area. Our site interpretation is not the true function, but to be most accurate, functional interpretations must be built on the accumulation of factors best expressed in demonstrative samples. This is why site location and assessment is bifurcated into two phases of work. Simply, adequate data was not available from most preliminary surveys to bifurcate the sample into more meaningful units.

Just as subtly, and equally as degrading to any data set is the assumption that the derived site information was not negatively impacted by modern land use or that collector habits have not interfered with the archaeological data set. This is seldom the case. Some functions or site
activities might never be manifested in the archaeological record. Artifact arrays can be transformed by agricultural practices and the selective removal of field data may inherently limit a site’s interpretive value if methods to compensate for this missing information are not devised. In this case, we will never known every activity that was carried out in an area. Interpretative models of any type have to look for and incorporate the best available evidence into the research base. Factors need to develop a model may have to be derived from information accumulated from reconnaissance and detailed investigations in the project area. Information indirectly gathered through previous amateur/professional investigations from one site and/or a selected group of similar sites across one environmental strata may be the best sources of modeling data.

It should be pointed out that settlement patterns cannot be adequately deduced by simple analogies based solely on ethnographic comparison. The tactical motives of the prehistoric groups versus historic groups may differ slightly and in reality, may not be equivalent although elements of each settlement system may look similar. Again it must be stressed that archaeological data from just one site will not always demonstrate function. However, meaningful reconstructive interpretations can begin by deducing activities from individual sites and comparing the accumulated functional data from one temporally related site to another. Ethnographic comparison must be used to make us mindful of how dynamic prehistoric patterns may have been and provide us with a set of terminology to more accurately describe what is being observed prehistorically. Various prehistoric settlement systems can be documented by this process of identification, interpretation, and comparison. In contrast, existing empiric correlative approaches have yet to take the socio-temporal context into consideration. Without using the range of available information, one can not recognize that people from different periods may have had differing reasons for utilizing the same space. These reasons would have had an impact on why certain landscape positions where selected as a site and why others were not. For these reasons and because of the degraded nature of archaeological resources, one statistical assumption or the relative value of a landscape position cannot be accurately measured utilizing empiric correlation only. The value of each hypothesized correlate might be tested, but the results might have little to due with behavior. Sites and their measure of worth can only be derived from fieldwork.

Again, what is called for is the deduction of function from artifact/ecofact attributes from individual sites and the comparison of this information from the multiple phase related assemblages. Temporally specific motives have to be proposed and then tested. Climate changes, seasonal fluctuation in weather, and evolving lifestyles clearly would have an affect on the desirability of a particular location at any one moment in time. The importance of varying forest canopies is a factor, but not anunchanging one. Climate change would have had an affect from one archaeological period to another. Seasonally specific settlement motives (i.e. even for one temporally specific group) may have: 1) considered the canopy (fall nut collecting); 2) indirectly considered the canopy (a hunting parties recognition of the positive influences of mast on game species); or 3) not considered the canopy at all (logistically motivated transient camp) though all may have produced identifiable refuse patterns in the same place. Conversely, interpretation might be muddled if identifiable refuse was not produced. Obviously, some degree of
comparative deduction is necessary, but any interpretation must be tempered by the local condition and the pattern from which the site originated.

Previous models tend to assume that 1) optimum environmental conditions only occur at a very few points in space, 2) that the prehistoric group was logistically driven by particular need, and 3) that all needs have a relatively similar value. Obviously, mast resources or open prairies might occur over wide areas. Hunting was not focused but was a regional pursuit. Particular factors or the juxtaposition of "important" factors may have not even been considered in this case. Again, one must consider that certain needs and desires may have changed with the season or as a result of the availability of certain resources during a particular season.

Prehistoric or aboriginal settlement systems subtly vary from modern conditions with regards to element spacing. However, there seems to be an overt concern with site spacing. This leans towards an assumption that prehistoric people were densely arranged in a target area and that all situations of equal value were used at the same rate. It can not be demonstrated that prehistoric people were either densely arranged or that they commonly taxed the environment. Good archaeological interpretation has to be wary of creating relationships when no actual synchronic link exists in reality (i.e. temporal control only exists at the phase and period level). No archaeological examples from Ohio exist which can claim prehistoric people intensively used broad landscape areas. It is of no surprise, that a sites might not exist in an area of equal environmental richness as where a known site or a group of similar sites has been found to be located. Some caution must be taken so as not to directly examine prehistoric site patterns as modern social patterns have been examined geographically and where the sampling universe is filled as in Central Place theory.

Obviously other factors (non-environmental) may have been involved in site selection processes. Anyone familiar with the archeological record knows that some settlements are found on particular locations while other locations with the same relative value may have never been used. For example, we may never know why a particular location was selected for a village while a second nearby area with equal environmental potential was not. However we do know that many complex sites were located in diverse catchment areas. The occurrence of factors invisible in the archaeological record must be assumed to exist. Sacred factors, not just profane ones, dictated the site selection process. Many sites had little to do with subsistence functions (i.e. isolated burials, individual burial mound, enclosures, and earthworks) and the availability of nutritional resources. Forest canopy data and soil productivity should not even be considered in some extreme functional subsets.

Though it might be the case, it cannot be assumed that the ideal site location is centered on the preferred habitat zone. This assumption is made if interval data is generated and if statical data is directly compared to other measured correlates. In extreme cases optimum living floors might not be found within the optimum habitat where all needs were met or where all the required resources were once found. Absurdly, rivers are highly productive but present drainage problems for housing. However, factors like periodic flooding may have limited the position of
semi-permanent village to high terrace areas which may be rather remotely located from the source of many resources used on a daily basis. Another common example of site/resource disassociation would be rockshelters. Upland sideslopes might offer few other advantages other than the optimum shelter itself. In fact, this author is familiar with riverine ecofacts being found in this preferred site type. Obviously, the source of these resources was a less important consideration since they could easily be transported to the sheltered space. Other elements of the catchments associated with rockshelters and caves have only a limited value in predicting where these types of sites actually exist.

These two examples clearly suggests that the prehistoric site selection process was a subtly ranked process. Some criteria many have been more important than others. Any real situation would creat a muddling affect where absolute distance data is concerned. On short-lived extractive types of sites (i.e. butchering stations, nut gathering loci, etc.) certain factors like the availability of drinking water may not have been considered at all. The consistent examination of this type of factor might statically overrate or underrate a particular site position.

Sometimes we have to assume that two sites or two artifacts are related which may not be the case. Models should not be constructed to take temporal/typological relationships for granted. Two identical artifacts may in fact have been deposited hundreds of years apart. However, repetitious behavior and the common occurrence of even isolated artifacts may infer some validity about how a certain habitat was used. In this case, a picture of land use can be drawn, but we cannot assume that all people were in an area for the same reason. However, if we are only interested in which habitats were used and in determining the general nature of the human environmental relationship, the nature of the assemblages regardless of age and size can sometimes be collapsed into temporal/functional subsets would have value in the examining impact. It would appear that given the above interpretive constraints, a modeling goal to identify every site and its position might never be reached. However, to direct preservation research to identify every situation which represents some potential for finding data regarding prehistory is achievable. The goal is to compare local conditions across multi-corridor areas to determine the rate of impacts. Selection then is to minimize impacts or to select design criteria where few impacts might occur. These local conditions (i.e. habitats) must be clearly defined and distinctly observable.

It would appear that previously developed yield values, such as low probability versus high probability, can not be truly measured and have little benefit to CRM models when they are. To clearly examine site potential along a corridor, background research must consider all the potential geomorphological/physiographic subsets that might occur in the region and what, if any, site types occur in each of these environmental sets. Although this seems more simplified than mathematically expressed probability factors, fundamental errors have occurred in previous studies which poorly present even these most basic local conditions.
It is believed that modeling should be looked at as a building process, where new and better information is always used to reformulate the model. Once mistakes and faulty information are recognized, then they are excluded from the model, and so are not repeated. To date, known predictive models have been applied repeatedly but changed very little beyond the location of the project, the abstract describing it, and the generated data base. How the model was applied across the project, how it clearly showed areas of high and low probability areas for site distribution was not discussed. As a result, there is little information available to show how the field strategies were guided or if it was justified to increase the investigation interval between units of exposure. Just because certain types of sites were not identified in the sample does not automatically imply that they don’t exist or that they won’t be found in other untested portions of a project area. Environmentally delimiting factors might exist in a project area, thus limiting the possibility of significant resources but only when all these preconditions are met.

A cursory CRM review seems to suggest that less work or no work was completed where spatially limited sites are sometimes found. However, spatially limits in itself is not a criteria for determining significance. In reality and to detect small sites, test unit and walking transect intervals need to be reduced and not increased. The approach which has been taken would limit detection of the fragile sites and most all small sites in any project area. Obviously, small sites (numerical and spatially limited scatters) might not be significant or have the ability to convey additional information. We still have a responsibility to record them when possible. However, such issues are infrequently addressed in any CRM work. Considering the possibility of unique depositional conditions to exist but never being addressed (alluvial condition, undisturbed area, etc.), whole classes of small, but excellently preserved, sites might never be identified let alone evaluated when a reduced strategy is implemented. It should also be noted, that certain types of sites may exist where surface remains are infrequently recovered (small mound, isolated burials, and prehistoric cemeteries). Obviously, increasing unit intervals or sidestepping small but unique land forms is a way of totally avoiding the identification of these unique site types.

In the name of science, previous attempts at predictive modeling have focused on the ranking of individual factors which may have influenced the site selection process. This approach will always require the testing of each variable (i.e. distance to water, soil productivity, etc) in order to determine their importance and/or their meaning or to maintain validity. This approach is much like Edison’s research, who tested thousands of filament types to develop the working light bulb. Like the filament experiment, there are probably thousands of environmental factors which may have influenced the use of a particular location. Similarly, each variable has to be independently tested to determine its relative value. However, in CRM investigations other methods of observation or other valid approaches can be used to study site landscape positioning. Prehistoric settlement was a working system. Unlike the Edison approach, we don’t have to evaluate every light bulb filament (i.e. factors in our case) to know if the bulb is burning (i.e. when and how native peoples used a particular landform). There is a more appropriate approach to CRM research. For accuracy however, CRM modeling investigations must be regional in scale where site landscape positioning (identified site types from broad physiographic areas) takes precedence over the strict evaluation of all environmental factors found at any one particular
location. Aboriginal life was an operating system and our investigation is to identify elements that made the system work. Regarding the requirement of CRM, we only need to examine the known the quality of the work that produced the site data to evaluate the results. As previously suggested, the relative value of site data can be determined by the level of replication which is found to exist in the record, itself.

Model Development

The following predictive model is being developed to provide a general discussion addressing the various local habitats where particular types of resources might be found. The investigations will attempt to identify any correlation between positive archaeological evidence and environmental factors. The model will generally use existing data or more properly the best available evidence (i.e. site setting, temporal relationships, and functional interpretations). When possible, artifact data and site structural evidence will be used to determine function or more properly determine thresholds of function. Obviously, to start one must begin with a basic formulation so the model’s validity can be tested. General habitats will be defined from existing physiographic and geomorphological terminology. As field evidence and environmental data accumulates, and as more temporal and functional data becomes available from sites or groups of sites, the formulation can be refined.

Based on the accumulated information, it should be possible to determine the types of cultural resources which might be impacted by this project. Secondly, the model has been designed to consider what correlation exists between site landscape positioning and resources preservation to determine the likelihood of impacting significant resources. ODOT is ultimately interested in what steps might be taken to minimize impacts to significant resources or if a particular designed corridor or an alignment within a corridor might exist which would minimize such impacts. Modern land use factors negatively impact sites and must be considered as they are known to make accurate estimates of yield and to devise field strategies.

The following model recognizes that ecologic factors or the availability of local resources are key factors in site selection but not exclusively. Non-habitation sites also exist. Immediate resource availability might have little to do with the original selection process. A variety of motives may have been weighed, or at times played no part in positioning a settlement or selecting a location for a site type. Conversely, we may never know why a particular site location was selected. However, the archaeological record for a region can be reviewed and both the kinds of land forms selected and the resultant resources can be identified with some certainty.

ODOT has completed extensive site locational studies on several environmentally similar physiographic regions across Ohio. Since site types and localities conducive to habitation have been previously identified, environmental factor can be used predictively to determine the potential for sites within individual projects, multiple corridors, and/or study areas. However, the
current resolution of published environmental/soil data may not delineate some smaller or unique environmental features. Field review and basis recordation of all field conditions and all resultant sites will always be needed to clearly identify what environmental feature will be impacted and to correlate this data to the following predictive settlement model.

Anyone familiar with Ohio’s archaeological record should realize that certain geomorphological attributes and superficial communities seem to have had a meaningful affect on regional exploitation patterns and modes of settlement. Because local conditions had a direct relationship to settlement patterns, this information is included to aid in settlement modeling and predicting the likelihood of sites in the immediate project area. The absence of certain habitats and the juxtaposition of certain habitat types can influence the types and distribution of sites in an particular project area.

This positive correlation is a major part of a proposed predictive model hypothesis. Theoretically speaking, all available land forms in Ohio were used by aboriginal peoples, although certain types of sites only exist on selected land forms. Our hypothesis also incorporates the idea that sites whose function is distinctly habitational, will only be found on 1) only better-drained land forms, 2) at locations providing the most natural shelter, and/or 3) in areas which have the most environmental diversity. Ideal habitations themselves might not focus on the point of maximum environmental diversity. Diversity itself is the total product of the site’s catchment or the resources availability in a region in close proximity to the point of habitation.

Based on this hypothesis, one can conclude that comparable corridors which cross similar land forms will have similar impacts. For example, if all environmental conditions are consistent from one corridor to another, the longer of two alternatives will have a greater impact to cultural resources. Secondly, if known site types occur within a region or physiographic area, one can predetermine, the potential information yield and/or the investigation scope which will be needed. Since site preservation is a critical factor in determining significance, how well certain types of sites might be preserved has the potential for providing additional significant information within this framework. How land forms are currently used and the inherent depositional nature of predicted sites within these land forms or habitats are clearly related. Previous assessment investigations suggest the types of resources that can be considered significant. First, one must define the types of habitats in a region, identify the types of sites that are known to occur there, define the depositional characteristic of these site types, and how they might be negatively impacted by modern land use. Answering these questions allows adequate modeling predictions to be made but they also fosters the development of sound investigation strategies.

Most environmental studies conducted in Ohio recognize five general physiographic regions. These include 1) the glaciated Till Plain (western and central Ohio), 2) the Lake Plain (northern Ohio), 3) Glaciated Plateau (east central and northeastern Ohio), 4) the Unglaciated Plateau (southeastern Ohio), and 5) the Lexington Plains or Outer Bluegrass (southwestern Ohio). These regions and their geomorphological elements have previously been described in
some detail so direct comparison of the model with localized geological/natural resources/soils reports can be made for clarity and to discuss the local condition. However, unique groups of repetitious habitats occur within each of these five distinct regions. It is critical to address each of these potential habitats although a given study area may not contain all these geomorphological elements or habitats.

Generally speaking, sites or archaeological data can be found on all land forms. How the position of each site type varies across the landscape is a particular problem that needs addressed in each CRM modeling summary. A preliminary list of site bearing habitats identified in the appropriate or associated physiographic region is summarized in Tables 3 and 4. A list of major site types and the incidence of site bearing habitats is also summarized. As previously indicated, this predictive model is concerned with consequential functional/temporal site attributes and settlement change. These tables recognize that common functionality may exist, or that through time, convincing evidence for changing function has yet to be demonstrated. However in such cases, functionally similar site types from each of the included periods have been reported. Categorizing these temporally unique situations together will not influence the estimation regarding potential significance, our summary of information yield per habitat, how one would approach further preservation issues across these habitats or in individual site cases.

It should be realized that site descriptions can and do change as more data about a site or a type of resource is collected. However, the presence, absence, or common occurrence of a certain type of site on a particular habitat is based on repetition and/or the best available evidence across the entire physiographic region. This information was generally drawn from the previously prepared Cultural Setting narrative in this report and from a number of county wide literature searches prepared during the completion of ODOT highway site investigations. Function as addressed in Table 4 is not necessarily a factor of a site’s synchronic relations, though how sites from a particular period relate might suggest function within a settlement/subsistence system.

Function herein is based on thresholds of activities which have previously been discussed in a number of ODOT reports. Logically, isolated finds and lithic scatters have fewer activity elements or low functional diversity. In contrast, transient and specialized camps would display moderate diversity, while base camps, hamlets, and villages in the prehistorical record should exhibit high functional diversity. Similarly in later (historic) native towns high diversity would be exhibited in the refuse record versus native camps having low diversity or isolated farms showing at least moderate level of activity. Obviously prehistoric sites like mounds, earthworks, and isolated burials may have little to say about settlement itself but are clearly a function of ceremonial activity. Their locations must be considered as independent elements in any modeling summary.

Some other factors besides cultural ones can influence significance statements due to the inherent nature of deposited resources. Table 4 was designed to explore modern land use characteristics and archaeological depositional characteristics as an aid in the definition of potential information yields and to suggest reasonable avenues for preservation. Certain site types
have a consistent potential for providing significant information. These estimates are also listed on Table 4. For example, documented undisturbed burial sites will always have to be addressed through excavation or mitigation. Village sites and hamlets, by nature, typically contain subterranean storage facilities which were usually filled with trash following their abandonment. Undisturbed mass deposits like these pits are typically considered significant when found. On the other hand, isolated finds and lithic scatters (when adequate documentation has been completed) have little or no visibility and focus. Here prehistoric context is lost. Function can only be observed through repetitious insinuation. Even in the case of the repetitive occurrence, one can not clinically document depositional behavior for any particular example because of various types of geomorphological processes, cultivation, construction development, and collector activities. Only infrequently can a recommendation of significance be made in these cases.

Logically, one can make a tentative recommendation whether certain site types in an undisturbed state are potentially significant or if certain preservation strategies must be made. Obviously, at least minimal levels of site survey, environmental documentation, and landscape characterization (i.e. collectively discussed as recordation here-in) must be made in the field to complete the coordinate process.

Obviously, one can concluded that if certain types of sites only occur on particular landforms or on particular habitats, each of these habitations would have a potential information (i.e. data) yield. For example, more transient types of behavior on upland settings generally leave only superficial depositions. Cultivation and uncontrolled collection would have a negative impact on preservation of these more superficial deposits. However in river valleys, flooding might protectively bury cultural remains. Undisturbed land-forms, even upland ones, would have an increased likelihood for higher yields. Based on these potential yields, recommended levels of investigations are insinuated. Work in poorly drained, plow disturbed areas would be completed once these areas were documented in the field and an attempt was made to record potential sites. Land forms where intrusive and/or deeper deposits might exist would normally require at least evaluation while the documentation of any well preserved sites require avoidance or mitigation. Obviously, the approach of this model would not avoid field investigations across impacted areas, but gives clearer cut directions as to how a CRM project should logically proceed.

Because information yields can be estimated and pre-ordained levels of documentation can be used to direct research across various land forms/habitats on which the project rests, the potential for significant resources along an alignment can be estimated. Project designs can be reviewed for the existence of higher yield areas. For example, one might easily document and compare the potential yield of an upland corridor versus a corridor through a low-land area. More importantly, corridors can be compared arithmetically (considering the project length and the percentages of high yield areas along these corridors) in order to determine which corridor might have the highest potential for impacts. Percentage matrices might be developed for multiple corridors considering low yield versus high yield regions. Areas totally disturbed by modern development (urban growth, commercial development, prior disturbance by highway.
construction, etc.) can also be considered in this impact statistic. Conditions such as widening of
existing right-of-way could also be shown to be less of an overall impact than new construction
across an undisturbed area. It could also be demonstrated that longer corridors might have a
greater impact than shorter ones. Local conditions including the availability of dry habitats,
higher resource potentials, and the juxtaposition of multiple, potentially significant site types
found in a particular habitat can be abstractly considered in the formulation of avoidance
avenues.

Obviously, the potential for all known sites types and site bearing habitats in the given
physiographic region are considered in the predictive model. Project specific implementation of
such an approach can only proceed with an idea and understanding of the local environmental
conditions within the study area. The supposed and/or exact positioning of any given resource
can only be determined later or by the documentation of actual land use and specific depositional
sequences along the corridor area. The reconnaissance level survey becomes a step on which our
understanding of the entire project is refined. Obviously, reconnaissance might only be needed on
a preferred alignment itself while other alternates which might never be impacted would not have
to be as discriminately documented in the field. Available remotely derived environmental data
and a consideration of previously known archaeological resources would suffice when only
predictive impact statements along a give corridor are needed.

Obviously, current modeling strategies along a single alignment can not solve final
resolution problems, that is predicting exact resource frequency and, in particular, the exact
position of significant ones. Regarding the benefits of modeling, the selection of a preferred
corridor (i.e. a preliminary finding of no adverse affect) can be reached by considering the
following four conditions: 1) if conclusion regarding potential impacts can be addressed; 2) if a
preferred corridor can be designed to miss most previously recognized eligible properties; 3) if
all recognized National Register properties (particularly burial and ceremonial sites) are avoided
by the preferred alignment or if provisions for mitigation are made if any significant resources
were to be impacted; and 4) if recommended level of recordation, evaluation and mitigation are
achieved along the preferred alignment. This is clearly a most cautious approach considering the
limitations of the predictive model as they have been developed herein.

Conclusively, such approaches can not be used in lieu of local background investigations
which can tell us the exact position of potentially significant resources. Reconnaissance level
survey to document the local conditions and to positively identify all land forms having the
likelihood of containing significant cultural resources would have to be completed to minimally
clear any project. However, the predictive model can be used to compare various alignments and
described the potential impacts prior to fieldwork. It is the authors opinion that these
considerations can allow the planning process to proceed to a logically designed preferred
corridor without actually gathering field data. Clearly, this approach hesitates from extensive
multi-corridor fieldwork but the model is not a replacement of intensive fieldwork within the
prefered corridor itself.