ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

CONFIDENTIAL

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SUBTASK 7.06
CULTURAL RESOURCES INVESTIGATION

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by

UNIVERSITY OF ALASKA MUSEUM
Fairbanks, Alaska 99701
and
TERRESTRIAL ENVIRONMENTAL SPECIALISTS, Inc.
Phoenix, New York 13135

for

ACRES AMERICAN, INCORPORATED
Liberty Bank Building, Main at Court
Buffalo, New York 14202

ANNUAL REPORT

SUB-TASK 7.06 CULTURAL RESOURCES INVESTIGATION

FOR THE SUSITNA HYDROELECTRIC PROJECT

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SUMMARY

The University of Alaska Museum developed a five step cultural resource program to assist the Alaska Power Authority, Acres American, and Terrestrial Environmental Specialists in complying with federal and state law and regulation concerning protection of cultural and paleontological resources for the proposed Susitna Hydroelectric Project. The program was designed to provide information necessary to meet the requirements for the Federal Energy Regulatory Commission license application. The five steps are aimed toward: 1) locating and documenting archeological, historical, and paleontological resources in the study area; and 2) testing and evaluating these resources and proposing mitigation measures to avoid or lessen the adverse impact which may result from the proposed project. Actual mitigation is beyond the present scope of work.

In preparation for field studies, all necessary permits were obtained, literature pertaining to the archeology, ethnology, history, geology, paleoecology, paleontology, flora and fauna in and near the study was reviewed, and available aerial photographs were examined. These data were used to develop a tentative cultural chronology for the study area and focused effort toward defining types of archeological site locales for each culture period within defined geochronologic units. These data coupled with paleoecological information were used to select 60 survey locales which were surveyed in 1980. Review of paleontological literature and prefield aerial reconnaissance of the upper Susitna River Valley delineated areas suitable for paleontological investigations.

The methods and defined study area varied for each aspect of study, i.e., archeology, geology, and paleontology. The archeological reconnaissance implemented surface and subsurface testing within each of the preselected survey locales in an effort to locate historic and archeologic sites. Survey data was consistently recorded on Site Survey forms which enabled systematic recording of information for each site and survey locale.

For each site located, regional maps, site maps, soil profiles, photographs, and other data were recorded. All specimens collected were accessioned by the University of Alaska Museum. Sites were given both University of Alaska Museum accession numbers and Alaska Heritage Resources Survey numbers.

Geological studies generated data that were used in selecting archeological survey locales. Data concerning surficial geological deposits and glacial events of the last glaciation were compiled and provide limiting dates for the earliest possible human occupation of the upper Susitna River Valley. This information was collected by literature review and field studies. Geological data collected during 1980 will be incorporated into the 1981 archeological program. Paleontological studies were conducted to: 1) develop baseline paleontological data within the study area; and 2) to assess the significance of these deposits and develop appropriate mitigation measures for these resources. Review of relevant literature and a prefield aerial reconnaissance delineated those areas that were suitable for examination. These areas were subsequently studied and the resultant collections analyzed.

The 1980 archeological reconnaissance located and documented 1 historic and 33 prehistoric sites. An additional 4 sites were discovered during a brief survey of one of the possible access routes (corridor 3) north of Watana base camp. The 37 sites found during the 1980 field season and four sites previously located (Bacon 1978) total 41 sites known to occur within the study area. It is expected that continued survey in 1981 will locate additional sites. Sites are also documented adjacent to the study area near Stephan Lake, Fog Lakes, Lakes Susitna, Tyone and Louise, and along the Tyone River. Impact on cultural resources will vary in relation to the type of activities that occur on or near them. Based on the present two dam proposal (Devil Canyon and Watana), most of the sites known to date within the study area will receive direct or indirect impact during construction and subsequent use and operation of the facility. The impact of transmission facilities, recreational activities, and upriver and downriver changes in hydrology and land access and use cannot be assessed at this time due to the lack of information concerning the amount and type of disturbance associated with these activities. Currently, transmission facilities and upriver and downriver areas are not part of the cultural resource field investigation.

Intensive testing, scheduled for 1981, is designed to collect the data on which to base the evaluation of significance for cultural resources discovered during 1980. Following intensive testing and completion of ancillary studies, the effect of the Susitna Hydroelectric project on individual sites can be determined and the appropriate mitigation measures recommended. As an interim measure, it is recommended that non-archeological personnel and preconstruction activities avoid documented sites until investigations are complete.

ACKNOWLEDGMENTS

The talents, work, and cooperation of many individuals have greatly facilitated the execution of the field research and presentation of this report. The high quality of the data collected during the 1980 field season is attributable to the field crew: Mr. Lester Baxter, Mr. Robert Betts, Ms. Martha Case, Mr. Steve Hardy, Ms. Jane Smith and Mr. Alan Ziff. A special note of thanks to Mr. Charles J. Utermohle for the excellent job he did as crew leader.

A special note of appreciation to Mr. Robert Betts who prepared the many fine graphics in this report, as well as initial preparation of individual site reports, and to Steve Hardy who conducted the paleontology studies and prepared that section of the report. Ms. Martha Johnson and Mr. Dixon Sims also prepared graphics and Mr. Barry McWayne photographed the artifacts and maps.

We would like to express our appreciation to the helicopter pilots whose high standards of safety and their concern for the well-being of field personnel enabled the safe completion of field work. Ms. Onnalie Logsdon provided much assistance in scheduling the helicopter logistics.

A note of thanks is due the following individuals and organizations for the valuable assistance they provided: Mr. C. Eugene West, Drs. Carol Allison and Mickey Payne, Alaska Power Authority, Acres American, Terrestrial Environmental Specialists, the crew at Watana Base Camp, Talkeetna Air Service, Mrs. Miriam Banker who provided a wide array of support services, and Ms. Justice C. Higgins who typed the report.

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1 - INTRODUCTION

This document is an annual report which presents results of the first year of a two year cultural resource research program designed to locate, document, evaluate and provide recommendations for mitigation of cultural and paleontological resources within the project area. This program is designed to provide information necessary to meet the requirements for the Federal Energy Regulatory Commission license application. This study is purely a pre-construction analysis of the cultural and paleontological resources which may be adversely effected by the proposed project, and is not intended to mitigate potential damage or destruction to these resources. Mitigation must await the decision of the Federal Energy Regulatory Commission which will decide whether a license will be issued to authorize construction.

Because this report is based on a program which is less than half complete, interpretation of data generated as a result of the research design and field testing conducted to date would be premature. Therefore, data are presented in descriptive format. Continued analysis of data collected during the 1980 field season and intensive testing scheduled for 1981 will certainly provide additional data upon which interpretative statements can be based.

The Susitna Hydroelectric Project, approximately 120 miles north of Anchorage (Figure 1) on the upper Susitna River (Figure 2), is a federally licensed and State funded project. Federal law and regulation require that cultural resources, and paleontological resources in an archeological context must be documented in connection with any federally funded or licensed project if there is a chance that those resources may be adversely effected. Consequently, it is mandated by law that archeological, historical and paleontological resources be identified and evaluated and the mitigation measures to reduce or avoid adverse effect be developed for the proposed Susitna Hydroelectric Project. In order to assist the Alaska Power Authority, Acres American, and Terrestrial Environmental Specialists, Inc.

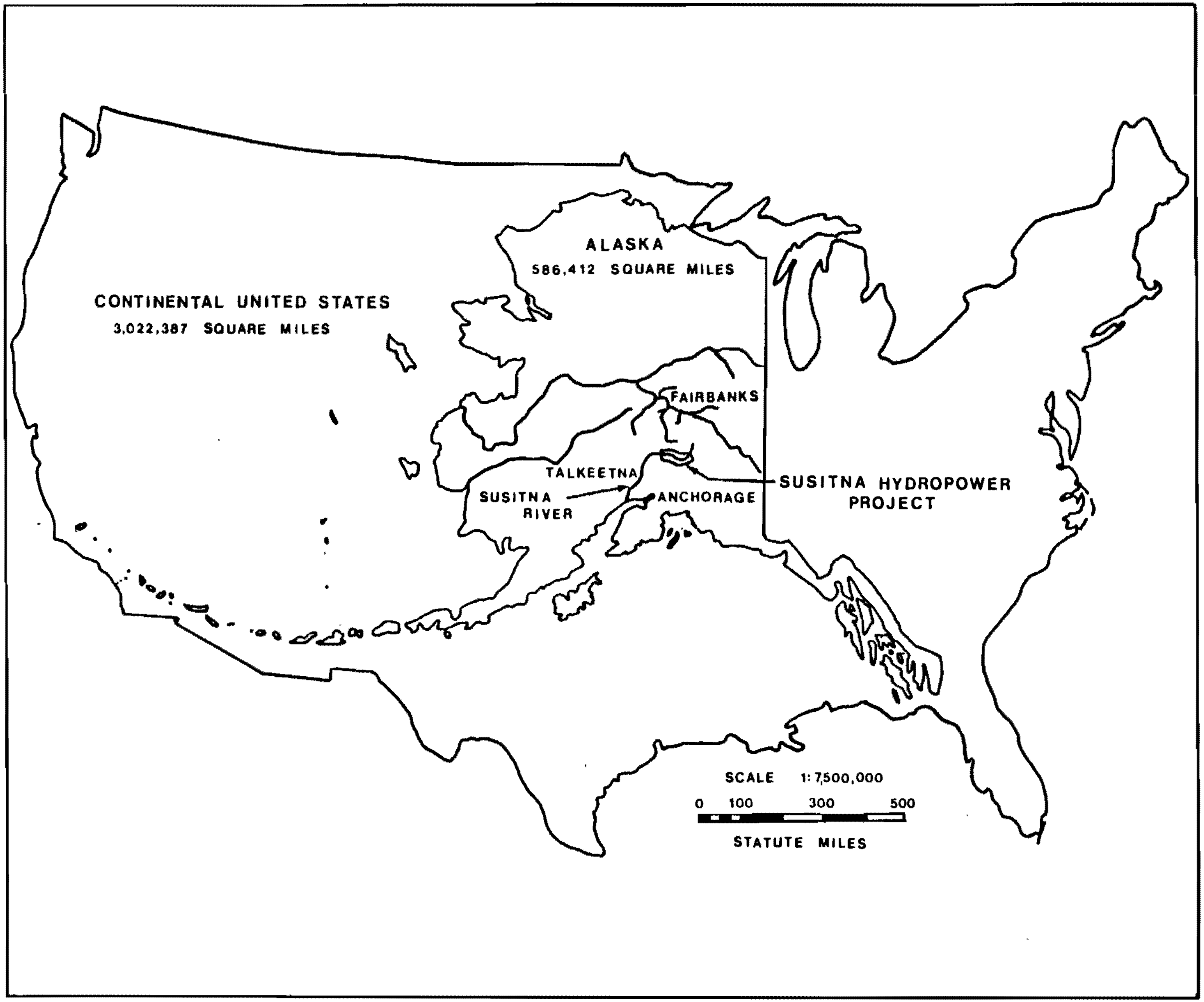


Figure 1.
Location of Susitna Hydroelectric Project.

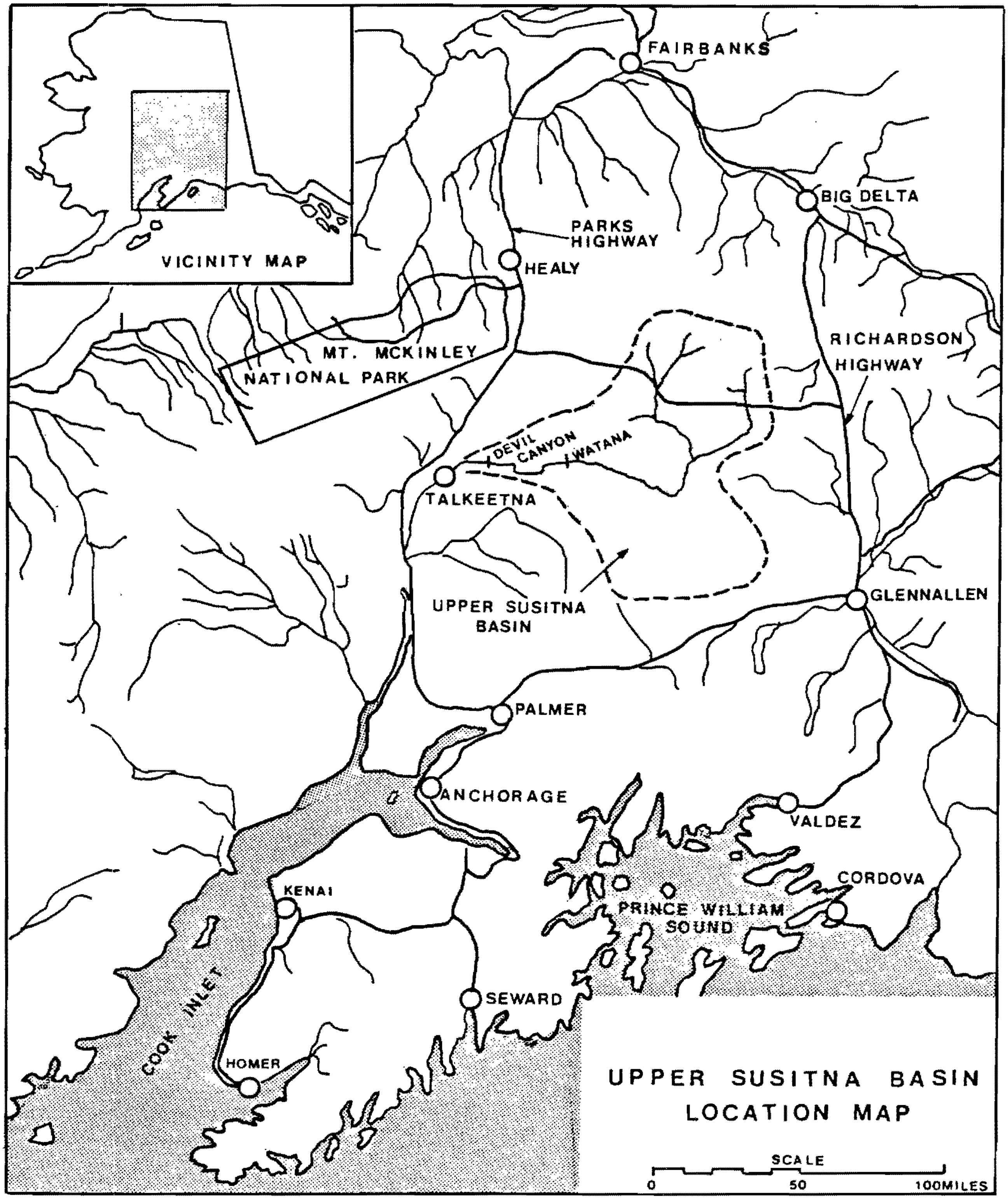


Figure 2.

Location map of Upper Susitna Basin.

in complying with these laws and regulations, and to meet the criterion for the Federal Energy Regulatory Commission license application, the University of Alaska Museum developed a five step program to document, evaluate, and recommend mitigation measures for these resources. These steps include:

(a) Preparation for field studies 1980, 1981.

(b) Reconnaissance level archeological and paleontological survey, 1980, 1981.

(c) Intensive testing of archeological and historical sites, 1981.

(d) Analysis and report preparation 1980, 1981.

(e) Curation of cultural and paleontological materials 1980, 1981.

1.1 - Overall Objectives of the Program

The five steps outlined above are aimed at fulfilling the two objectives of the project:

(a) Identification of archeological, historical, and paleontological resources in the defined study area (see Methodology section for definition of study area). This process was implemented during the 1980 field season and will continue through the 1981 field season.

(b) Testing and evaluation of these resources in order to evaluate significance and make recommendations for mitigating potential adverse effects that preconstruction studies, dam construction, and/or dam operation may have on them. Intensive testing will begin in 1981.

1.2 - Specific Objectives of the First Year

1.2.1 - Archeology

1.2.1.1 - Preparation for Field Studies--Step 1

Prior to implementing the 1980 field program it was necessary to complete the following tasks:

(a) Federal and state archeological permits were applied for and received (Federal Permit #80AK-023, State Permit #80-1).

(b) Literature pertaining to the archeology, ethnology, history, geology, paleontology, flora and fauna of the study area as well as adjacent regions was reviewed prior to preparing the Procedures Manual/Research Design submitted to T.E.S. in the spring of 1980.

(c) Archeological, ethnological and historical data were synthesized into a regional and local chronology (Figure 4, Chapter 2) in an effort to predict the types and ages of sites that could be expected to occur within the study area. In addition to cultural data, geological data concerning the last glaciation were also examined in order to establish limiting dates for human occupation of specific areas within the upper Susitna River basin. Objectives of the geology portion of the cultural resource studies are discussed in this section. Results of the 1980 field season indicate that prefield season projections of site locations, and temporal placement provided reliable estimates of what has been subsequently documented by field studies.

(d) Aerial photographs of the study area were examined, the interpretation of which focused on identifying probable areas containing cultural resources as well as supplementing geological data.

(e) All previously recorded cultural resources were plotted on 1:63,360 USGS maps in order to document the location of sites within and adjacent to the study area.

1.2.1.2 - Reconnaissance Level Archeological Survey

The purpose of this step is to identify, locate and inventory archeological and historical sites within the study area. These sites will be subject to more intensive study during the 1981 field season. Because it is not the intent of a reconnaissance level survey to examine 100 percent of an area, data synthesized and generated about the study area were used to select 60 survey locales for testing during the 1980 field season. Maps of each survey locale can be found in Appendix E.

Between June 1 and August 31, 1980 sixty survey locales were examined using surface and subsurface testing procedures. In addition testing and reconnaissance was conducted as needed at boreholes, auger holes, borrow areas, helicopter landing zones, the proposed Watana airstrip and along seismic lines by various subcontractors on the project. In early September, after the close of the field season, an additional brief limited reconnaissance was conducted along the proposed route of the access road from the Watana base camp to the Denali Highway (Corridor 3).

The reconnaissance level survey resulted in the location and documentation of 33 sites which are discussed in Chapter 3. In addition, four other sites were located during the brief survey of the Denali Highway access route, bringing the total to 37 sites. These sites plus four sites located during a 1978 survey (Bacon 1978b) document a total of 41 sites within the study area to date. Other sites are located in close proximity to the study area and include those on Stephan Lake, Fog Lakes, Lakes Susitna, Louise and Tyone, and the Tyone River. However, at present, it appears that these sites may not be adversely affected by the project.

1.2.1.3 - Analysis and Report Preparation--Step 4

This step is an integral part of each step of the project. It entails compilation of the individual reports for the other steps of the project as well as synthesizes all data recovered and makes recommendations for mitigating adverse effects on cultural and paleontological resources when sufficient data is available to make recommendations.

The analysis of cultural material, and geological and paleontological data from the 1980 field season was conducted between July 1980 and January 1981. A portion of these data were presented in the first semi-annual report submitted to T.E.S. in August 1980. These data and data gathered and analyzed since the semi-annual report are included in this report.

1.2.1.4 - Curation of Cultural and Paleontological Materials--Step 5

Recording of recovered artifactual material and associated contextual data will be an ongoing program throughout the duration of and after the project. As specified by the Federal Antiquity Permit obtained for this project, materials and supporting documentation must be stored and maintained in a suitable repository. In this case the repository is the University of Alaska Museum.

Artifacts and paleontological specimens recovered during the 1980 field season have been accessioned into their appropriate collections at the University of Alaska Museum in accordance with state and federal requirements pertinent to the preservation of antiquities.

1.2.2 - Geology

In order to accomplish the archeological objectives it was necessary to conduct geological studies to generate baseline data on the surficial geological deposits and glacial events in the study area which provided one of several criteria subsequently applied to the selection of survey locales during 1980 and 1981. Additionally, geological studies provide limiting dates for the earliest possible human occupation of specific areas within the region.

1.2.3 - Paleontology

In connection with cultural resource studies it was necessary to develop baseline paleontological data aimed at defining the type and range of paleontological specimens that could possibly occur within the study area and to assess the significance of these deposits in order to develop appropriate mitigation measures for these resources.

The results of archeological, geological and paleontological studies conducted during the 1980 field season are discussed in Chapter 3. These data are presently being used to refine the survey design for the 1981 field season.

2 - METHODOLOGY

The methods used for the archeology portion of this project and its two related subsections, geology and paleontology (as they relate to cultural resources), varied. Study area size and individual methods are discussed below.

2.1 - The Study Area

2.1.1 - Archeology

The study area delineated for cultural resource studies includes both direct and indirect impact areas. Direct impact is the immediately demonstrable effect of a land modification project on the resource base. Indirect impact relates to adverse effects that are secondary but clearly brought out by the land modification project.

Direct impact areas include the proposed reservoirs of the Devil Canyon and Watana dams, proposed dam construction sites and associated facilities, proposed borrow areas, access corridors, and any other areas subject to subsurface disturbance during preconstruction, construction, or operation of the Susitna Hydroelectric project. Indirect impact areas are those outside the above areas but none the less affected by the project due to such activities as increased access to remote areas afforded by roads into the project area, downcutting and erosion caused by changes in stream and river flow resulting from fluctuation of water levels of the reservoir, and areas selected for recreational development to be defined by planning studies presently underway.

During 1980, the cultural resource study area was defined as those lands within approximately 3 km of the Susitna River from just below Devil Canyon to the mouth of the Tyone River (Figure 3). Also included,

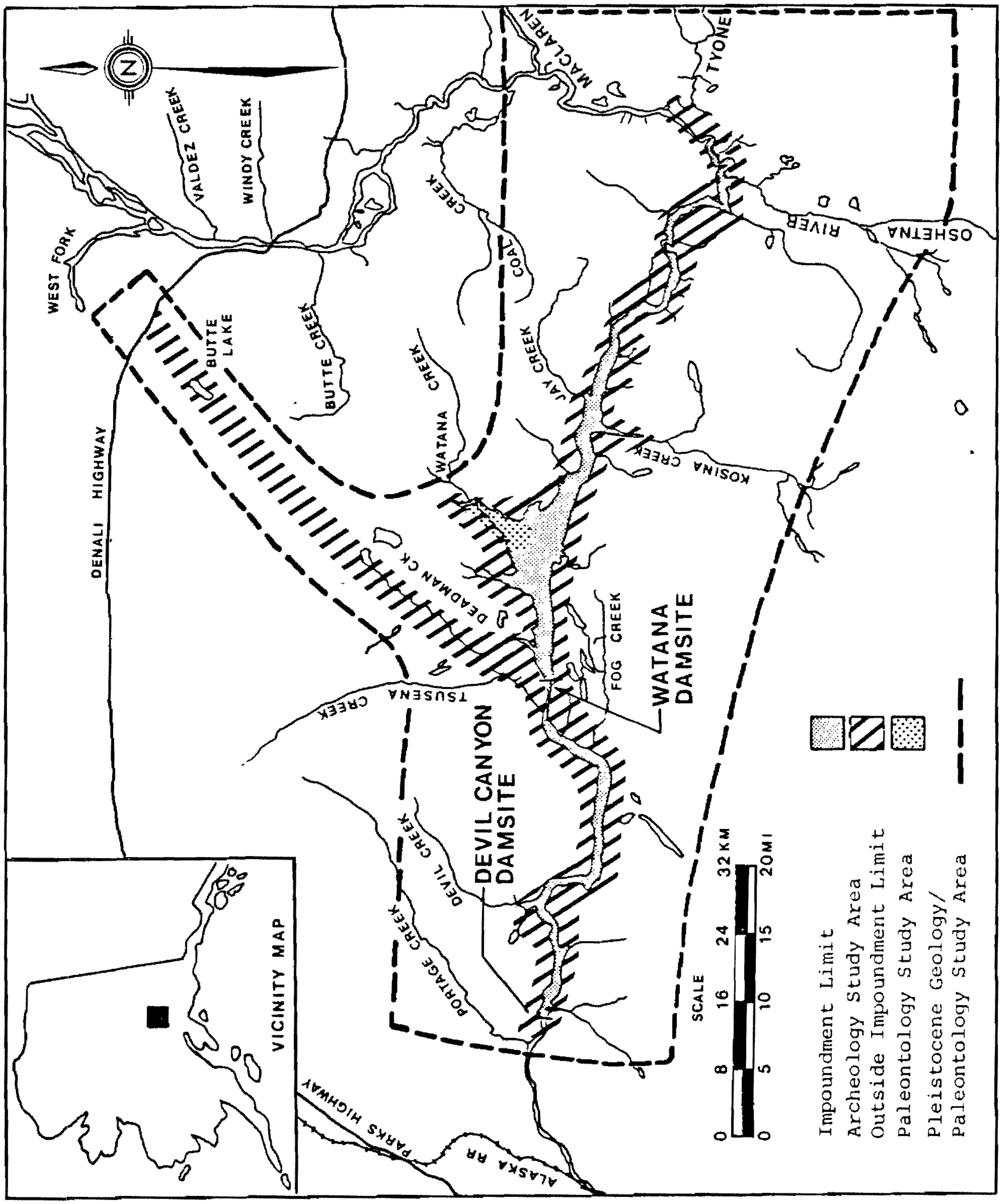


Figure 3.

1980 Study area for cultural resources and associated activities.

as requested, was one of the possible access corridors (Corridor 3) from the Watana camp north to the Denali Highway, an area approximately 2 km wide (Figure 3).

This area was briefly examined during a four hour helicopter reconnaissance conducted after the 1980 field season. Areas outside the defined study area were examined when it was necessary to obtain data essential to the cultural resource study.

The study area is not static. It has, and will continue to, changed in response to modifications in the engineering of the hydroelectric project, as well as to new data provided by ongoing studies associated with the overall project, such as land use analysis and recreation planning.

2.1.2 - Geology

The study area for geological studies supporting cultural resource analysis is approximately 16 km wide on each side of the Susitna River extending from the Portage Creek area to the mouth of the MacLaren River (Figure 3). When necessary, contiguous areas were examined.

2.1.3 - Paleontology

The study area for paleontological studies is confined to the Watana Creek vicinity. This locale was selected because it was the only area identified within the entire Susitna basin that provided suitable large deposits for pre-Pleistocene paleontological studies (Figure 3).

2.2 - Methods, Archeology

In preparation for field studies, a research design based on current data was developed (see Procedures Manual, Archeology 7.06). The research design integrated the current data (Appendices A, B, C) into a cultural chronological framework, and developed a research strategy that is structured to predict archeological site locations in relation to physical and topographic features within the limits of contemporary archeological method and theory. Based on the delineated cultural chronology, documented site locales for each culture period, geological evaluation, and paleoecological data of the project area, 60 survey locales (Figures 106 through 167) were identified as exhibiting relatively high potential for archeological site occurrence. These locales were subject to preliminary examination for cultural resources representing various periods of Alaska prehistory. The data used in selecting the survey locales are presented below.

2.2.1 - Application of Data Base

2.2.1.1 - Cultural Chronology

A tentative cultural chronology was constructed utilizing archeological data from known sites in or adjacent to the study area. Archeological sites of several cultural periods spanning the past ca. 10,000 years and several cultural/historical periods are known (Figure 4). These data assisted in selecting survey locales for the 1980 field season.

Archeological sites which may occur in the upper Susitna region are not expected to exceed 9,000 B.C. in age, based on the sequence of deglaciation that occurred in the area. The earliest sites that are expected in the study area are those representing the American Paleoarctic Tradition, specifically the Denali Complex for which West (1975) ascribes a date of ca. 10,000 B.C. to 4,500 B.C. This distinctive and long lasting stone tool industry is characterized by wedge-shaped microblade cores, microblades, core tablets, bifacial knives, burins, burin spalls and end scrapers. Incorporation of Denali into the American Paleoarctic Tradition follows Dumond (1977) who suggests that the Denali Complex is a regional variant of the American Paleoarctic Tradition as defined by Anderson (1968a). The Denali Complex has been dated to between 8,600 B.C. to 4,000 B.C. in

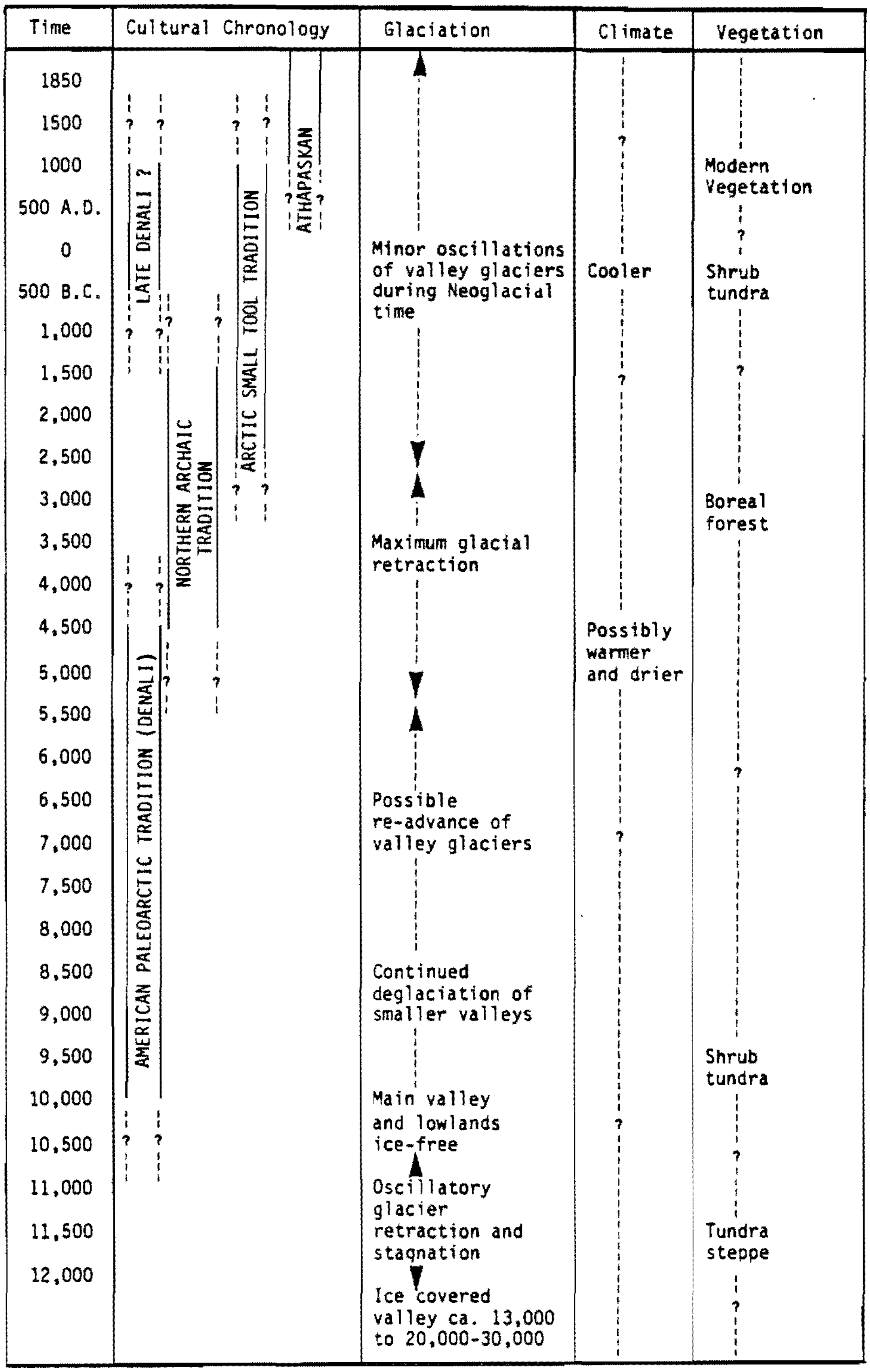


Figure 4.

Speculative Cultural Chronology and Inferred Glacial Climatological and Vegetational Regimens of the Upper Susitna Valley.

Interior Alaska. There appears to be a hiatus of Denali sites in the Interior archeological record after 4,000 B.C.; however, several sites in the Tanana Valley which contain elements thought to be distinctive of the Denali Complex date to between 2,400 B.C. and A.D. 1,000. This may suggest a late persistence of this stone industry. Sites representative of the Denali Complex are located in areas adjacent to the study area. The oldest dated Denali Complex site in the Alaska Range area is Component II, at the Dry Creek site which dates to ca. 8,600 B.C. (Powers and Hamilton 1978:76).

Other sites containing the Denali Complex in surrounding regions are Teklanika 1 and 2 near Mt. McKinley, MMK-004 at Lake Minchumina, the Campus site, the Village site at Healy Lake, site FAI-062, the Donelly Ridge site, several undated Denali sites on the Ft. Wainwright Reservation in the central Tanana Valley, several sites at Tangle Lakes, two sites near Lake Susitna and upper Cook Inlet, the Beluga Point site, and the Long Lake site in the Talkeetna Mountains. These suggest that the Denali peoples were extremely widespread and occupied both inland and coastal zones. If a continuum between early and late Denali proves to be real, a time span of over 9,000 years would exist for Denali peoples. The available information suggests that sites representing the Denali period exist within the study area.

The question of the late duration of the Denali Complex is not settled. Several sites in regions adjacent to the study area have yielded materials similar to those of the Denali Complex, i.e., microblades, microblade cores, and burins, which have late dates. These are the Village site at Healy Lake with a date of ca. 500 A.D. (Cook 1969), and MMK-004 at Lake Minchumina dated to ca. 800-1000 A.D. (Holmes 1978). At the Dixthada site similar material has been dated to ca. 470 B.C. Several as yet undated sites containing Denali-like material were also located during a 1979 survey in the Tanana Valley (Dixon, Smith, and Plaskett 1980a) and could represent late Denali occupation. Sites potentially of late Denali age in areas near the upper Susitna study area suggest that late Denali sites could also exist in the study area. Several sites documented during the 1980 field season may represent this period, however, further testing and evaluation is necessary in order to support this hypothesis.

Areas surrounding the study area have produced sites representative of the Northern Archaic Tradition as defined by Anderson (1968b) and which date from ca. 4,500 B.C. Northern Archaic sites include Lake Minchumina, Dry Creek, the Campus site, the Village site at Healy Lake, several sites found at Ft. Wainwright in 1979, Tangle Lakes, Lake Susitna, Beluga Point, and the Ratekin site. The distribution of these sites is similar to that for the Denali Complex sites. This tradition is characterized by notched projectile points, notched pebbles, a variety of bifaces, end scrapers, and notched boulder chip scrapers. It is possible that sites representing the Northern Archaic Tradition exist within the study area. A site on Stephan Lake dating to ca. 4000 B.C. may already document the presence of a Northern Archaic Tradition site in the study area. Several projectile point types indicative of this tradition were found during the 1980 field season and along with a radiocarbon date of ca. 4700 B.P. suggests that this tradition is present in the upper Susitna Valley.

The Arctic Small Tool Tradition is characterized by assemblages containing microblade cores, microblades, burins, burin spall artifacts, flake knives, and bifacial end blades. This tradition is represented by coastal and non-coastal sites, several of the latter being known from the Alaska Interior. Dumond (1977) suggests that the Arctic Small Tool Tradition can broadly encompass a Denbigh-Choris-Norton continuum, and this is how the tradition is used here. One site in the immediate study area, Lake Susitna Site 9, has been suggested as a possible Arctic Small Tool Tradition. A date of 2,200 to 1,800 B.C. has been documented for the Arctic Small Tool occupation at Onion Portage (Anderson 1968) and may be somewhat later in the southern interior.

Norton period sites, the late end of the Arctic Small Tool Tradition continuum, first appear on the Bering Sea coast about ca. 500 B.C. Norton does not predate 400 B.C. in the upper portion of the Naknek drainage, and lasts to ca. 1000 A.D. around much of the Bering Sea area (Dumond 1977:106-108). Shortly after its appearance (ca. 500 B.C.) Norton may be represented in Interior Alaska archeological sites. This is suggested by artifacts from Lake Minchumina, TLM-018, in the upper Susitna Basin, and the Beluga Point site in upper Cook Inlet.

It should also be noted that Norton period sites in the Bristol Bay region tend to occur well up major salmon streams, presumably exploiting this rich resource (Dumond 1977:113). Inland Norton period sites demonstrate the importance of caribou in the Norton subsistence strategy (Dumond 1977:113). The Beluga Point site in upper Cook Inlet may respresent the maritime portion of the Norton subsistence cycle. Norton populations employed a subsistence pattern that included the seasonal exploitation of both coastal resources (sea mammals, shell fish, and fish) and interior resources (caribou, moose, salmon, etc.). This shift in subsistence strategy may have been a response to climatic amelioration which occurred after 1000 B.C. and preceded the "Little Ice Age" (ca. A.D. 1600-A.D. 1800). This change in resource exploitation may be reflected by the occurrence of Norton period archeological sites in the Susitna study area.

Late prehistoric Athapaskan and historic period sites have also been documented in areas adjacent to the study area. Late prehistoric Athapaskan sites are represented at Lake Minchumina, the upper component at the Healy Lake Village site, the upper component at Dixthada, several sites at Tangle Lakes, other sites on Lakes Susitna, Louise and Tyone, a reported site on the Tyone River, and another site in the vicinity of upper Cook Inlet. These late prehistoric Athapaskan sites indicate widespread occupation of several regions in Alaska by these groups. Dumond and Mace (1968) have suggested, based on archeological and historical data, that Tanaina Athapaskans may have replaced the Pacific Eskimo in upper Cook Inlet sometime between 1650 A.D. and 1780 A.D. Possibly this replacement occurred somewhat earlier in the study area.

The chronology presented here is speculative and is intended to provide a baseline from which archeological sites of different periods in the project area can be expected. This chronology is presently being tested and refined using data from archeological sites located in the study area.

In order to evaluate the significance of archeological sites located during survey and testing (with respect to National Register criteria), as well as aid in the analysis of archeological materials collected, it is necessary to explicate hypotheses which can be tested and evaluated utilizing the project data.

A fundamental hypothesis to be examined in this study is the validity of the cultural chronology which has been proposed. To test the cultural chronology each period must be examined separately against archeological data from sites located during survey. To evaluate a site against a proposed period in the chronology it is necessary that the full range of artifactual material from the site, not just selected types, and non-artifactual contexts be compared against the known range of artifactual material from sites of the period and the attempt made to explain the range of variability and the anomalies. This should lead to a fuller understanding of periods involved, or the elimination of invalid periods for the study area and possibly the delineation of others presently unknown. The proposed cultural chronology will be refined based on interpretation of the 1980 and 1981 field data.

2.2.1.2 - Geological Data

Geological data was reviewed, aerial photographs examined and a preliminary data base developed which provided information on glacial events and surficial geological deposits within and adjacent to the study area (see Chapter 3). These data were used in conjunction with archeological data to select survey locales for testing during the 1980 field season. Updated geologic data were incorporated into ongoing cultural resource studies and will be applied to the 1981 field season.

During the 1980 field season aerial reconnaissance was conducted in order to outline more specifically the distribution and range of surface landforms and deposits as well as to examine the potential for stratigraphic work. Stratigraphic reconnaissance was conducted in a number of areas in order to generate data on major valley-forming geologic events. Geological reconnaissance was conducted in order to examine land forms specifically associated with glacial events in the area such as, moraines, deltas, lake plains, and eskers, in order to suggest limiting data for cultural resources in specific areas.

Based on the analysis of the above geological data, a revised geo-archeological terrain map is presently being developed. This map is not complete at present, but will be completed prior to the 1981 field season and assist in defining survey locales to be tested. In addition, organic samples collected and submitted for radiocarbon analysis were used to provide keys to stratigraphic units within the study area, information which will be applied to site age whenever possible. Tephra samples were also collected in order to identify ash horizons noted in archeological sites and stratigraphic sections. As with the geological data, this information will be used to date cultural resources when possible.

2.2.2 - Research Strategy

An analysis of the data derived from the literature search focusing on site locales has established that archeological sites occur in a non-random pattern in relation to associated physical, topographic, and ecological features. Based on the analysis of site locational data from regions adjacent to the study area, the features characteristically associated with archeological site occurrence are:

(a) Overlooks - locales of higher topographic relief than much of the surrounding terrain. They are charcteristically well drained and command a panoramic view of the surrounding region. It is generally inferred that overlooks served as hunting locales and/or possibly short term camp sites. Because these sites occur in elevated areas, soil deposition is generally thin and they are frequently easily discovered through subsurface testing or examination of natural exposures. Examples of sites ascribed to the Denali Complex which occur in this setting are the Campus Site, Donnelly Ridge, Susitna Lake, and the Teklanika sites. Northern Archaic Tradition sites also known to occur on overlooks are the Campus Site, some sites in the Tangle Lakes area, Susitna Lake, the Ratekin Site, and a site near the Watana Dam project area. Archeological sites ascribed to the Arctic Small Tool Tradition frequently occur on overlooks; however, no positively identified Arctic Small Tool sites situated on overlooks have yet been reported from the study area or regions immediately adjacent to it. The Nenana River Gorge site, some of the Tangle Lakes sites, and Lake Susitna are all Athapaskan period sites which occur on overlooks.

(b) Lake Margins - sites ascribed to all defined traditions have been discovered on the margins of major lakes. It is generally inferred that they are frequently more permanent seasonal camps and that fishing, the exploitation of fresh water aquatic resources and large mammal hunting were the primary economic activities associated with these sites. These inferences are primarily based on the location of these sites rather than an analysis of faunal and artifactual material. Sites on lake margins may exhibit greater soil deposition than overlooks because of their lower topographic position. Sites in this setting are frequently discovered through subsurface testing, the observation of surface features, or through the examination of natural exposures. Athapaskan sites on lake margins include those at Lake Minchumina, Healy Lake, Tangle Lakes, Lake Susitna, Lake Louise, and Lake Tyone. Archeological sites ascribed to the Arctic Small Tool Tradition are reported to occur on lake margins and an example is the Norton component reported at Lake Minchumina. At Lake Minchumina, Healy Lake, Tangle Lakes, Susitna Lake and Stephen Lake, sites which may be ascribed to the Northern Archaic Tradition are known to occur on lake margins. Denali Complex sites which have been found near lakes include the Tangle Lake sites, Lake Minchumina, Healy Lake, Long Lake, and Lake Susitna.

(c) Stream and River Margins - numerous sites have been reported along the banks of abandoned channels of streams and rivers. They vary from large semi-permanent seasonal camps to what appear to be brief transient camps. Soil deposition at such locales may be greater than either lake or overlook sites because of the low topographic setting of streams and an active agent (the stream or river) for soil deposition. Sites may be discovered through the examination of natural exposures, subsurface testing, and visual observation of cultural features. Denali Complex sites reported along stream and river margins or abandoned channels include Dry Creek, Carlo Creek, and the Campus site. Northern Archaic Tradition sites found in this type of locale are Dry Creek and the Campus site. The Merrill site, which is ascribed to the Norton period of the Arctic Small Tool Tradition, is a former meander of the Kenai River. Athapaskan sites on stream and river margins include Dixthada, Dakah De'nin's Village and the Nenana River Gorge site.

It can easily be noted in the review of site locational data that many sites have been subject to reoccupation and share more than one of the defined physical, topographic, or ecological features characteristic of archeological site locales. It would appear that there may be a compounding effect in human utilization of a locale, if more than one of these major variables occur, thus possibly increasing the probability of its use and subsequent reuse. It is also recognized that this analysis is limited because it does not address known chronological and settlement pattern gaps in the archeological record. Additionally, sites such as caves, rock shelters, quarry sites, etc., are not reported immediately adjacent to the study area, although they may occur in the Susitna region. By focusing initial survey efforts in these locales as well as natural exposures, it was anticipated that most of the archeological sites which can be easily discovered would be found during initial stages of the project, thus providing maximum time for evaluation and planning to insure their protection. Thirty-seven archeological sites were located and recorded during the 1980 field season through implementation of this research strategy.

However, a problem in the delineation of the topographic, physical, and ecological features listed above is that a variety of specific settings are subsumed under these general categories and little precise detail about individual sites is available. One objective of the 1980 research strategy was to attempt to obtain more precise data relevant to prehistoric settlement patterns and the juxtaposition of individual sites in relation to the natural environment. Forms used to compile this data are discussed below and presented in Appendix D. It is anticipated that analysis of this data will increase predictability for locating archeological sites. Additionally, this examination may permit detailed analysis of shifting subsistence patterns during various cultural historical periods which in turn may enable correlation of changing settlement patterns with environmental change(s).

Field data recording gathered detailed site specific information such as the geomorphic feature on which sites were located, topographic position and elevation, slope, exposure, view, stratigraphy, as well as details about the surrounding terrain and environment. This specific kind of information may enable an analysis of settlement patterns in relation to ecological variables and human response to changes in these variables through time. A Site Survey Form was developed which outlines the specific kinds of information that field personnel were required to record. This form is presented in the Appendix D. Similar information was also collected at locales where test pits did not yield cultural evidence to facilitate analysis of areas where sites do not occur.

The research strategy developed for this project is based on a two field season plan designed to provide feedback data throughout the project so that new data can be used to modify, refine and further develop the cultural resources investigation. There were three primary objectives of the 1980 field research program. These were:

(a) Examination of areas which will be immediately affected by the Susitna Hydropower project (proposed airstrips, borrow areas, drilling locales, etc.);

(b) Survey and testing of the documented archeological site locales; and

(c) An on-the-ground survey of preselected survey locales within the study area.

The efforts of the 1981 field season will focus on:

(a) Survey of additional areas slated for construction or preconstruction disturbance;

(b) Rigorous testing of sites discovered during the 1980 field season to determine spatial limits, depth of deposits, stratigraphic placement of cultural materials, probable age and function of sites, etc.; and

(c) The implementation of sampling procedure applied to each of the survey areas.

Reconnaissance data from the 1980 season will be used to develop the sampling strategy employed in the second season, and to analyze archeological site distribution and non-site locales within the project area. The second season's sampling and intensive testing will provide a basis for the assessment of individual site significance, and obtain data which will hopefully enable a specific and thorough analysis of settlement patterns through time.

During the second field season a sampling design will be used to test for subsurface archeological sites. The sampling design will be developed for the Devil Canyon and Watana Dam construction sites and impoundment areas, since the actual location of these have been established. The sampling design will follow standard stratified random sampling procedures for the defined sampling strata. The purpose of the 1981 sampling will be to test for archeological site occurrence in a representative number of randomly selected locales for each strata in an attempt to obtain additional data pertinent to prehistoric settlement patterns within different physical and topographic settings through time. In addition to sampling during the second season, testing will be conducted at sites located during both seasons. Testing is necessary to evaluate these sites for archeological significance, define the spatial and temporal limits, and propose mitigating measures.

2.2.3 - Data Collection Procedures

To insure consistent data collection in the field and provide a systematic format for data retrieval, a Site Survey Form was used for this project (Form 1, Appendix D). The form served as a basis for recording specific information on each site located during the reconnaissance level survey as well as a basis for further intensive testing or excavation, if necessary.

The form is organized into major categories including: site location, environment, site description and condition, photographic records and additional information such as a site map, and location of test pits.

Subcategories within each of these headings provide specific data on these topics. Use of the form is discussed in the Technical Procedures Section of the Procedure Manual. Although the form organizes a large quantity of data, it is designed to supplement field notebooks, not to replace them.

Daily field notes were kept by each crew member. Each page was numbered in the upper right hand corner along with the date or dates included on that page. Each site was noted by BOLD underlined numbers (i.e., UA80-23) at the beginning of the notes associated with that site. Field notebooks for survey recorded much of the same information found on the Site Survey Forms, such as site location, topography, vegetation, soils, extent of site, and photographs taken. Field notebooks for testing also recorded a detailed description of soils, drawings stratification of soils, drawings of significant features or artifacts in situ, horizontal and vertical placement of artifacts and features excavated at the site, site maps, methods of excavation and collection of non-archeological samples (soil, pollen, radiocarbon). A space was left on each page for additional notes and corrections. Crew leaders kept a continuous log of all areas surveyed, noting both the location of all test pits and natural exposures and the presence and absence of cultural material.

Once an archeological site was located, additional test pits were excavated to the north, south, east, and west of the test pit which first documented the site. This testing was designed to assist in determining extent of the the site as well as to locate additional cultural material. In an effort to keep sit disturbance to a minimum, preliminary testing at each site was limited, and the number of tests made at each site varied with the nature of the specific site. All test pits were numbered, mapped, and backfilled.

The location of all excavated and surface collected artifacts were recorded. Specimens were bagged by arbitrary 5 cm levels, unless natural stratification was encountered. Each bag contained the following information: location (i.e., Devil Canyon, Survey Locale 15), date, University of Alaska Site Number (i.e., UA80-23), name of excavator, test number (as recorded on site map, i.e., Test #1), depth, and specimen(s) in bag. Radiometric samples collected were double wrapped in aluminum foil and placed in ziplock bags with the following data recorded on each: location, date, site number, collector's name, test number, depth, specimen. All individual bags from each test were placed in a larger bag with site number, name, date, and location on the outside. All test pit bags were placed in a site bag with the site number and date on the outside. All site bags were organized by sampling locale and stored at the Watana Base Camp until transported to the University of Alaska Museum in Fairbanks for cataloging and analysis.

A site specific and regional map was made for each site. Site maps included horizontal and vertical datum points, site grid, all test pits made, location of surface artifacts, features (such as hearths, cabin remains, house pits), distance and direction to other sites or major land features, a scale, date, name of person drawing map, name of person recording data, and reference to pages in field notebooks on which additional information was recorded. Regional maps showed the site in relation to a larger portion of the study area including nearby rivers, lakes, topographic features, and vegetation communities.

Photographs were taken of each site located. The first picture at each site was an identification shot indicating site number, date, and crew. Other photographs recorded the environment around the site, features at the site, soil profiles exposed in test pits, and artifacts or features in situ before removal by excavation. Each photograph was recorded by roll and frame and recorded on the survey form. Direction of view, if applicable, was noted for each photograph taken along with a short statement of content, and any other data pertinent to the photograph. When practical, a metric scale or other reference object was included.

Detailed soil profiles were drawn of soil deposits exposed during excavation. These included a description of color, grain size, consistency, and moisture of each unit. Measurements documenting depth and thickness for each unit were also recorded.

A catalog of all specimens collected in the field during survey or excavation was prepared during Step V, Curation. Pertinent data was recorded for each specimen, including its Museum accession and catalog number, description of specimen, excavation or collection unit, level or depth from which it was collected, date of collection, and collector or excavator. Site information collected and recorded during survey and testing was recorded on Alaska Heritage Resource Site Survey long forms; a sample of which is presented as Form 3 (Appendix D). These become a permanent public record of the State of Alaska.

The 1980 reconnaissance was directed toward on-the-ground evaluation of preselected survey locales that have been identified for the project area. The purpose of this evaluation was to provide a basis for the development of sampling strata. Along with this evaluation an attempt was made in the field to identify areas that potentially may be eliminated from further survey, and the location of as many site locales as possible. Form 2 (Appendix D) was developed to aid these unit evaluations.

2.3 - Methods, Geology

2.3.1 - Literature Review

Prior to the 1980 field season all published geologic reports were collected and reviewed for information relevant to the study. Because specific glacial/ climatic studies are not available for the immediate study area, literature for the adjacent regions was heavily relied upon. The review concentrated on those areas for which radiocarbon dates were available from meaningful stratigraphic contexts. Because of the relatively high quality of climatic sequences from the Glacier Bay-Boundary Ranges region, Southeast Alaska, and Brooks Range, these areas were also reviewed. No attempt was made to review the geologic literature for northern and southeast Alaska.

2.3.2 - Reconnaissance Air-Photo Mapping

During May a regional map of the Susitna Valley was prepared for a first-order interpretation of the geologic history and terrain-units to be studied by the archeologists. The map extended to at least 10 km and usually 15-20 km from the Susitna River. Units, which were defined completely from air-photo interpretation, using 1:20,000 false color infrared U-2 flight lines were subdivided on the basis of age and surface characteristics. This map, though not detailed in the immediate vicinity of the Susitna Canyon, was used in the archeologic research design. Because this map is presently being updated, it will not be discussed further.

2.3.3 - Field Study

Field studies were carried out during June and August, and relied almost completely on helicopters for logistical support. Four major objectives of the field program were to ground truth and reinterpret the regional geo-archeologic map, to carry out a regional stratigraphic reconnaissance, to help interpret and describe significant archeologic sites, and to examine some of the more critical glacial-geomorphologic features in the region near the proposed impoundment area.

2.3.3.1 - Aerial Reconnaissance

The first field objective was to get a regional overview of the Susitna Valley in order to become familiar with the distribution and range in surface landforms and deposits, and to examine the potential for stratigraphic work. In addition, this overview was necessary to examine the mapping done from air-photos in order to test its reliability and accuracy. This reconnaissance was done in conjunction with project archeologists in order to provide collective agreement on the basis for revised mapping. This joint examination allowed the geologist and archeologists to define the map units that best accommodate both needs.

2.3.3.2 - Stratigraphic Reconnaissance

A second objective was to determine the number and quality of river bluff exposures that might provide stratigraphic information needed to interpret and date the major valley-forming geologic events. After a "fly-by" look at all river bluffs along the Susitna and all of the tributaries from the Chulitna River to the Tyone River, 25 exposures were selected for further study. Those not selected for further study were observed from the helicopters, and here only briefly described. At each selected exposure the entire bluff face, was examined and a selected stratigraphic section measured. The sediments were divided into significant natural units, and the character and height of each unit was described above "recent high water" which was used as an altitude datum. Study of each exposure resulted in a detailed sketch and description of units, including the character of the surface above the exposure. In addition to measuring and describing all units, as many as possible were sampled for various reasons. Organic matter in key units was sampled whenever possible for radiocarbon dating. Organic horizons with well preserved plant macrofossils were sampled for paleobotanical analysis. Some sediment units were sampled to obtain a representative sample of the unit lithology. In addition, many exposures contained one or more volcanic ash layers, which were also sampled.

2.3.3.3 - Archeologic Sites

During the field season the geological examination of archeologic sites was conducted, particularly those that were well stratified. Geologic descriptions of the sediment units and regional relationships at the sites greatly aided in site interpretation.

2.3.3.4 - Geomorphic Reconnaissance

A final field objective was to examine the landforms within the study area. Major glacial moraines, deltas, lake plains, eskers, and terraces were described and their heights and gradients measured. Most examination was done from the air, but many glacial-geologic features were studied on the ground. Also the geomorphic character of each of the geo-archeologic terrain units within the impoundment area were briefly described from the air.

2.3.4 - Revised Geo-Archeologic Terrain Unit Mapping

During June a week was spent refining the earlier map to make it more detailed, and therefore more useful for archeological purposes. Twenty-six units were defined, and mapped directly on the U-2 images. During map revision, much more attention was focused on surface relief and drainage characteristics of each unit than on its estimated age. This mapping was done within the field season because the archeologists needed to have the best possible data available for the remainder of the season. This mapping is not included in this report because it has not yet been transferred to the 1:63,000 scale base maps, and because another map revision is intended. Moreover, verbal description of geoarcheological units is provided. It was realized during the field season that a new revision was necessary for two reasons. First, R&M Consultants are preparing a very detailed terrain-unit map for the proposed impoundment area which they have agreed to share. And second, the 1:2000 scale high-quality color air photos are now available. These larger-scale photos will allow refinement of the 1:120,000 scale less maps used earlier.

2.3.5 - Data Organization and Compilation

Between September and December the field data was organized, clarified and tabulated where possible. All short written descriptions were transferred to the 1:63,360 scale base maps. All stratigraphic diagrams and descriptions were redrawn and edited. All samples were double-checked and curated, and a detailed sample list was prepared. All photographs were labeled and keyed to geologic steps and exposures. In addition, partial re-examination of the air-photos resulted in the beginning of a glacial-geomorphic map for the Susitna Region.

2.3.6 - Investigation and Dating of Samples

Nine organic samples were submitted for radiocarbon dating, and all have provided good dates for key stratigraphic horizons. One faunal sample of a fossil mammoth(?) was examined and identified by University of Alaska scientists. One paleobotanical sample has been tentatively identified by the herbarium staff at the University of Alaska Museum. One tephra sample has been submitted to Pullman, Washington for bulk- and trace-element analysis.

2.4 - Methods, Paleontology

Assessment of the Tertiary plant-bearing deposits within the impoundment area requires that all such deposits be identified. Prior to the field season, a literature search was conducted for information indicating the presence of any deposits which would require investigation other than those exposed in the area of Watana Creek. This search revealed no published account of additional deposits containing Tertiary plant fossils within the impoundment area. During time spent at the site, reconnaissance of the area surrounding Watana Creek was conducted via helicopter. No deposits were noted outside the interpreted limits of the basin of deposition. The area encompassed by the basin includes: the Watana Creek drainage south of T. 22 S., Talkeetna Mts. (D-3) Quadrangle; the drainage basin of the unnamed creek which enters the Susitna River on the north bank in section 27, T 32 N., R. 6 E., Talkeetna Mts. (D-3) Quadrangle and all drainages east to Watana Creek; and all rock outcroppings exposed along the Susitna River immediately opposite those described herein.

Field work conducted during July 1980 consisted of mapping all outcrops within the Watana Creek study area, detailed sampling and description of the Tertiary deposits, and compilation of a representative collection from the plant-bearing beds within the Tertiary deposits. Outcrop locations and those areas which were sampled and described in detail are discussed in Chapter 3. Fossil plant localities are indicated in the unit descriptions of the stratigraphic columns in Chapter 3.

Various geologic measurements, observations, and other pertinent investigations were undertaken on deposits considered to make up the type section of the Tertiary terriginous deposits.

The attitude of the beds was measured and recorded at each locality. Where applicable, the outcrops were differentiated into units on the basis of lithology, texture, color, or other characteristic geologic feature. Each unit was measured for thickness and described as to lithologies, texture, structure, presence or absence of fossils, and other geologic information, and sampled for further laboratory studies.

Samples from 57 horizons were sent to Western Petrographic, Inc., Tucson, Arizona for thin section preparation to allow detailed compositional analysis of the sediments. A sieving procedure to reveal size parameters, and heavy mineral extraction to aid in provenance studies, are being conducted on selected sand samples at the Geology Department, University of Alaska, Fairbanks.

Units exhibiting fossils with a degree of preservation adequate to enable further laboratory studies were sampled for fossil plant specimens. All specimens were labeled with the field number of the unit from which they were collected. The fossil collection from Watana Creek was cataloged into the permanent paleontological collection of the University of Alaska Museum, Fairbanks, where preparation techniques and subsequent identification are being conducted.

Additional sampling of selected units was undertaken for palynological studies. All coal units of thickness adequate (approximately 0.5 feet) to allow useful analysis were sampled and later prepared for the purpose of determining the presence of pollen and/or spores. One hundred and forty five microscope slides, representing 29 coal units were prepared for future pollen and spore identification.

3 - RESULTS AND DISCUSSION OF BASELINE STUDY

3.1 - Introduction

In addition to archeological investigations, geological and paleontological studies were conducted in order to provide data which would enhance the location and evaluation of cultural resources within the study area. Prior to and during the 1980 field season geological studies were conducted to provide data that would define the ages of surficial deposits and provide limiting dates for human occupation of the area. Based on the sequence of glacial events that occurred in the study area, these data were applied to the investigations of cultural resources and are presented in this section. Paleontological studies were conducted in order to define the types and range of paleontological specimens that could possibly be found in an archeological context, as well as to identify and evaluate paleontological resources in the study area. The results of these studies are included in this section. Federal law mandates that site locational data not be released if it may create a risk of harm to the site. Therefore, site location maps in Appendix E are not included in reports released to the general public.

3.2 - Archeology

Surface reconnaissance and subsurface testing in 60 survey locales located 1 historic and 32 prehistoric sites during the 1980 field season. One-hundred and one historic period sites were located and recorded by the land use analysis team (subtask 7.07) under the direction of Dr. Alan Jubenville and are described in that report. Since the land use analysis study was examining historic sites in the study area, cultural resource studies concentrated on prehistoric sites. However, historic sites encountered in survey locales were recorded.

Cultural resources were located in 14 (23%) of the 60 survey locales examined. A total of 24 sites were documented for these 14 locales. Four additional sites were located in Borrow Area E and five sites were located in other areas. A brief survey after the field season of one of the alternative access corridors (corridor 3) located four additional sites bringing the total located in 1980 to 37.

The fact that no sites were located during testing in 46 (76%) of the survey locales could be due to the reconnaissance level testing employed, sampling bias, or the fact that site locational data used for selecting survey locales needs to be further refined to reflect specific topographic settings in the Upper Susitna River Valley. Although it is possible that no sites exist within the limits of the selected survey locales, the fact that testing in 23% of the areas did locate cultural resources suggests otherwise. Further testing is scheduled during the 1981 field season for many of these survey locales as well as new survey locales.

Survey locales examined in 1980 were selected based on the application of archeologic, ethnographic, historic, and geologic data compiled and refined prior to and during the 1980 field season. Maps depicting these locales are presented in Appendix E. Specific criteria used for defining and selecting survey locales are discussed in Chapter 2.

3.2.1 - Archeological Site Reports

The sites found in 1980 as well as four sites located in 1978 are discussed below. Each site report contains information concerning the setting, the results of reconnaissance testing, an inventory of collected artifacts, a site map, and one or more soil profiles. Maps showing the location of each site on USGS 1:63,360 scale maps are located in Appendix E. Artifacts specifically discussed in the text are presented in Figures 78 through 86 at the end of this section.

During first year reconnaissance level survey the minimal amount of cultural material needed to document the existence of a site and provide a basis for evaluating further study was collected. Therefore, not all cultural material noted was collected. The provenience of artifacts at each site was recorded in relation to their distance from the site datum set up at the site. Metal tags inscribed with the appropriate University of Alaska Museum accession number were left at each site to mark the site and avoid confusion in site designations.

To avoid confusion, the meaning of certain terms as used in this report are discussed below:

Site: Any location with detectable physical evidence of prehistoric and early historic human activity in the Susitna Valley within the confines of a defined topographic setting. Physical evidence deposited as a result of human activity includes but is not limited to tools, lithic debitage, animal bones, and features (including hearths, house pits, cairns, etc.).

Locus: One of two or more concentrations of cultural material within a site which is spacially discrete from other concentrations of cultural material.

Scatter: A concentration or cluster of cultural material at a site or within a locus.

Probe: Shovel probe. A subsurface testing method using a shovel. For this project probes were excavated in each survey locale in 5 cm arbitrary levels and were excavated to at least 50 cm when possible.

Test: A systematic excavation conducted with a trowel. Tests varied in size depending on the terrain. In some cases probes were turned into tests when cultural material was encountered. All profiles of tests presented in the report have equal horizontal and vertical scales.

cmbs: Centimeters below the surface.

asl: Above sea level.

Survey Locale: One of the 60 areas selected for testing during the 1980 field season based on the application of archeologic, ethnologic, historic, and geologic data (see Appendix E).

Flake: A fragment of rock culturally removed from a parent rock by percussion or pressure flaking. The remains of lithic tool manufacturing or repair, usually characterized by a bulb of percussion, a striking platform, and radiating ripples or force lines from the point of impact or pressure on the ventral surface.

Retouch: The occurrence of small flake scars along the edge of a lithic artifact.

Component: The manifestation of a given archeological phase at a site (Willey and Phillips 1070). Sites may be single component (representing only one cultural period) or multicomponent (representing two or more distinct cultural periods).

Level: The vertical subdivision of an excavation unit, generally a naturally deposited stratigraphic unit.

Horizon: In soil science, a natural developmental zone in a soil profile.

UA80-XX: Each site is represented by a University of Alaska accession number. All artifacts from a given site are numbered with this site number. Individual specimens receive consecutive numbering, i.e. UA80-68-1, UA80-68-2, etc.

TLM XXX: State Heritage Resource Survey site numbers are also assigned to sites discussed in this report. The first three letters reflect the USGS quadrangle in which the site is located; in this case TLM represents Talkeetna Mts. The following three digit number represents the specific site.

Phase I (reconnaissance survey): In terms of the archeological section of the Susitna Project Phase I refers to reconnaissance level testing. It is not the same as phase I, pre-licensing studies for the overall project. Phase I has been specified by BLM to indicate archeological studies conducted at the reconnaissance level.

Phase II (intensive testing): In terms of the archeological section of the Susitna Project Phase II refers to intensive testing of sites located during reconnaissance testing (phase I). It is not the same as phase II post-licensing studies for the overall project. Phase II testing has been sepcified by BLM to indicate intensive testing of archeological sites.

A discussion of individual sites follows:

3.2.1.1 - Site UA80-68, State Number TLM 021

Area: 1 km NW of confluence of Kosina Creek and Gilbert Creek
Area Map: Figure 103; Location Map: Figure 176
USGS Map: Talkeetna Mts. C-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 449700 Northing 6953850 (Locus A)
Easting 449500 Northing 6953750 (Locus B)
Easting 449050 Northing 6953800 (Locus C)

Latitude 62°42'52" N., Longitude 147°58'55" W. (Locus A)
Latitude 62°42'48" N., Longitude 147°59'25" W. (Locus B)
Latitude 62°42'50" N., Longitude 147°59'52" W. (Locus C)

T. 30 N., R. 8 E., Seward Meridian
Sec. 5, SE¼SE¼SE¼ (Locus A)
Sec. 5, SW¼SE¼SE¼ (Locus B)
Sec. 5, SW¼SW¼SE¼ (Locus C)

Locus A: Site Map: Figure 5; Soil Profile: Figures 7 and 8
Locus B: Site Map: Figure 6

Setting: Three distinct loci (A, B, C), are located along the exposed rocky crest of an east-west trending ridge at an elevation of 884 m (2900 feet asl) (Figure 176). Locus A is situated at the extreme eastern end of the ridge overlooking Kosina Creek approximately 1 km downstream from the confluence of Kosina Creek and Gilbert Creek. Kosina Creek is approximately .5 km east and 122 m (400 feet) lower than the elevation of locus A. Loci B and C are located .5 km and 1 km, respectively, to the west of loci A on high points of the ridge which offer unobstructed views to the north and south of low kettle and kame topography (Figure 176).

The ridge upon which the site is located is one of the most prominent features in the area and is the highest elevation within 8 km. Kosina Creek is easily accessible from the site but is only visible from locus A. Vegetation at loci A and B is limited to dwarf birch, Labrador tea, various low bush berries, and lichens. Vegetation in the vicinity of locus C consists primarily of tundra and scattered black spruce. Locus C is situated at a point where the ridge is less well defined and is truncated by a north-south stream channel.

Phase I Testing: Phase I testing was concentrated at locus A (Figure 5). Helicopter scheduling limited the time available for recording loci B and C, and testing was restricted at each of those loci. All three loci have tentatively been recorded as representing a single site.

Locus A: Locus A consists of four flake scatters naturally exposed on the deflated, rocky crest of the ridge (Figure 5). Approximately half the surface material observed was collected. Two scrapers and a retouched flake were found spacially isolated from the flake scatters (Figure 79; b, c, d). Four test pits were excavated but only test 4 (Figure 5) produced cultural material from the surface to 5 cmbs. Artifact lithologies include rhyolitic tuff, chert, and basalt.

Locus B: Locus B consists of six flake scatters exposed in a blowout on the crest of the ridge at a point slightly higher than the general ridge line (Figure 6). Scatter 1 included the medial section of a projectile point (Figure 79, f). All observed surface artifacts were collected including a scraper and a biface (Figure 79, e and g). Test 1 (Figure 6) produced one chert flake associated with burned bone fragments and charcoal at a depth of 9 cmbs. A radiocarbon determination of 1,160 ± 100 years B.P.: 790 A.D. (DIC-1878) was obtained from this charcoal (UA80-68-1a). A single flake (not collected) was observed in situ in the edge of a blowout adjacent to test 1 at the same depth as the bone and charcoal horizon in test 1. It is possible that the radiocarbon date obtained on the charcoal from test 1 may date the surface artifacts exposed by deflation.

Locus C: Locus C consists of a single flake scatter exposed in a blowout. The scatter consisted of 21 brown chert flakes, 6 basalt flakes, and 2 rhyolite flakes clustered within a 1 m diameter. All 21 chert flakes and 4 basalt flakes were surface collected. Test 1, located at the locus datum, produced 1 grey chert flake directly below the vegetative mat, between the surface and 5 cmbs. The distinctive dark brown chert from locus C was not observed at the other site loci.

Inventory of Collected Artifacts

Locus A
Scatter 1
Surface:

116 Light brown rhyolite flakes
1 Grey-white rhyolite flake (possible burin spall)
1 Grey rhyolite flake
1 Grey chert flake
1 Mottled rhyolite flake

Subsurface:
Test 4

191 Light grey rhyolite flakes
44 Dark grey rhyolite flakes
1 Grey chert flake
3 Dark grey chert flakes
ca. 200 Very small rhyolite flakes

Scatter 2
- 7 Light brown rhyolite flakes
- 1 Grey rhyolite flake
- 1 Grey chert flake

Scatter 3
- 4 Light brown rhyolite flakes
- 1 Grey-white rhyolite flake
- 1 Light brown chert flake
- 1 Grey chert flake
- 1 Green chert flake

Scatter 4
- 2 Light brown rhyolite flakes

Isolated Finds
- 1 Grey-white rhyolite flake
- 1 Grey basalt flake
- 1 White chert scraper
- 1 Light brown rhyolite scraper
- 1 Grey-white rhyolite retouched flake

<u>Locus B</u>
Scatter 1
- 19 Light brown rhyolite flakes
- 19 Grey rhyolite flakes
- 1 Black basalt flake
- 2 Grey chert flakes
- 1 Grey rhyolite flake (retouched)
- 1 Dark grey rhyolite projectile point, medial section
- 1 Bone fragment

Scatter 2
- 2 Grey chert flakes

Scatter 3
- 1 Grey-white rhyolite flake

Scatter 4
- 3 Grey-white rhyolite flakes
- 4 Grey-white rhyolite flakes (retouched)
- 1 Tuffacious rhyolite biface
- 1 Cherty rhyolite scraper

Scatter 5
- 7 Light brown rhyolite flakes
- 1 Grey rhyolite flake
- 1 Black basalt flake

Scatter 6
    2 Light brown rhyolite flakes

Test 1
    1 flake
    Carbon sample with burned bone fragments

<u>Locus C</u>
<u>Scatter</u> 1
    21 Dark brown chert flakes
    2 Black basalt flakes

Test 1
    1 Black basalt flake

<u>Inventory of Faunal Material</u>

<u>Locus B</u>
<u>Scatter</u> 6
Surface: 1 long bone fragment, calcined, medium-large mammal

Subsurface:
    Test 1, 9cmbs: long bone fragments, calcined, medium-large mammal
        1 phalanx fragment, 1st or 2nd, large mammal, possibly caribou (<u>Rangifer tarandus</u>)

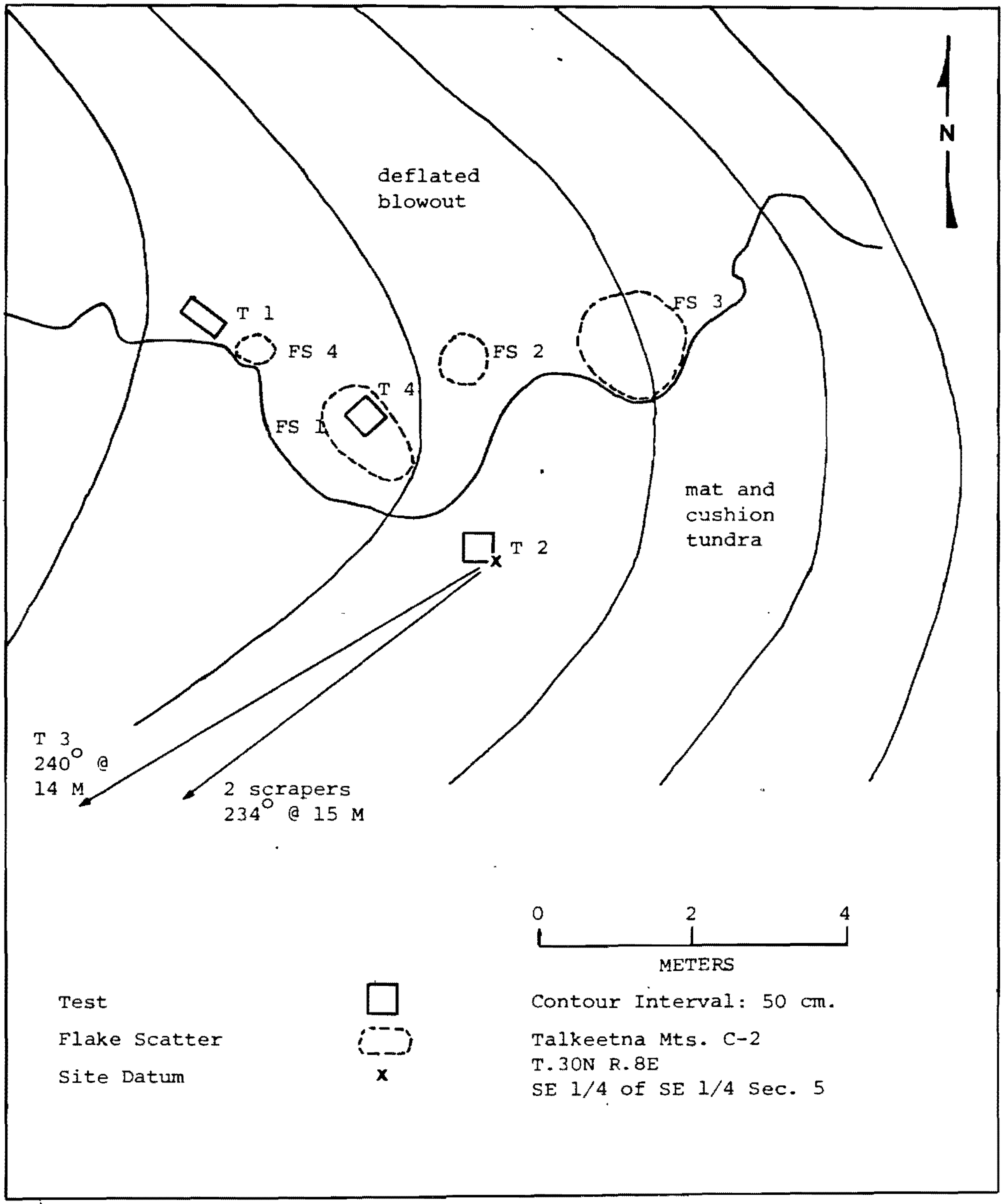


Figure 5.

Site map UA80-68 (TLM 021), locus A.

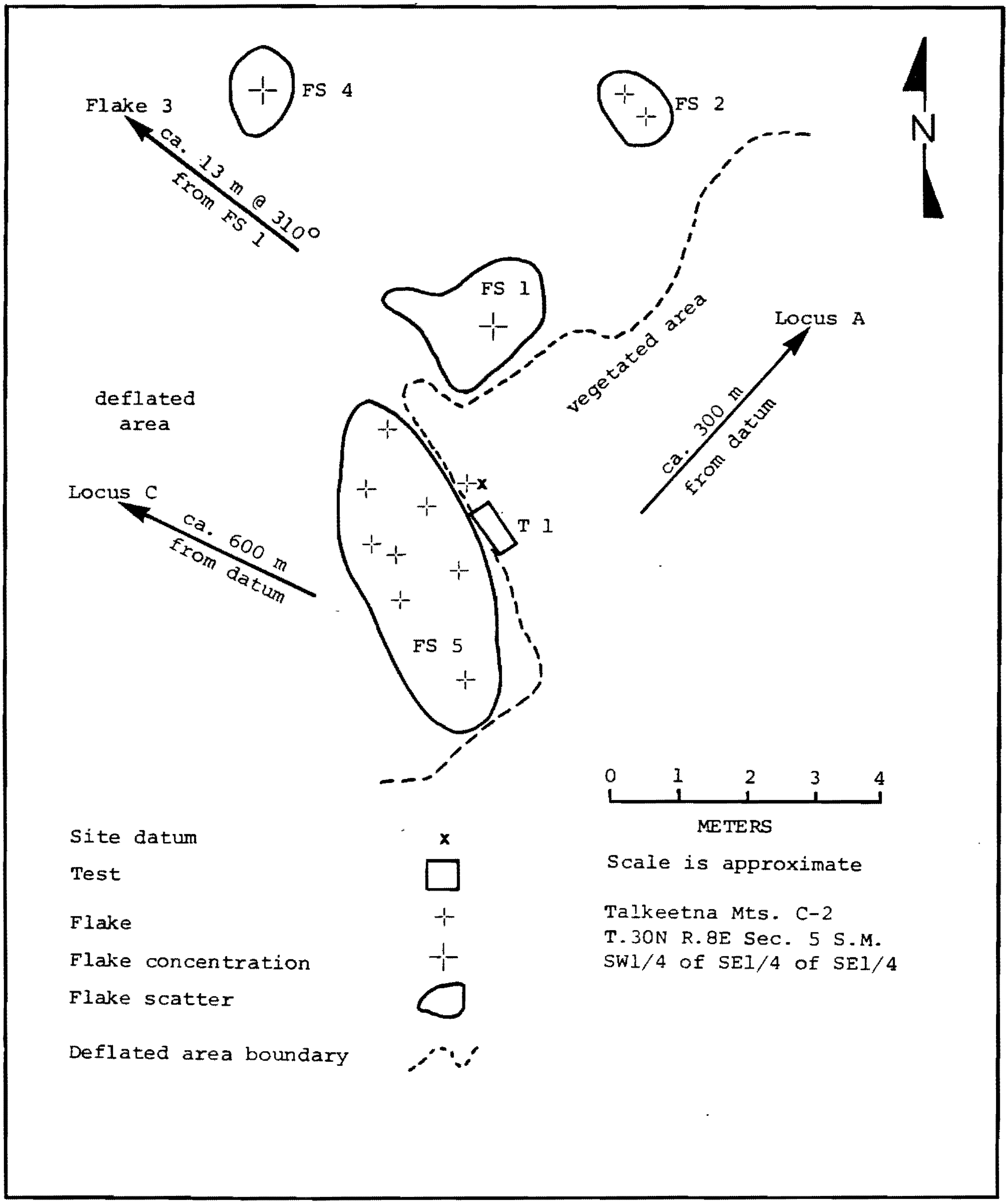


Figure 6

Site map UA80-68 (TLM 021), locus B.

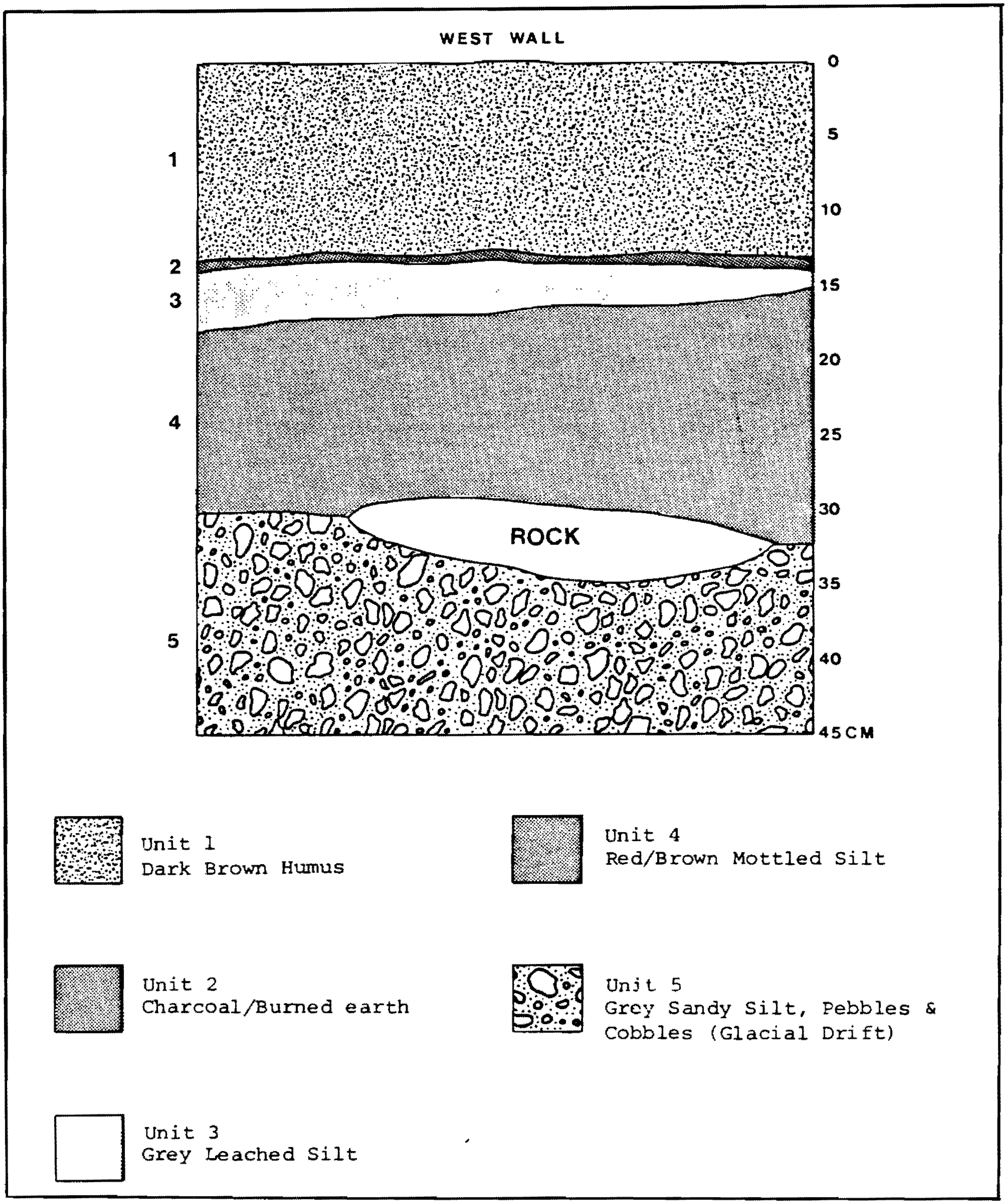


Figure 7.

Soil Profile UA80-68 (TLM 021), locus A, test 2.

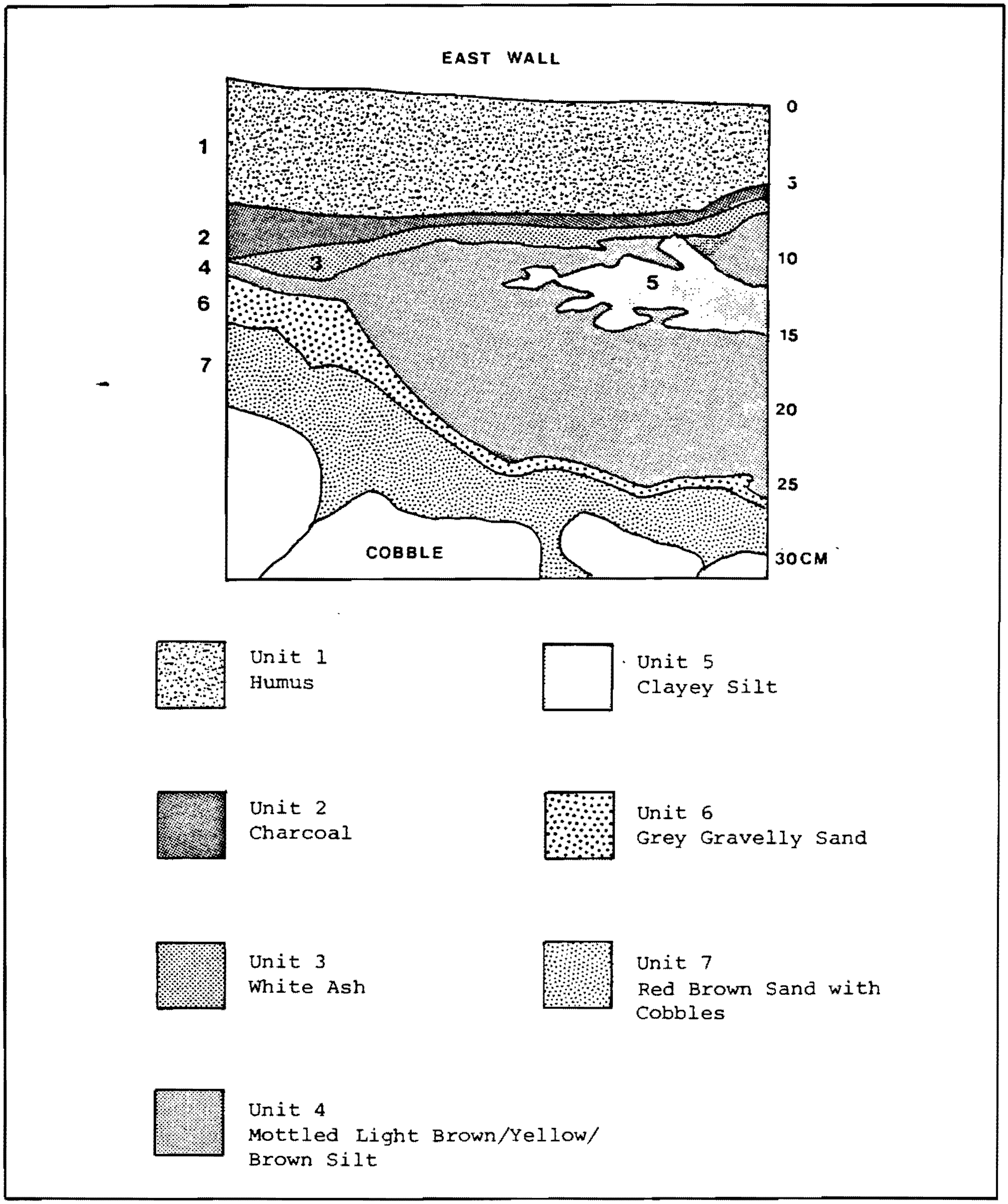


Figure 8.

Soil Profile UA80-68 (TLM 021), locus A, test 3.

3.2.1.2 - Site UA80-69, State Number TLM 022

Area: Borrow E, Survey Locale 15

Area Map: Figure 100; Survey Locale Map: Figure 119

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 417900 Northing 6966850

Latitude 62°49'28" N., Longitude 148°36'35" W.

T. 32 N., R. 4 E., Seward Meridian

Sec. 36, SW¼NE¼NE¼

Site Map: Figure 9; Soil Profile: Figure 10

Setting: The site located in Borrow Area E, is situated on the east bank of Tsusena Creek at its confluence with the Susitna River (Figure 119). At this location Tsusena Creek is a shallow, fast flowing, clear water stream approximately 15 m wide. The site is on the bank of a flat alluvial terrace overlooking the creek and the Susitna River to the south and southwest. The alluvial terrace, which has been downcut by Tsusena Creek at its eastern end, extends southwestward along the north bank of the Susitna River for 3.2 km, varies from approximately 400 to 800 m in width, and is 451 m (1480 feet asl). From the site location both the north and south banks of the Susitna River are in view for approximately 800 m to the west. The terrain rises steeply to the north and northeast of the site where the elevation is 61 m (200 feet) higher than the site. Immediately to the northeast, Tsusena Creek emerges from a deep canyon with almost vertical bedrock walls. Travel upstream is extremely difficult or impossible due to the narrow canyon and a 30 m waterfall approximately 3 km upstream from the mouth of the creek. The site is mantled by a mature forest of mixed white spruce, birch, aspen, and cottonwood. Some black spruce occurs in poorly drained areas. Thick mat ground cover consisting of sphagnum moss, lichens, and grasses covers the floor of the forest.

Phase I Testing: There are no surface indications of a site at this location, however a shovel probe revealed charcoal and burned bone at 15 cmbs. This initial probe was expanded to test 1 (Figure 9) which was excavated to a depth of 35 cmbs and revealed a charcoal lens and fragments of burned large mammal bone between 14 and 15 cmbs (Figure 10). Test 1 also exposed three river cobbles at the same depth, and this feature may be a hearth. The cobbles were left *in situ*. No lithic material other than the cobbles was revealed by test 1. A total of five tests were excavated at the site (Figure 9). Both tests 3 and 4 (Figure 9) produced subsurface charcoal and test 4 exposed a possible fire cracked rock in the humus layer which was left *in situ*. Tests 2 and 5 (Figure 9) did not reveal charcoal or cultural material. A radiocarbon determination on a charcoal sample (UA80-69-1a) from test 1 produced a modern date.

Inventory of Faunal Material

Test 1, 0-5 cmbs:	10 long bone fragments, medium-large animal 1 phalanx fragment, 1st or 2nd, large mammal, possible caribou (*Rangifer tarandus*)
5-10 cmbs:	25 long bone fragments, calcined, medium-large mammal 1 phalanx, 3rd, caribou (*Rangifer tarandus*) 1 canine tooth fragment, calcined, possible bear (*Ursus* spp.) 7 tooth fragments, calcined, medium-large mammal
14-15 cmbs:	6 long bone fragments, calcined, medium-large mammal

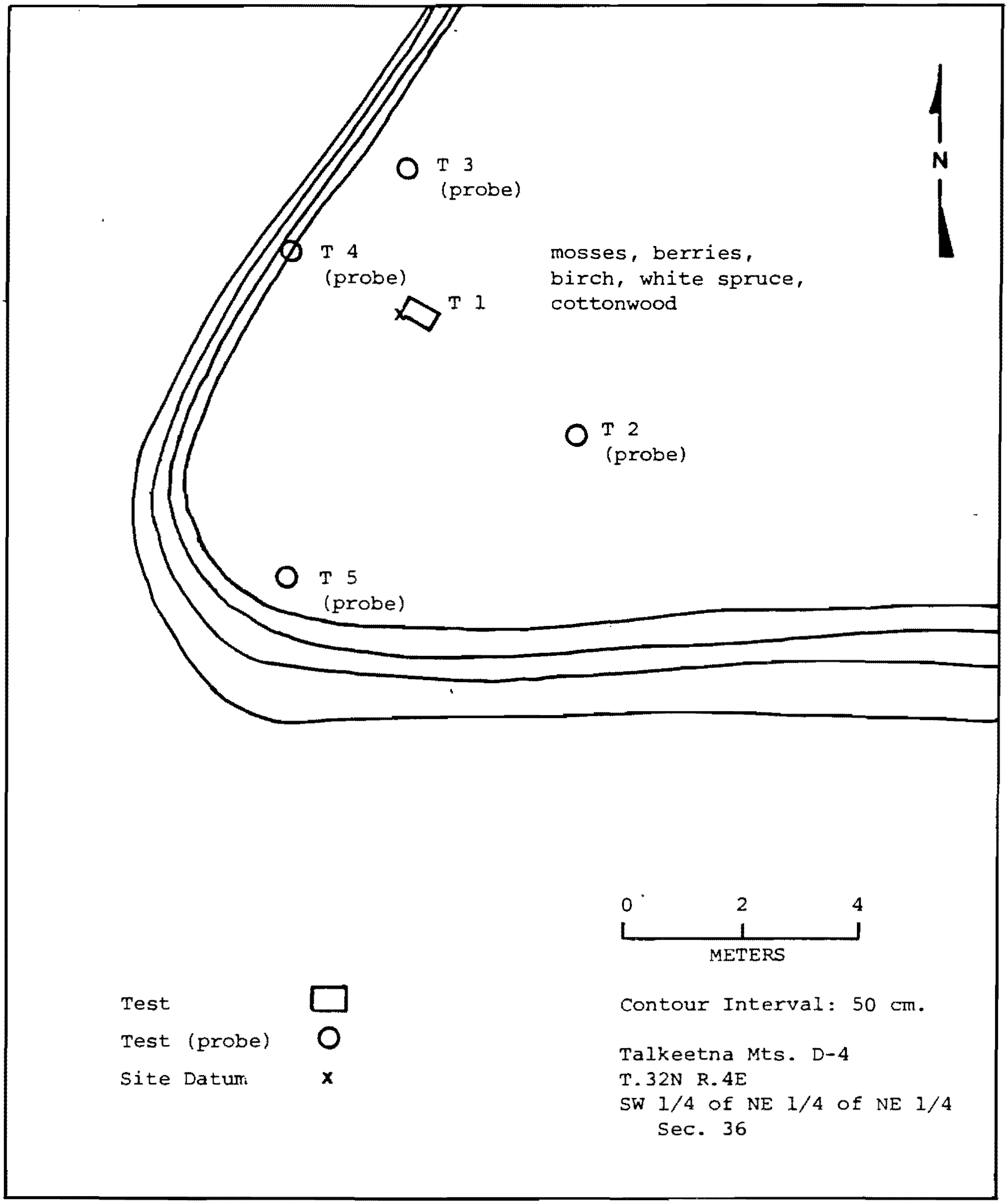


Figure 9.

Site map UA80-69 (TLM 022).

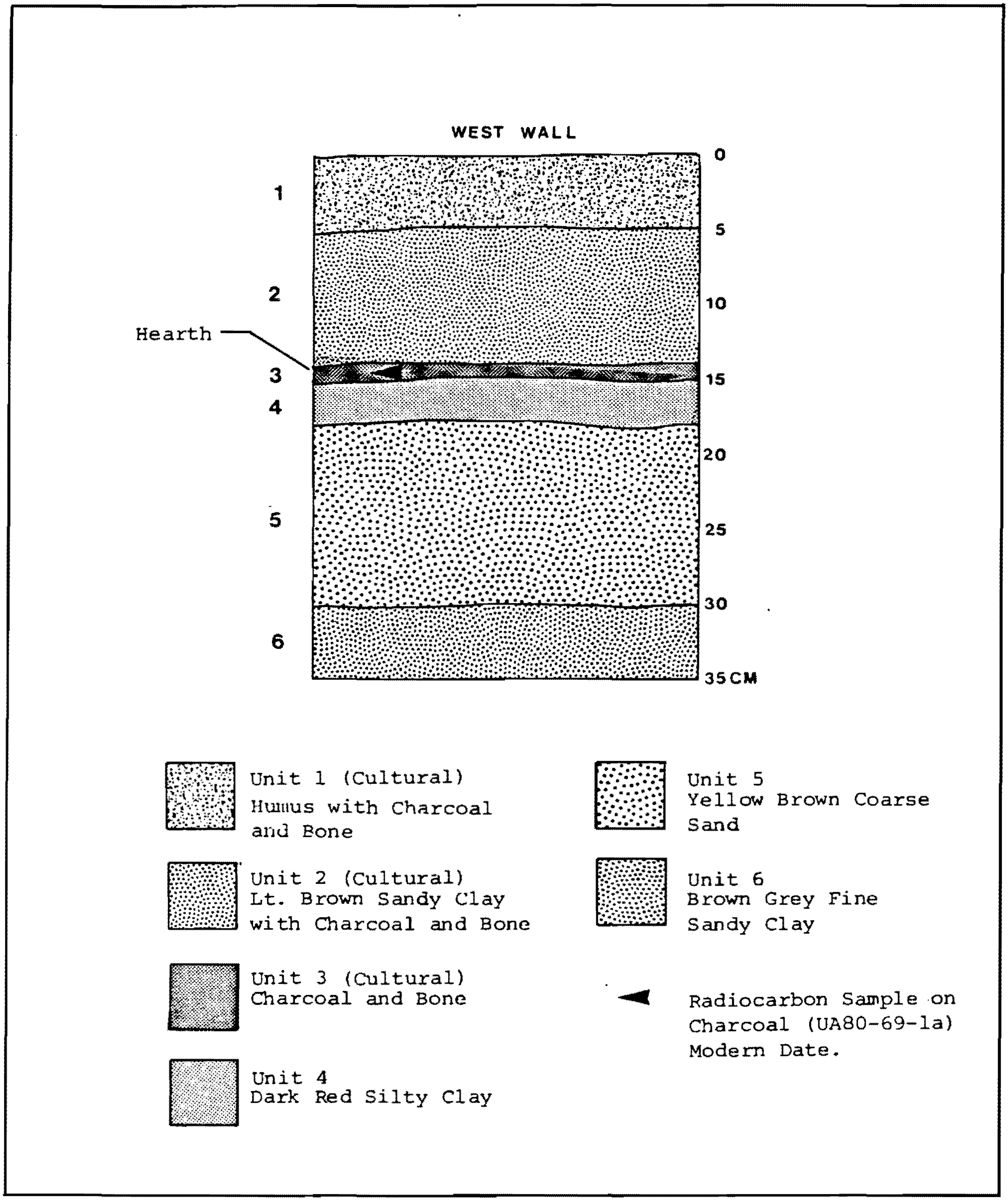


Figure 10.

Soil profile UA80-69 (TLM 022), test 1.

3.2.1.3 - Site UA80-70, State Number TLM 023

Area: Borrow E

Area Map: Figure 100; Location Map: Figure 173

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 416950 Northing 6966800

Latitude 62°49'27" N., Longitude 148°37'50" W.

T. 32 N., R. 4 E., Seward Meridian

Sec. 36, NW¼SE¼NW¼

Site Map: Figure 11

Setting: The site, a collapsed trapper's cabin, is located in Borrow Area E approximately 1 km west of the mouth of Tsusena Creek at the mouth of an unnamed clear water creek which joins the Susitna River from the north (Figure 173). The cabin remains, not visible from the river, are located on a relatively flat alluvial terrace approximately 50 m east of the braided mouth of the creek and about 15 m north of the Susitna River. The terrain in the vicinity of the site has little topographic relief although immediately west of the cabin a narrow dry 1.5 m deep abandoned channel cuts into the terrace. The alluvial terrace is approximately 1.2 km wide at the site location and is bounded to the north by the main river valley wall which rises steeply 152 m (500 feet) and then continues to rise at a more moderate slope. Vegetation in the vicinity of the site consists of large white spruce, cottonwood, and birch. Ground cover consists of high brush with thick moss, blueberry, wild rose, grasses, and a litter of fallen logs and upturned stumps.

Phase I Testing: This cabin is collapsed and the wall logs are partially decomposed and covered with soil and vegetation. The soil accumulation is probably due to a fallen sod roof. The lowest course of logs remains in situ and enabled approximate measurement of the cabin to be made. The dimensions are 3.5 m by 5 m (11 by 16 feet) with the long axis oriented 306° north (Figure 11). The remains of a door measuring 66 cm by 140 cm (26 by 55 inches) is evident in the southwest wall facing the Susitna River. The logs exhibit saddle notching at the ends. The ground in the immediate vicinity of the cabin is littered with historic cultural debris (Figure 11), which includes a frying pan, coffee cans, metal plates and dishes, glass jars, stove pipe, canvas, cans, milled lumber, nails, wire, a #6 trap, the rubber sole of a shoe, and various wooden and metal pieces of what appear to be the remains of a dog sled. One glass jar with the inscription "NUXATED IRON" was collected. All other historic artifacts were left in place. There is no evidence of outbuildings or a cache in the immediate vicinity of the site. Four shovel probes were dug in the vicinity of the cabin (Figure 11) but none produced historic or prehistoric cultural material.

Winston Hobgood, a biologist and trapper involved in fur-bearer studies for the Susitna Hydroelectric Project, reported that this cabin was built by Oscar Vogel who trapped along the Susitna River in the 1930's and 1940's. This cabin, according to Hobgood (1980, oral communication), was one of a string of 10 line cabins approximately 10 miles apart with Vogel's main headquarters cabin located on the Talkeetna River. Vogel, primarily a wolf trapper, quit trapping in 1949 and died in Anchorage in 1979. The May 1972 issue of Alaska Magazine contains an article by Oscar H. Vogel entitled "My Years with the Wolves". A photograph of one of Vogel's line cabins illustrates the above article and is probably representative of what the cabin at site UA80-70 looked like prior to its collapse.

Inventory of Collected Artifacts

1 Glass bottle (NUXATED IRON)

Number key to UA80-70 (historic cabin) site map:

1. 6" stovepipe sections
2. frying pan
3. metal pan
4. 5 gallon can
5. round can
6. square can with round screw lid
7. oil can
8. coffee can
9. Hills Brothers coffee can
10. baking powder can
11. Wild Rose lard can
12. glass jar bottom
13. bottle (iron)
14. metal bucket
15. wire loop
16. metal plate
17. rubber shoe sole
18. wood/metal frame part (dog sled)
19. canvas/wood

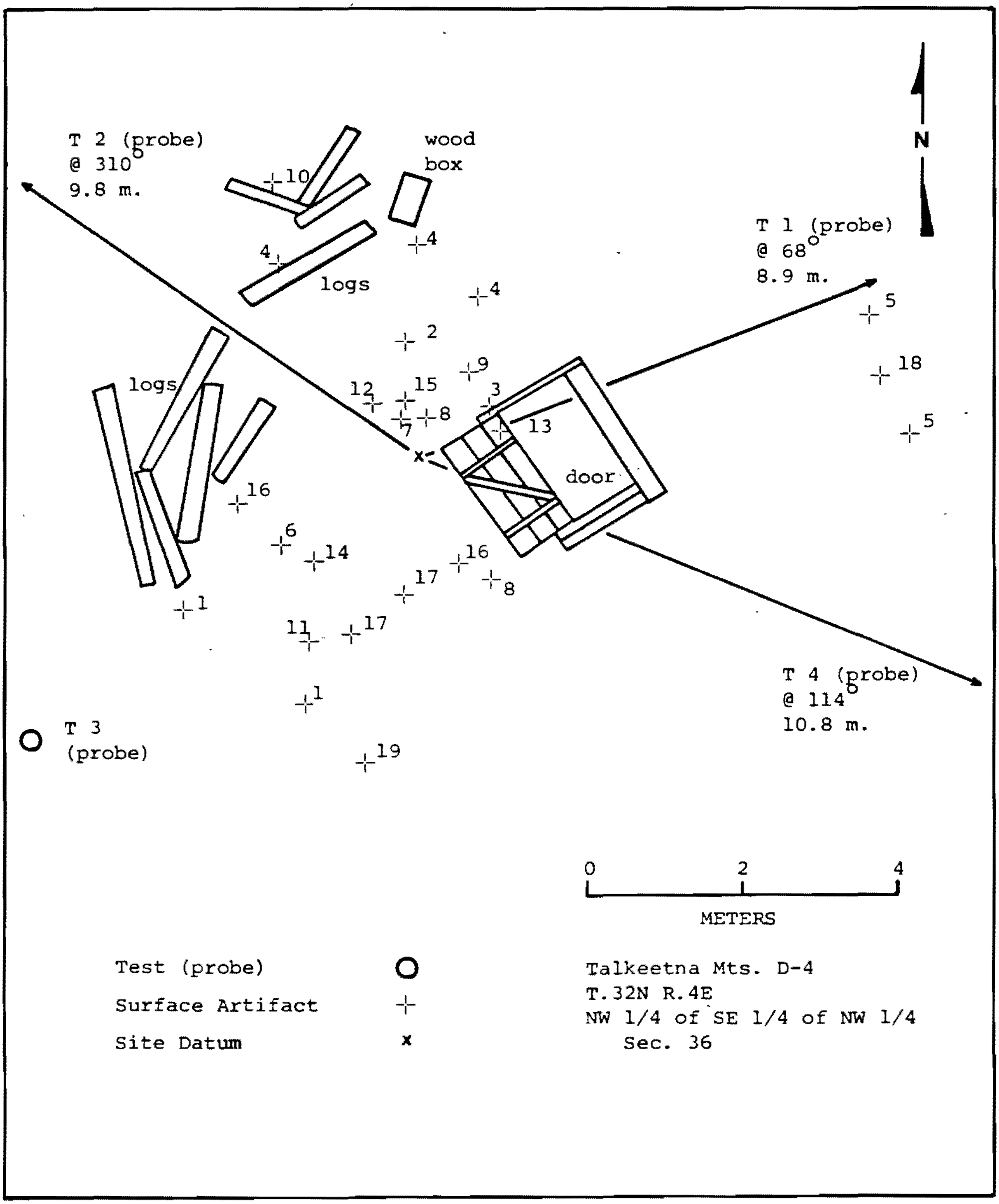


Figure 11.

Site map UA80-70 (TLM 023)

3.2.1.4 - Site UA80-71, State Number TLM 024

Area: Borrow E

Area Map: Figure 100; Location Map: Figure 172

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 416400 Northing 6966900

Latitude 62°49'33" N., Longitude 148°38'12" W.

T. 32 N., R. 4 E., Seward Meridian

Sec. 36, SW¼NW¼NW¼

Site Map: Figure 12; Soil Profile: Figure 13

Setting: The site, located approximately 1 km west of Tsusena Creek in Borrow Area E, is about .5 km upstream from the mouth of a small unnamed creek which joins the Susitna River from the north (Figure 172). It is situated on the end of a ridge approximately 150 m west of the creek, and overlooks an alluvial terrace to the south (Figure 172). The site is located about 3 m below the point of the ridge on a small bench and is about 30 m above the level of the alluvial terrace. To the northwest the ridge rises gradually for about 400 m and then becomes part of the slope of the main valley which rises steeply to the 762 meter (2500 foot asl) elevation. The site is situated in a dense stand of birch, white spruce, and alder which restrict the view from the site, and a thick carpet of moss covers the ground. However, in the absence of trees the creek and most of the alluvial terrace between the site and the Susitna River would be visible. Other ground vegetation in the vicinity of the site includes forbes, Labrador tea, and high bush berries. Black spruce are present on the alluvial terrace below the site.

Phase I Testing: There is no surface indication of a site at this location; however, a shovel probe produced a single cortex flake at a depth of 20 to 30 cmbs. This black basalt flake has a white patina on the dorsal surface. The shovel probe was expanded (test 1) but no additional cultural material was found although some charcoal was present between 5 and 10 cmbs in the humus layer (Figure 13). It was probably not cultural in origin because charcoal was found in all other tests. A total of five tests were excavated at the site, four of which were located on the small bench where the cortex flake was found and one (test 2) on the point of the ridge (Figure 12). The cortex flake from test 1 was the only cultural specimen found at the site. Six rock fragments, three of which exhibit facets that appear polished, were collected from test 1. Laboratory analysis indicates that these rocks are silicious metasedimentary types and that the facets are natural cleavage planes.

Collected Artifact Inventory

1 Black basalt cortex flake
6 Silicious metasedimentary rock fragments

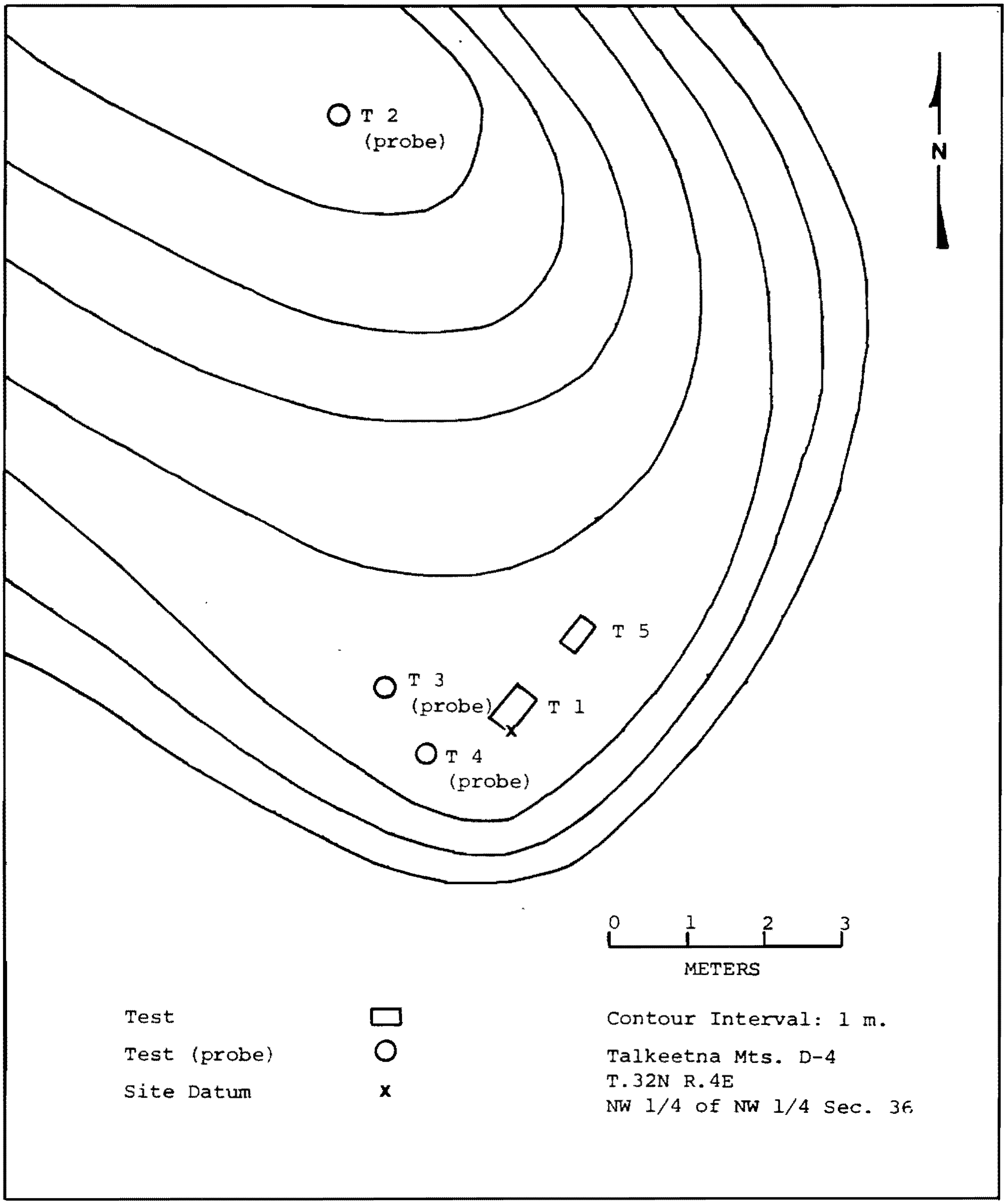


Figure 12.

Site map UA80-71 (TLM 024).

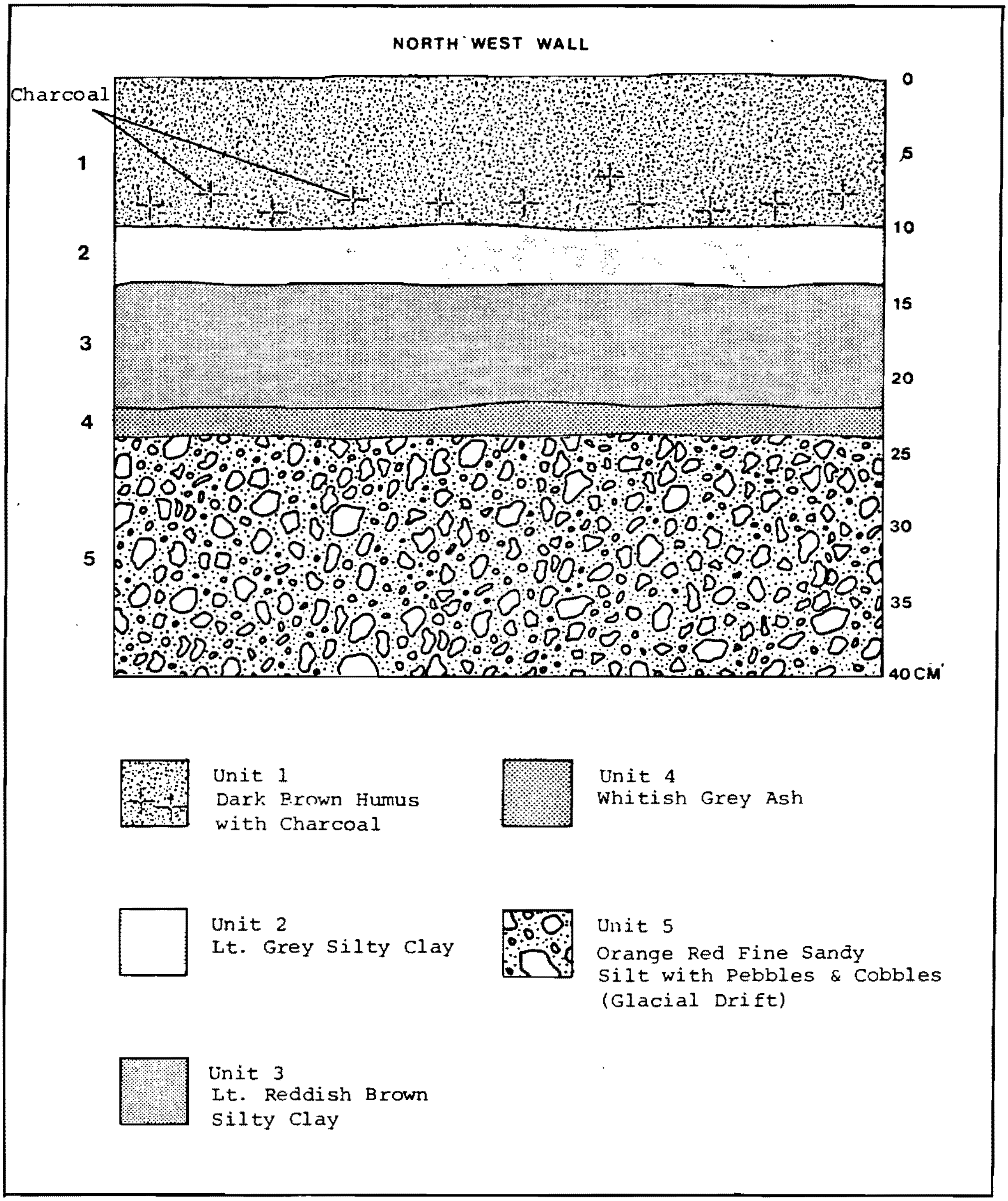


Figure 13.

Soil profile UA80-71 (TLM 024), test 1.

3.2.1.5 - Site UA80-72, State Number TLM 025

Area: Summit of Drumlin

Area Map: Figure 101; Location Map: Figure 177

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 434900 Northing 6963300

Latitude 62°48'04" N., Longitude 148°17'10" W.

T. 31 N., R. 6 E., Seward Meridian

Sec. 2, NE¼SW¼SW¼

Site Map: Figure 14; Soil Profile: Figure 15

Setting: The site, located 3.6 km south of the Susitna River and 3.5 km southwest of the mouth of Watana Creek, is located at the northeast end of a ridge at the highest elevation of a streamlined knob (Figure 101). Site topography exhibits sharp relief from the surrounding terrain which is 91 to 122 m (300 to 400 feet) lower in elevation. The view from the top of the hill is excellent in all directions for a distance of over 10 km, however, the view from the site is oriented to the southwest, overlooking a small valley. To the north a long stretch of the Susitna valley is visible, although the river itself cannot be seen. The Fog Lakes are visible 4 km to the west, as is the mouth of Watana Creek to the northeast. Bedrock is exposed at the summit of the hill and on the slopes to the north and southeast. Mosses, Labrador tea, and low brush are the common vegetation on the site, with higher brush dominating the slopes below. Vegetation on the surrounding plain 100 m below is open moist tundra with black spruce adjacent to seasonal or former stream channels. More extensive stands of black spruce and birch are located on better drained slopes to the south and north with areas of treeless tundra to the east and west.

Phase I Testing: The site contains both surface and subsurface cultural material. A surface flake scatter covering an area 4 m north-south by 35 m east-west is exposed in a blowout (Figure 14). Within this larger scatter, a concentration of flakes occupies an area of 4 m square. Twelve flakes and a banded chert core tablet (Figure 79, h) were surface collected. Other observed surface flakes were left *in situ*. Three tests were excavated, two of which produced cultural material (Figure 14). A single rhyolite flake was found in test 1 at 11 cmbs (Figure 15). Test 2 produced two black basalt flakes between 7 and 10 cmbs. Artifact lithologies represented at the site are quite diverse and include rhyolitic tuff, basalt, quartizite, chert, and obsidian.

Collected Artifact Inventory

1 Grey black banded chert core tablet
1 Brown chert flake
1 Black obsidian flake
1 Clear obsidian flake
1 Grey chert flake
3 Grey rhyolite flakes
6 Grey basalt flakes
1 Yellow brown quartzite flake
1 Grey chert rock fragment

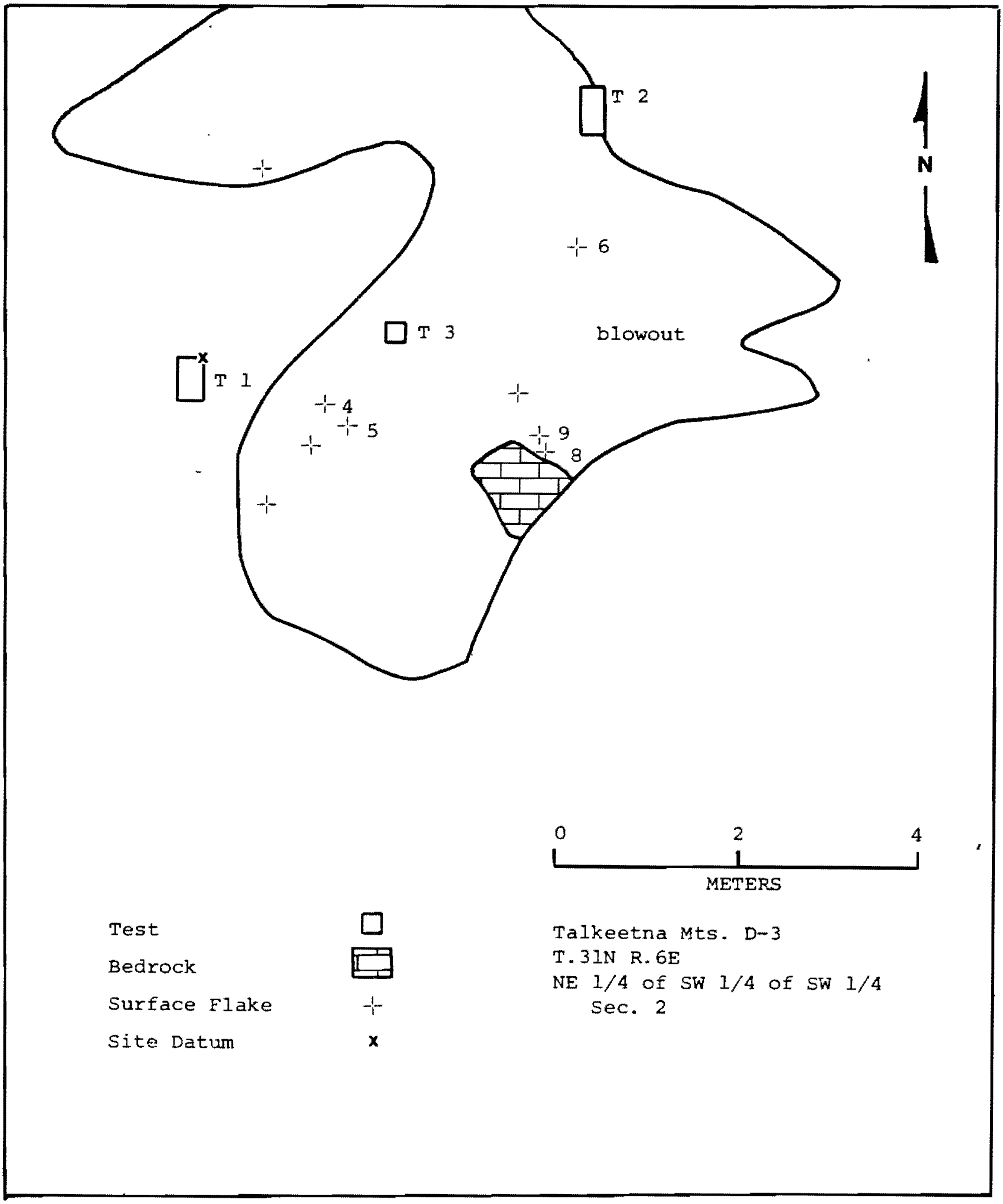


Figure 14.

Site map UA80-72 (TLM 025).

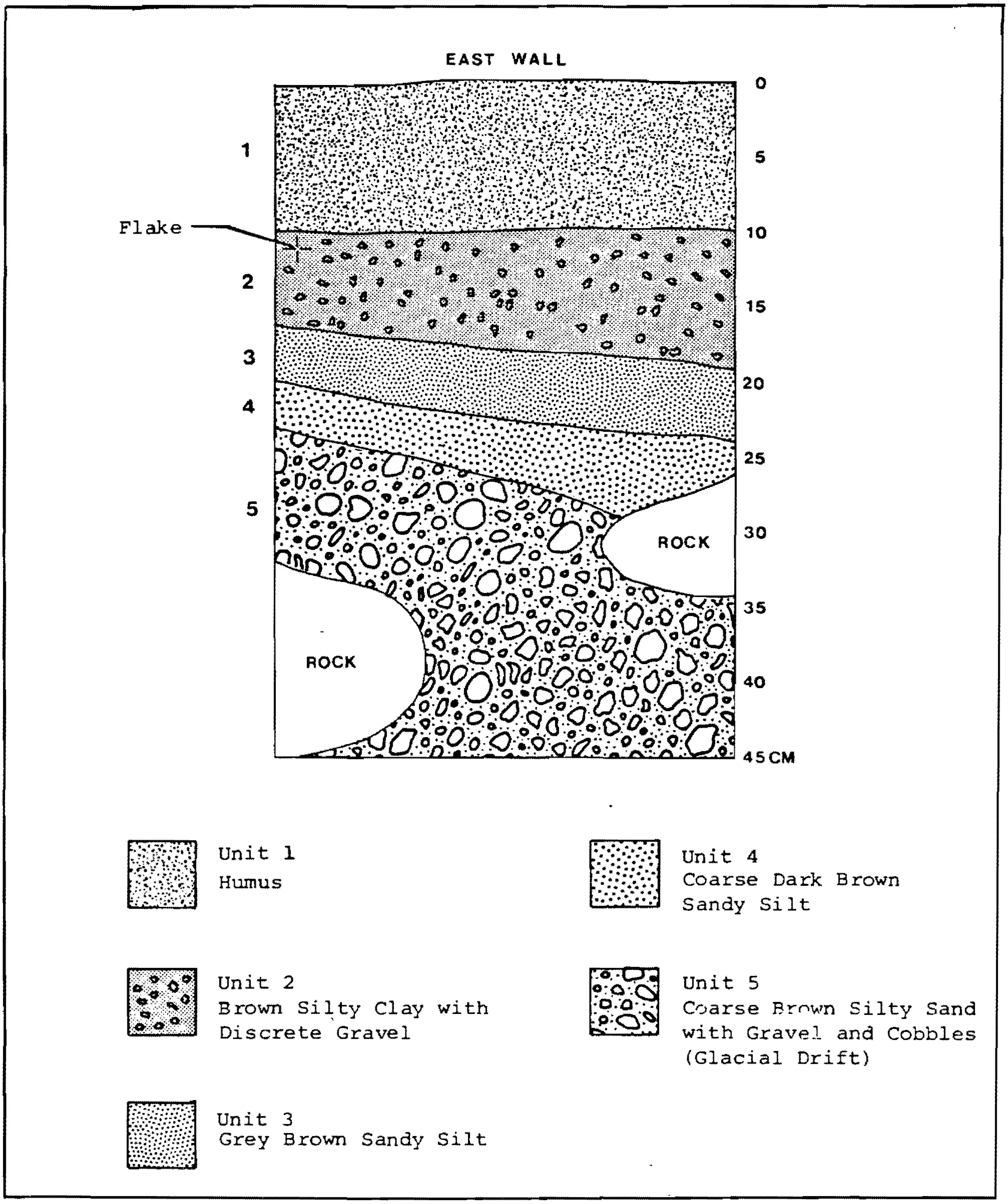


Figure 15.

Soil profile UA80-72 (TLM 025), test 1.

3.2.1.6 - Site UA80-73, State Number TLM 026

Area: Survey Locale 45
Area Map: Figure 104; Survey Locale Map: Figure 156
USGS Map: Talkeetna Mts. C-1, Scale 1:63,360

Site Location: UTM Zone 6 Easting 478150 Northing 6945900

Latitude 62°38'40" N., Longitude 147°25'35" W.

T. 30 N., R. 11 E., Seward Meridian
Sec. 32, NW¼NE¼SE¼

Site Map: Figure 16; Soil Profile: Figure 17

Setting: The site is located on the north side of the Susitna River directly across from the mouth of Goose Creek (Figure 156). It is situated at the 677 m (2222 foot asl) elevation at the south-western point of a 1.5 km long peninsula. At this point the Susitna forms a tight bend, flowing almost completely around the site. Two abandoned stream channels cut across the point, one immediately northeast of the site and the other approximately 900 m northeast in the vicinity of site UA80-149 (TLM 042). The site is 46 m above the Susitna with the point increasing in elevation to the northeast to 762 m (2500 feet asl). The view to the northeast is excellent for 3 km downriver and 4 km upriver. The view across the river encompasses approximately 1 km of the Goose Creek drainage. In this area the Susitna is wide and shallow with gravel bars and islands in sight. Several small kettle lakes are located 2 to 3 km northeast of the site and are easily accessible from it. The site area is level and open with scattered spruce, willow, Labrador tea, blueberry, mosses and lichens forming the major vegetation. The slopes leading down to the Susitna are steep, eroded, and poorly vegetated. Spruce are present at the bottom of the slope and increase in density with proximity to the river.

Phase I Testing: The site consists of isolated surface artifacts and a possible hearth, or other feature, all of which are exposed at the top of an eroded bank overlooking the Susitna River (Figure 16). All observed surface artifacts were collected from the exposure and include an endscraper (Figure 79, a), flakes, and two river cobbles observed out of geologic context and possibly the partial remains of a cultural feature. All of these artifacts were found on active erosional surfaces. Intensive surface reconnaissance did not locate any *in situ* artifacts and nine tests (Figure 16) revealed no subsurface artifacts. Two large river cobbles in the bluff exposure overlooking the river to the northwest were located in silt deposits where no other gravels or cobbles were present. Their position in a silt matrix may be the result of human activity. In an attempt to determine if these cobbles were part of a hearth, or other feature, the bank was troweled back (test 9) and a soil profile drawn (Figure 17). No other cobbles, charcoal, or cultural material was observed while preparing the bank to draw a soil profile. However, two volcanic ash samples (UA80-73-5 and 6) were collected between 22 and 35 cmbs (Figure 17).

Collected Artifact Inventory

1 Light reddish-brown chert endscraper
1 Black chert flake
1 Light brown-white chert flake
1 Grey rhyolite flake
2 Ash samples
2 Cobbles

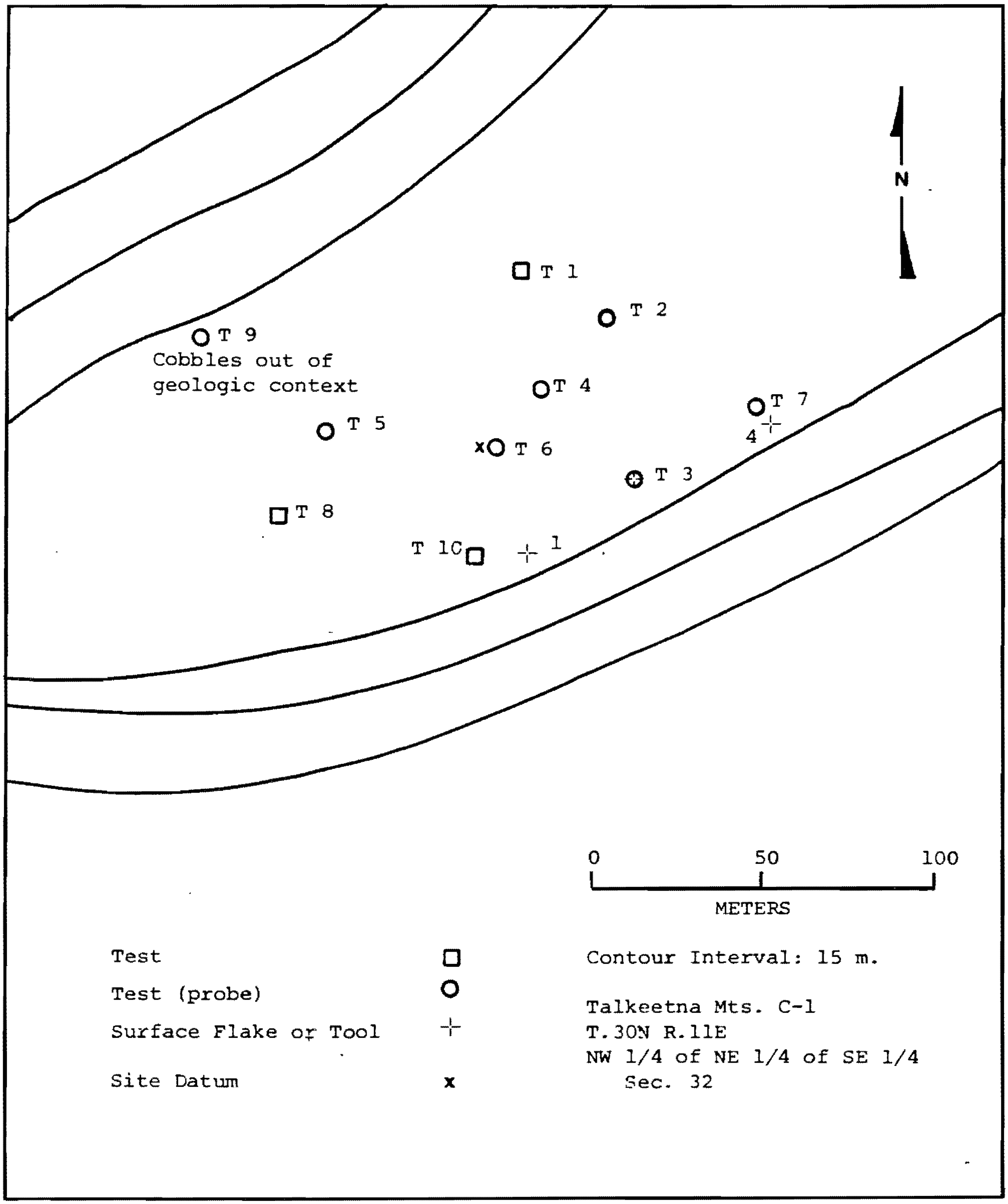


Figure 16.

Site map UA80-73 (TLM 026).

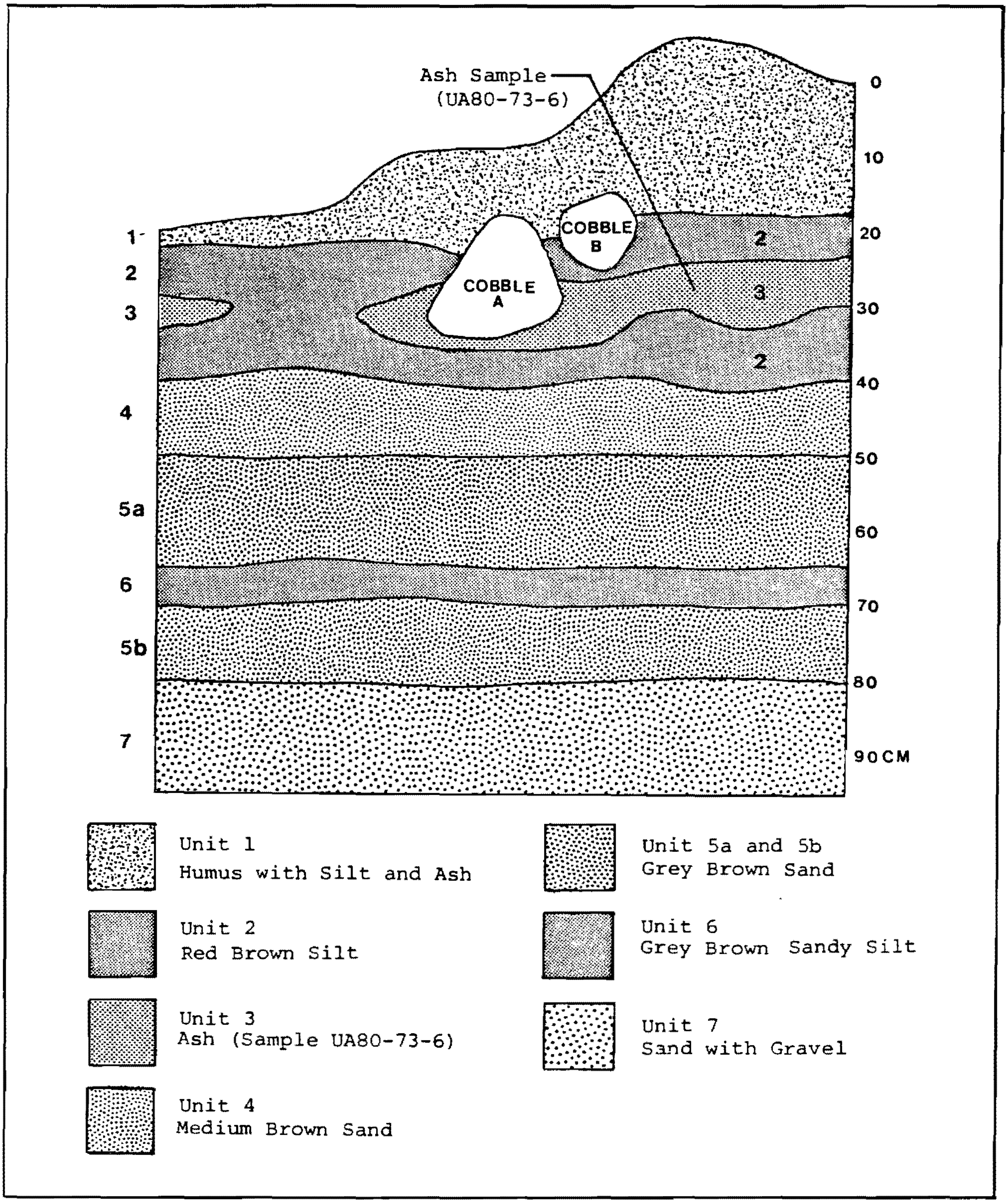


Figure 17.

Soil profile UA80-73 (TLM 026), test 9.

3.2.1.7 - Site UA80-74, State Number TLM 027

Area: Survey Locale 14

Area Map: Figure 100; Survey Locale Map: Figure 118

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 414800 Northing 6965100

Latitude 62°48'30" N., Longitude 148°40'20" W.

T. 31 N., R. 4 E., Seward Meridian

Sec. 3, NE¼SE¼NE¼

Site Map: Figure 18; Soil Profile: Figure 19

Setting: The site is located on the south side of the Susitna River at the mouth of an unnamed stream which joins the Susitna from the east, approximately 4 km upriver from the mouth of Fog Creek (Figure 100). Situated on the summit of a discrete cone shaped knoll approximately 100 m from the river margin, the site overlooks both the Susitna and the mouth of the small clear water stream approximately 50 m to the south. The knoll forms the end of a ridge which extends northeast towards higher ground. In all other directions the 30 m high knoll slopes steeply to the level of the Susitna River. The top of the knoll is approximately 20 m square, sparsely vegetated, and commands a good view in all directions, which is limited only by the tops of several trees rooted on the steep slopes below. The Susitna is in view for 5 km downstream and 1.6 km upstream. The views westward across the river and eastward along the ridge system behind the site are restricted by hills about 800 m asl. Below the site there is evidence of terracing by the Susitna. Tree growth on the slopes of the knoll is dense but only a few birch and aspen grow on top, along with dwarf birch, blueberry, Labrador tea, low bush cranberries, mosses, and lichens. The vegetation at the base of the knoll changes from birch and aspen to black spruce, high bush cranberries, grasses, and sphagnum moss.

Phase I Testing: No surface indication of the site was observed, however cultural material was found in each of three test pits excavated on the relatively flat summit (Figure 18). Test 1 (Figure 18) produced two distinct lithologies, each associated with a different soil horizon. Three basalt flakes were discovered between 3 to 5 cmbs at the contact between the humus layer (unit 1) and a whitish-grey volcanic ash (unit 2). Between 19 to 24 cmbs, and associated with the contact between a dark grey volcanic ash (unit 4) and glacial drift (unit 5), 11 large patinated light green tuffacious flakes. (Figure 78, a-g and s-j), and a possible flake core (UA80-74-10; Figure 78, j), were found. Due to the weathered and extremely soft nature of these artifacts, it is uncertain whether or not the larger flakes have been retouched. These specimens recovered from test 1 appear to be associated with a subsurface scatter which was only partly exposed by this test. Three ash samples were collected from test 1, one (UA80-74-36) from the upper ash horizon 3 cm to 7 cmbs (Figure 19, unit 2) and two (UA80-74-37 and 38) from the lower ash horizon 17 cm to 21 cmbs (Figure 19, unit 4). Test 2 (Figure 18) produced 12 flakes 20 to 25 cmbs which appear to be struck from the same tuffacious material as the specimens recovered between unit 4 and unit 5 in test 1. Test 3 (Figure 18) produced 2 basalt flakes and 6 tuffacious flakes 22 to 28 cmbs. Results from the preliminary testing suggest that the site may encompass the entire top of the knoll and may contain vertically stratified cultural material bracketed by deposits of volcanic ash.

Collected Artifact Inventory

29 Light green tuffacious flakes (7 with possible retouch)
1 Possible light green tuffacious flake core
5 Black basalt flakes
3 Ash samples (test 1)

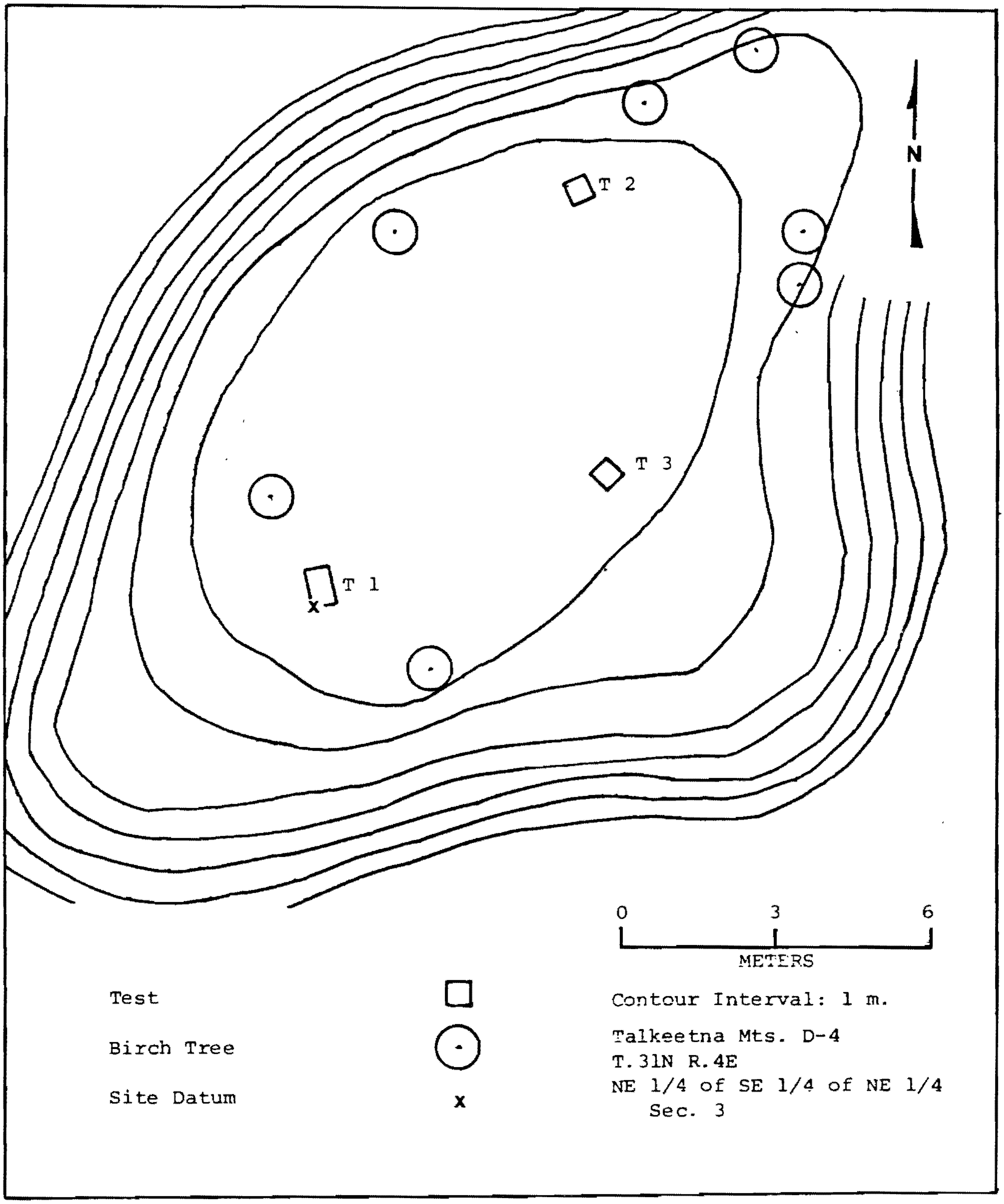


Figure 18.

Site map UA80-74 (TLM 027).

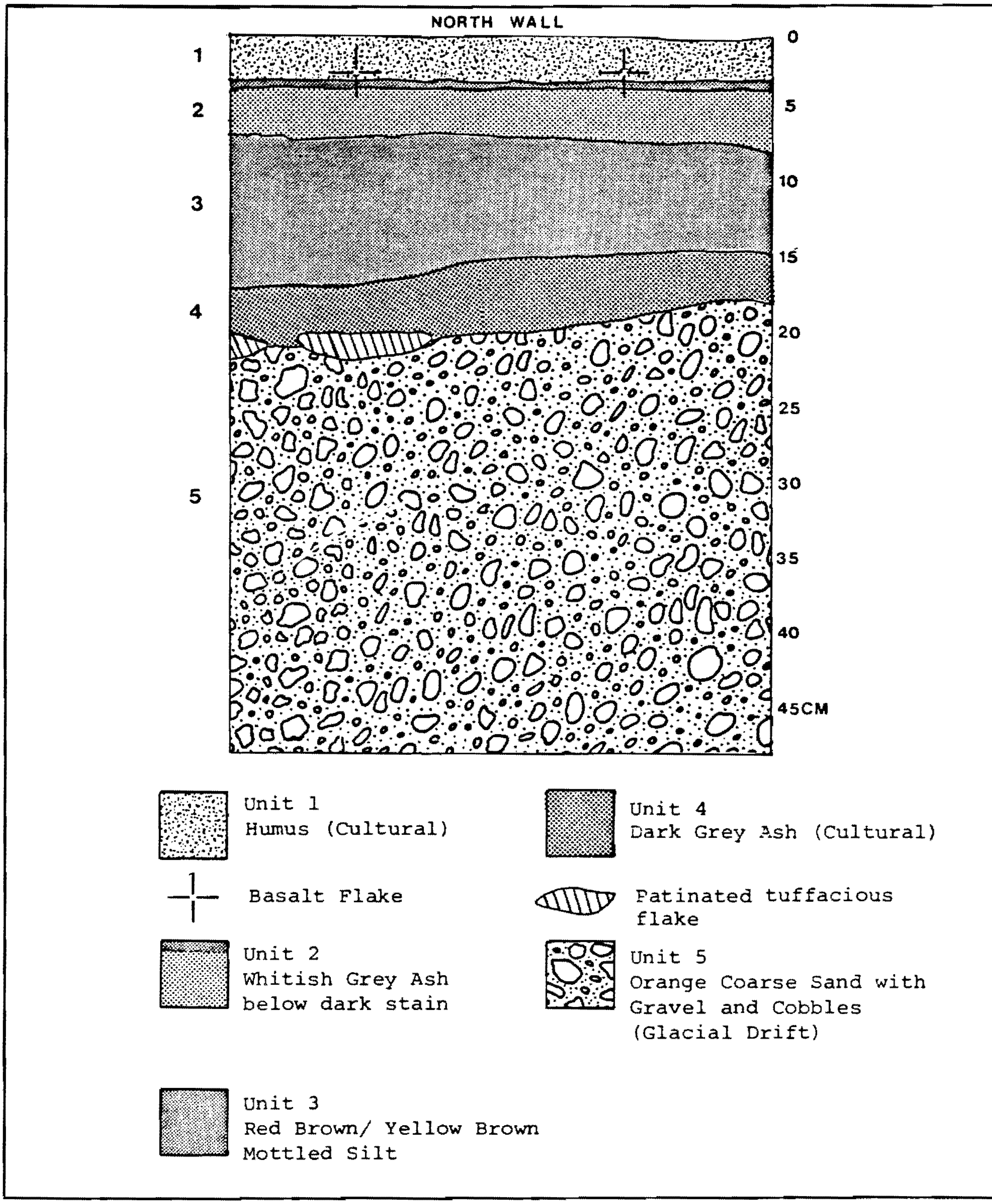


Figure 19.

Soil profile UA80-74 (TLM 027), test 1.

3.2.1.8 - Site UA80-75, State Number TLM 028

Area: Esker downriver from the mouth of Tyone River
Area Map: Figure 104; Location Map: Figure 178
USGS Map: Talkeetna Mts. C-1, Scale 1:63,360

Site Location: UTM Zone 6 Easting 487850 Northing 6950700 (Locus A)
Easting 487200 Northing 6950300 (Locus B)

Latitude 62°41'18" N., Longitude 147°14'15" W. (Locus A)
Latitude 62°41'09" N., Longitude 147°15'00" W. (Locus B)

T. 30 N., R. 12 E., Seward Meridian
Sec. 17, SW¼NE¼SE¼ (Locus A)
Sec. 17, NW¼SE¼SW¼ (Locus B)

Site Map: Figure 20; Soil Profile: Figure 21

Setting: The site, consisting of two loci (A and B), is located on the north margin of the Susitna River approximately 2.5 km downriver from the mouth of the Tyone River (Figure 104). The two site loci are situated on a long esker which parallels a bend of the river for approximately a kilometer (Figure 178). The esker is a discrete topographic feature with a 2 m wide flat crest approximately 30 m above the level of the Susitna River. A well used game trail runs the entire length of the ridge.

Locus A is located a few m below the highest elevation at the northeast end of the esker (Figure 178). The outlet stream from a small lake 1.2 km northwest of locus A joins the Susitna River approximately 200 m north of locus A at the terminus of the ridge. The mouth of this stream is not visible from locus A due to dense vegetation.

Locus B is located approximately 750 m southwest of locus A on the level crest of the same ridge line. The view from both loci is good in all directions although limited by the relatively low elevation of the esker. The view includes the Susitna River and the lowlands to the south and southwest for a distance of several kilometers. Other eskers of various lengths and elevations are located in the area on both sides of the Susitna River. Vegetation at both site loci includes black and white spruce, dwarf willow, bearberries, mosses, and lichens. To the southeast the terrain is characterized by poorly drained areas predominantly vegetated with black spruce, birch, and sphagnum moss including areas of muskeg and standing water. The Susitna River borders the site to the southeast.

Phase I Testing: Surface reconnaissance along the top of the esker resulted in the collection of two isolated flakes. At locus A one rhyolite flake was found in a blowout approximately 10 m south of the highest elevation on the ridge line (Figure 20). Intensive surface reconnaissance and three tests in the vicinity of the blowout did not result in the location of any additional cultural material. Test 1 (Figure 20) was placed at the edge of the blowout where the flake was found and tests 2 and 3 were placed at the highest elevation of the ridge. At locus B a basalt waste flake was surface collected from the middle of the game trail which follows the ridge crest. Again, intensive reconnaissance and a single test (test 1) in the area where the flake was found failed to produce any additional cultural material. Further survey and testing are needed to determine whether the two flakes found at this site are isolated finds or are associated with other material.

Collected Artifact Inventory

Locus A 1 Grey rhyolite flake

Locus B 1 Black basalt flake

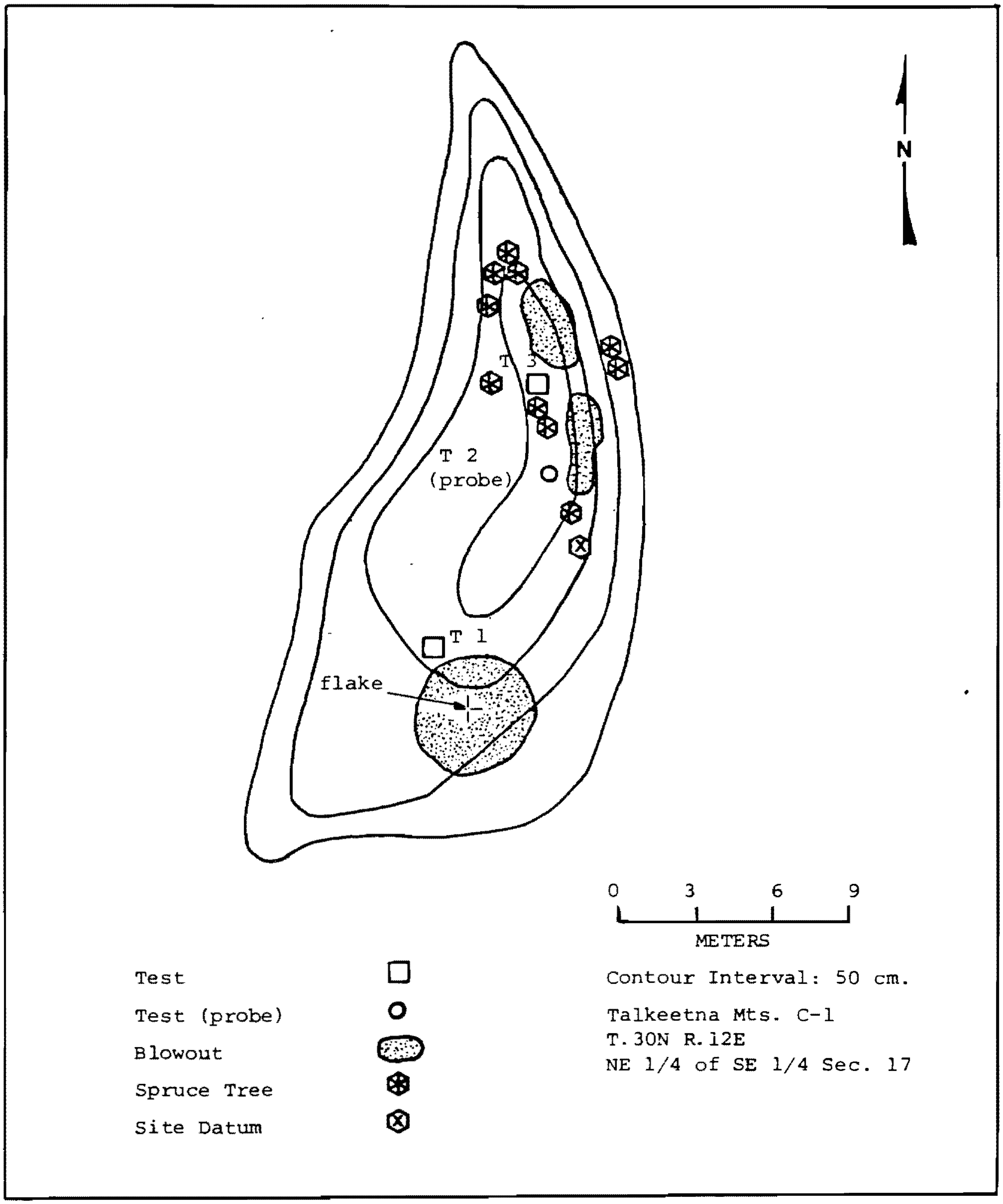


Figure 20.

Site map UA80-75 (TLM 028) locus A.

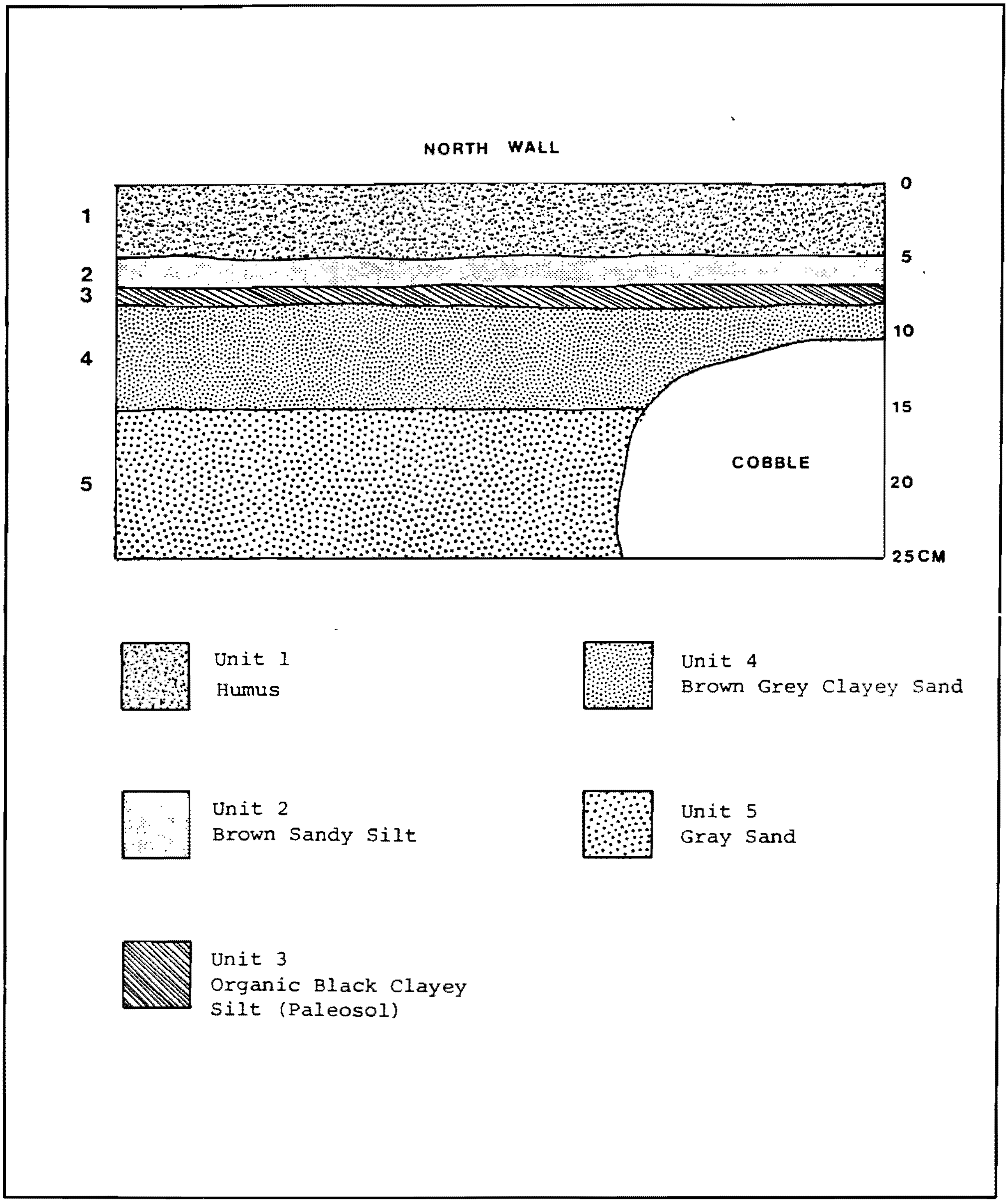


Figure 21.

Soil profile UA80-75 (TLM 028), test 1, locus A.

3.2.1.9 - Site UA80-76, State Number TLM 029

Area: Survey Locale 14

Area Map: Figure 100; Survey Locale Map: Figure 118

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 414800 Northing 6964900

Latitude 62°48'25" N., Longitude 148°40'20" W.

T. 31 N., R. 4 E., Seward Meridian

Sec. 3, SE¼SE¼NE¼

Site Map: Figure 22; Soil Profile: Figure 23

Setting: The site is located on the south side of the Susitna River at the mouth of an unnamed stream which joins the Susitna from the east, approximately 4 km upriver from the mouth of Fog Creek (Figure 100). The site is approximately 200 m south of site UA80-74 and is situated on the edge of an alluvial terrace on the south side of the stream at a point where the direction of the ridge changes from a north-south to an east-west orientation (Figure 118). The elevation of the site above the level of the river is approximately 30 m and both the stream mouth and the knoll upon which site UA80-74 is located are in view. The Susitna River is approximately 150 m west of the site and the deep, fast flowing stream lies approximately 100 m to the north. Both the Susitna River and the stream are visible and easily accessible from the site. The view to the east is restricted by the terrace in that direction. Views in all other directions encompass the terrain immediately accessible from the site with some visual restriction due to fairly dense black spruce. The primary orientation of the site is to the northwest overlooking the stream and stream mouth. Sign of moose (Alces alces) and other game is abundant and a well used game trail crosses the site. Vegetation at the site includes scattered birch, black spruce, high bush cranberry, Labrador tea, blueberry, sphagnum moss, and lichens. Surrounding vegetation varies between dense and open lowland spruce-hardwood forest with some white spruce and alder in the vicinity of the stream mouth. Sphagnum moss is thick near the stream and there are several moss-covered bedrock outcrops adjacent to the stream channel approximately 100 m upstream from the mouth.

Phase I Testing: There is no surface indication of the site on this terrace, and cultural material was revealed by a shovel probe (test 1). A total of five subsurface tests were excavated, four of which were on the terrace and one on a bench above the terrace (Figure 22). Only test 1 produced cultural material. A total of 224 flakes were excavated from test 1 which exposed a portion of a large flake scatter 14 to 34 cmbs (Figure 23). The stratigraphy of the site is somewhat distorted by solifluction, however, the flakes seem to be associated with a light orange silty clay stratigraphic unit mottled with grey ash (Figure 23, unit 3). This grey ash appears to be similar in color and texture to the grey ash (Figure 23, unit 4) associated with the artifacts from the lowest cultural level at site UA80-74. Unfortunately no datable radiocarbon samples were obtained at either site and further testing will be required to clarify their temporal and spacial relationship. Three distinct lithic types were represented in the flakes from test 1: basalt, light brown chert, and translucent chalcedony. The majority of flakes are basalt, 10 are chert, and one is chalcedony. The frequency and lithic diversity of flakes from test 1 suggests the site may be more extensive than initial testing indicates.

Collected Artifact Inventory

213 Black basalt flakes
10 Light brown chert flakes
1 Translucent chalcedony flake

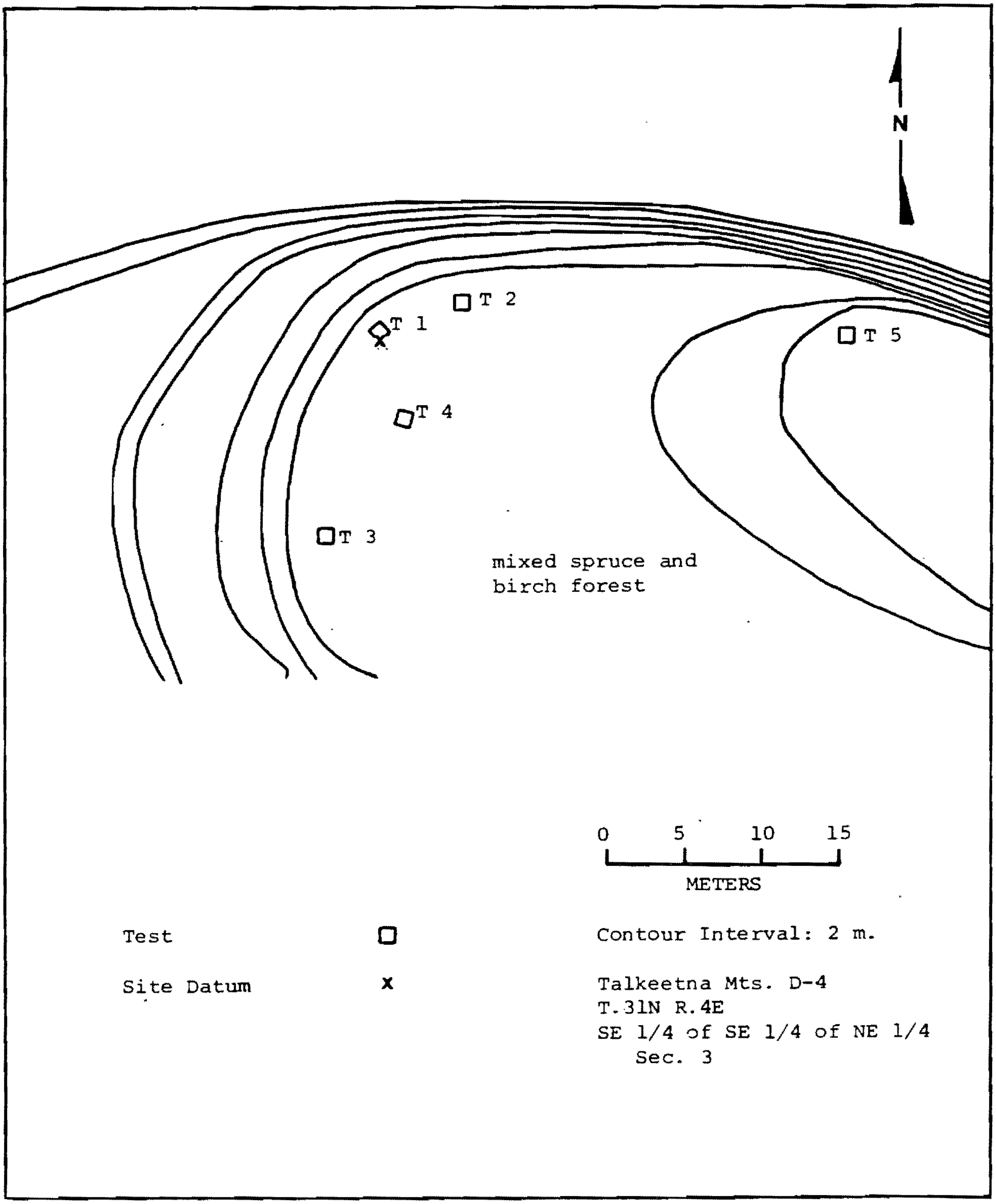


Figure 22.

Site map UA80-76 (TLM 029).

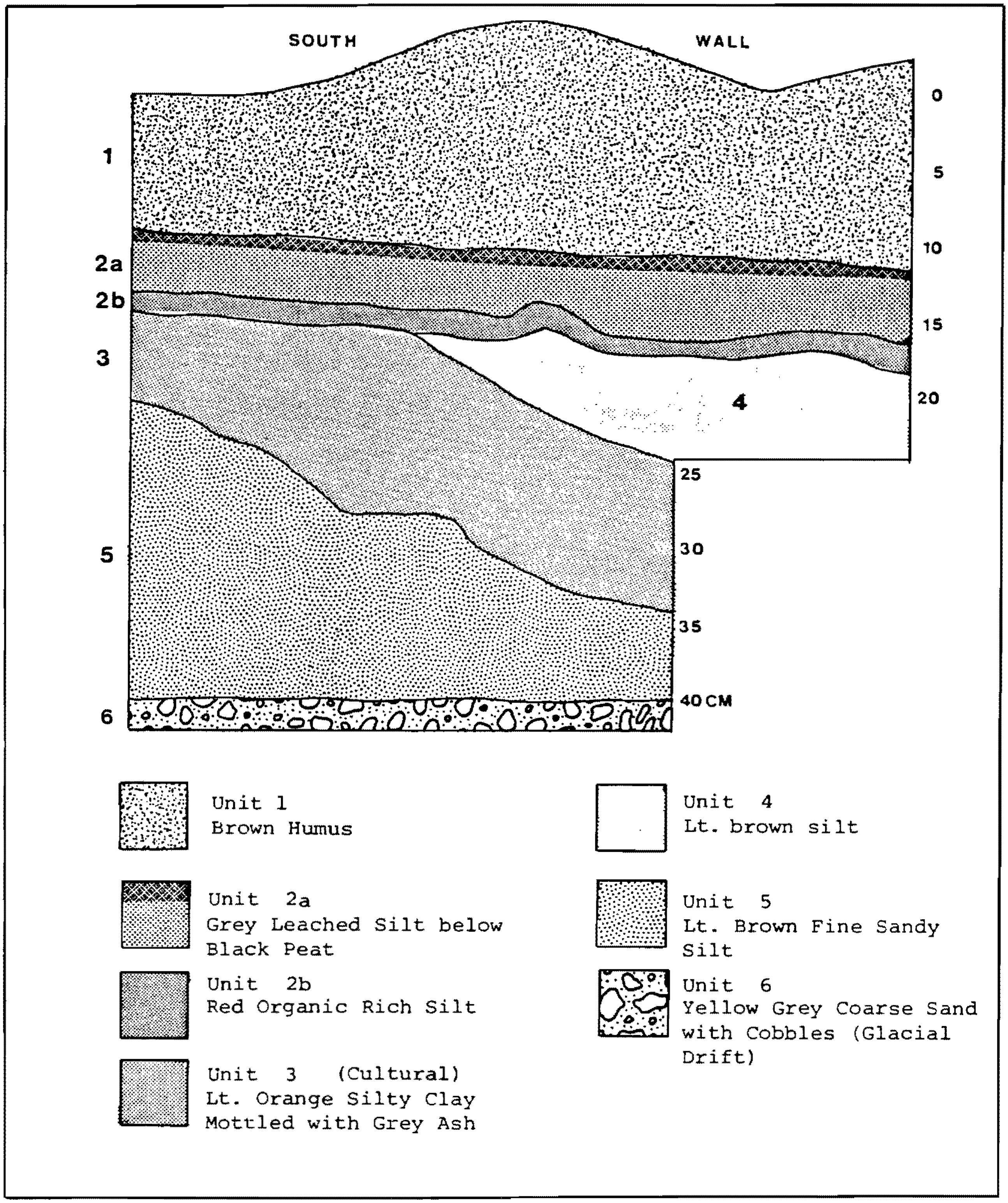


Figure 23

Soil profile UA80-76 (TLM 029), test 1.

3.2.1.10 - Site UA80-77, State Number TLM 030

Area: Survey Locale 13
Area Map: Figure 100; Survey Locale Map: Figure 117
USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 413350 Northing 6961400

Latitude 62°46'15" N., Longitude 148°41'50" W.

T. 31 N., R. 4 E., Seward Meridian
Sec. 15, SW¼NW¼SW¼

Site Map: Figure 24; Soil Profile: Figures 25 and 26

Setting: The site is located at an elevation of 457 m (1500 feet asl) on the south margin of Fog Creek approximately 900 m upstream from the confluence of Fog Creek and the Susitna River (Figure 117). Situated on the point of an alluvial terrace, the site is approximately 46 m above Fog Creek and overlooks the deeply incised bedrock canyon through which Fog Creek emerges to join the Susitna River. Fog Creek drains a large area including the Fog Lakes region and is a major tributary of the Susitna River. Below the site the creek is shallow with braided channels and is approximately 10 m wide. The site occupies the rounded bend of a continuous terrace where it changes from an east-west orientation, parallel to Fog Creek, to a north-south orientation parallel to the Susitna River. East of the site the terrace joins a ridge which rises parallel to Fog Creek. West of the site the terrace edge drops off steeply for 30 m to a broad, relatively flat alluvial flood plain. The view from the site is primarily northeast up Fog Creek and west down Fog Creek to its mouth, encompassing a distance of approximately 1.5 km. Visibility in other directions is limited by the terrain and dense spruce forest. Both Fog Creek and the Susitna are easily accessible from the site. A deeply incised game trail traverses the terrace on which the site is located and continues up the ridge east of the site. A recent moose (_Alces alces_) kill is located on the alluvial plain immediately below the site where a grizzly bear (_Ursus arctos_) has partially eaten and buried an adult moose (_Alces alces_). Scattered spruce and birch are present at the site but do not block the view. Low bush cranberry, blueberry, Labrador tea, mosses, and lichens form the principal ground vegetation. The surrounding vegetation is a relatively dense lowland spruce-hardwood forest with white spruce and alder present along the creek.

Phase I Testing: The site contains both surface and subsurface cultural material. Artifacts are eroding out of the game trail that traverses the site. A complete side-notched basalt projectile point (UA80-77-520; Figure 80, h) was surface collected from the trail. Flakes observed along the game trail were left in place, and total of five tests were excavated at the site, four of which produced cultural material (Figure 24). Only test 2, placed on a bench below the main terrace near the surface flake scatter, did not produce cultural material. All tests on the main terrace produced cultural material, and it appears that the site occupies an area at least 20 m square including portions of the terrace several m from the edge. Over 500 flakes and 6 tools are represented in the artifact assemblage, and radiocarbon determinations and stratigraphy from tests 1 and 4 suggest that the site may be multicomponent.

Test 1 (Figure 24) produced 356 flakes, a complete side-notched basalt biface (UA80-77-327; Figure 80, b) and a slightly concave base of a side-notched chert projectile point (UA80-77-89; Figure 80, a). The artifacts from test 1 (Figure 24) appear to be associated with a light grey volcanic ash (unit 2b and 2c; UA80-77-539) and an orange brown pebbly silt (unit 4) at a depth of 10 to 17 cmbs. A radiocarbon determination of 2310 ± 220 years B.P.: 360 B.C. (DIC-1877) was obtained on charcoal (UA80-77-1a) 10 to 13 cmbs in test 1 (Figure 25). Test 3 (Figure 24) produced 105 flakes, three basalt blade fragments (UA80-77-427, 428, and 429; Figure 80, c and d), two of which articulate to form the proximal portion of a blade, a basalt blade core fragment (UA80-77-430; Figure 80, e) and a large black argillite blade-like flake (UA80-77-437; Figure 80, f). In addition, three possible fire-cracked rock fragments (UA80-77-434, 435 and 436) were found in association with the artifacts from test 3. Cultural material from test 3 was excavated between 16 to 21 cmbs from light brown silt and dark grey volcanic ash. Solifluction has distorted the stratigraphy, and the silt and ash units lie directly above glacial drift. Test 4 (Figure 24) produced 65 flakes 25 to 28 cmbs apparently associated with charcoal (UA80-77-2a) from which a radiocarbon determination of 4720 ± 130 years B.P.: 2770 B.C. (DIC-1880) was obtained. A whitish grey volcanic ash (Figure 26, unit 5) is 9 cm above the charcoal, and a sample of this ash was collected (UA80-77-538). Test 5 (Figure 24) produced two flakes and a retouched flake (UA80-77-517; Figure 80, g) at 20 to 22 cmbs. Lithologies represented at the site include basalt, reddish-brown, brown and grey chert, argillite, tuff and tuffacious rhyolite. This site has produced the highest frequency of diagnostic artifacts of any site discovered to date within the impoundment limit of the Susitna Hydropower Project. Radiocarbon dates from two charcoal concentrations (tests 1 and 4) may possibly suggest that this site is multicomponent, however further testing will be required to clarify the relationship of the two radiocarbon determinations and to ascertain the temporal and spacial extent of the site.

Collected Artifact Inventory

Surface:

1 Grey basalt side-notched projectile point (complete)

Subsurface:

482 Black basalt flakes
17 White tuff flakes
12 Light brown tuffacious rhyolite flakes
1 Grey chert flake
1 Reddish-brown chert flake
1 Brown chert flake
1 Black basalt retouched flake
1 Reddish-brown chert side-notched projectile point base
1 Black basalt side-notched biface
1 Black basalt blade core fragment
3 Black basalt blade fragments
1 Black basalt blade-like flake
3 Fire-cracked rock fragments
2 Ash samples
2 Charcoal samples

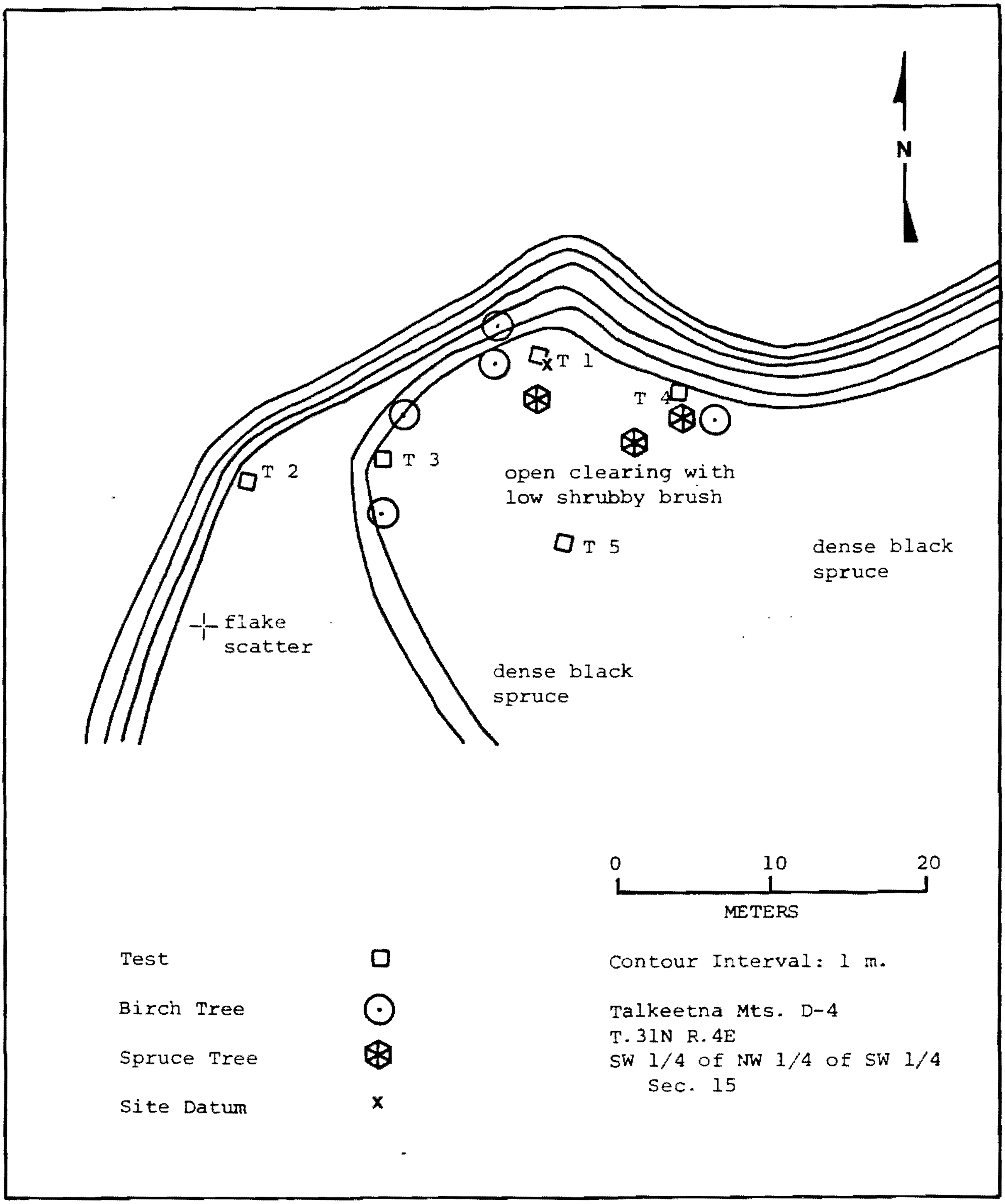


Figure 24.

Site map UA80-77 (TLM 030).

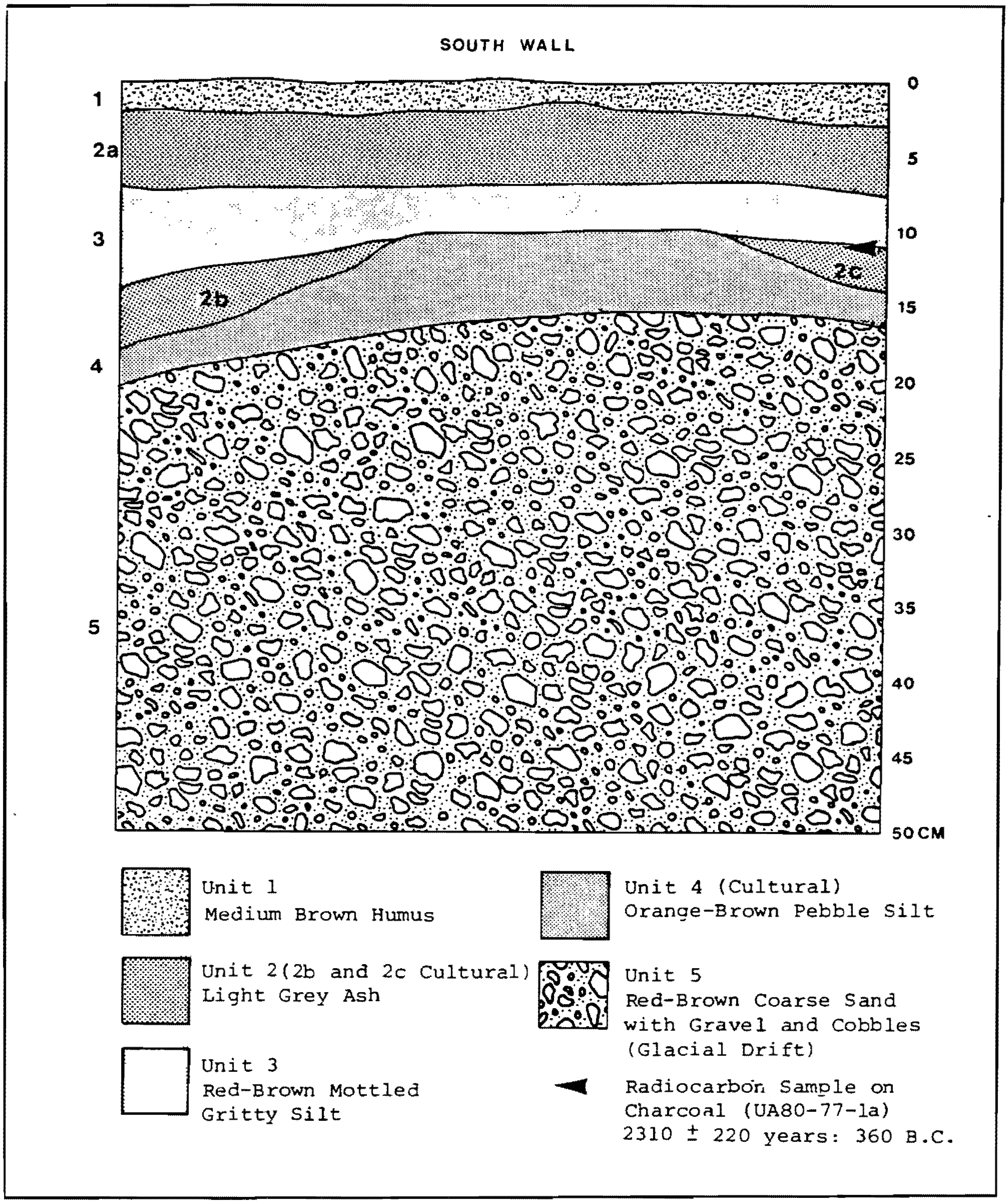


Figure 25.

Soil profile UA80-77 (TLM 030), test 1.

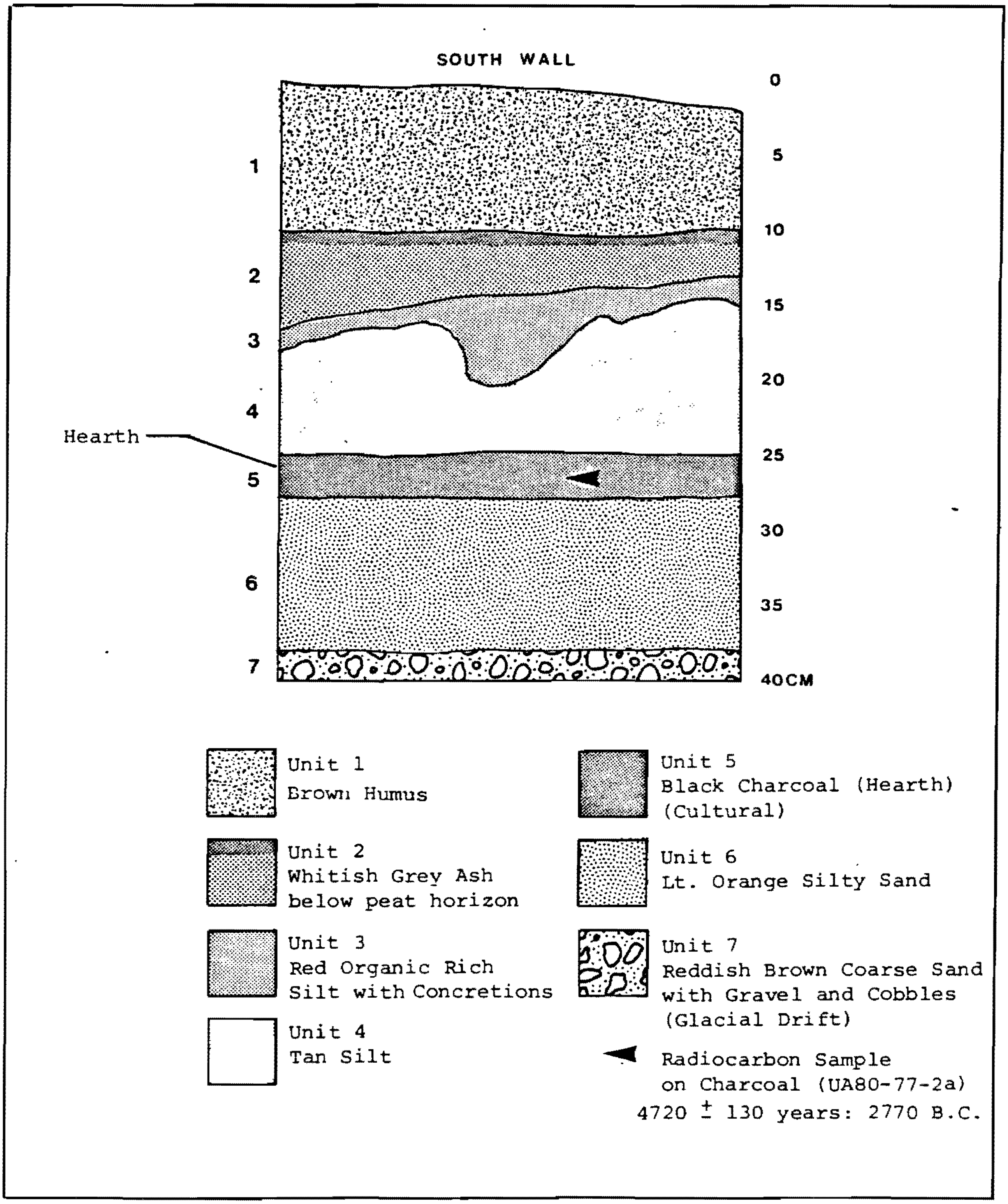


Figure 26.

Soil profile UA80-77 (TLM 030), test 4.

3.2.1.11 - <u>Site UA80-78, State Number TLM 031</u>

Area: Survey Locale 30
Area Map: Figure 101; Survey Locale Map: Figure 136
USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 448900 Northing 6963700

Latitude 62°48'02" N., Longitude 148°00'20" W.

T. 31 N., R. 8 E., Seward Meridian
Sec. 5, NW¼SE¼SW¼

Site Map: Figure 27; Soil Profile: Figure 28

Setting: The site is located on a high plateau on the north side of the Susitna River approximately 4 km downriver from the mouth of Kosina Creek (Figure 136). A 1.5 km wide valley separates this plateau from higher mountains to the north. The site is situated approximately 274 m (900 feet) above the level of the river at an elevation of 823 m (2700 feet asl), in a system of hills and ridges surrounding several small kettle lakes. The site is located on the eastern end of the southernmost ridge in this locale, approximately 300 m east of the largest of three kettle lakes which lie to the west of the site (Figure 136). The Susitna River is approximately 1.7 km southwest, and although visible from the site, is not easily accessible from it. The site appears to be oriented towards the local accessible terrain rather than the river. The principal view is to the east and south. The terrain in the vicinity of the site is glacially scoured kettle and kame topography. Vegetation at the site consists of low brush with scattered stands of black spruce. Bedrock is exposed on the ridge and, where not exposed, is generally within 20 cm of the surface. Most ridges in the vicinity are subject to deflation and there is little soil or vegetation along their crests. At lower elevations, off the ridges, vegetation consists of denser stands of black spruce, sphagnum moss, and muskeg. In the Susitna Valley to the south, the vegetation is an upland spruce-hardwood forest.

Phase I Testing: A black chert endscraper (UA80-78-1; Figure 81, a) was surface collected during reconnaissance along this ridge system. No other artifacts were observed on the surface although a black chert pebble fragment (UA80-78-2) of similiar lithology was surface collected in the vicinity. A total of three tests were excavated at the site, none of which produced subsurface cultural material (Figure 27). Test 1, (Figure 27) in the immediate vicinity of the endscraper, revealed the soil deposition on the ridge to be 20 cmbs. A total of seven archeological sites were found situated on ridges and knolls within the same topographic setting (Survey Locale 30) as site UA80-78. Other sites within a 1 km radius of site UA80-78 are UA80-79, UA80-143, and UA80-144. Each of these sites is located in an area of high topographic relief offering a panoramic view of the surrounding terrain. The plateau encompassed by Survey Locale 30 was probably utilized prehistorically as hunting terrain and contains the highest concentration of sites found to date in the vicinity of the impoundment area. However, the deflated character of the terrain may bias sampling in this area because sites are naturally exposed and consequently highly visible. Initial reconnaissance and testing at UA80-78 suggests that this surface site may be limited to an isolated find not associated with other cultural material. However, further reconnaissance and testing are required before this can be confirmed.

Collected Artifact Inventory

1	Black chert endscraper
1	Black chert pebble

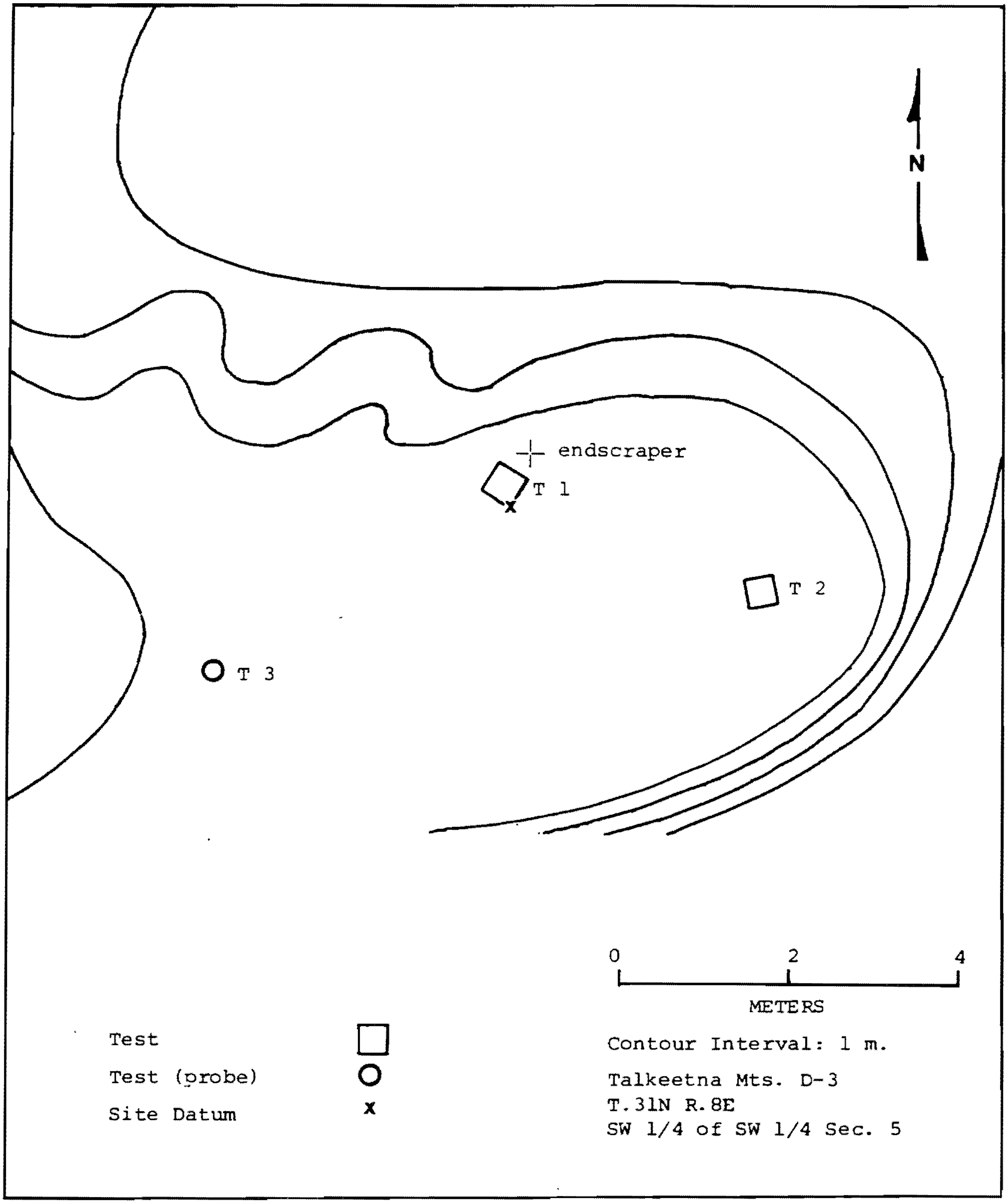


Figure 27.

Site map UA80-78 (TLM 031).

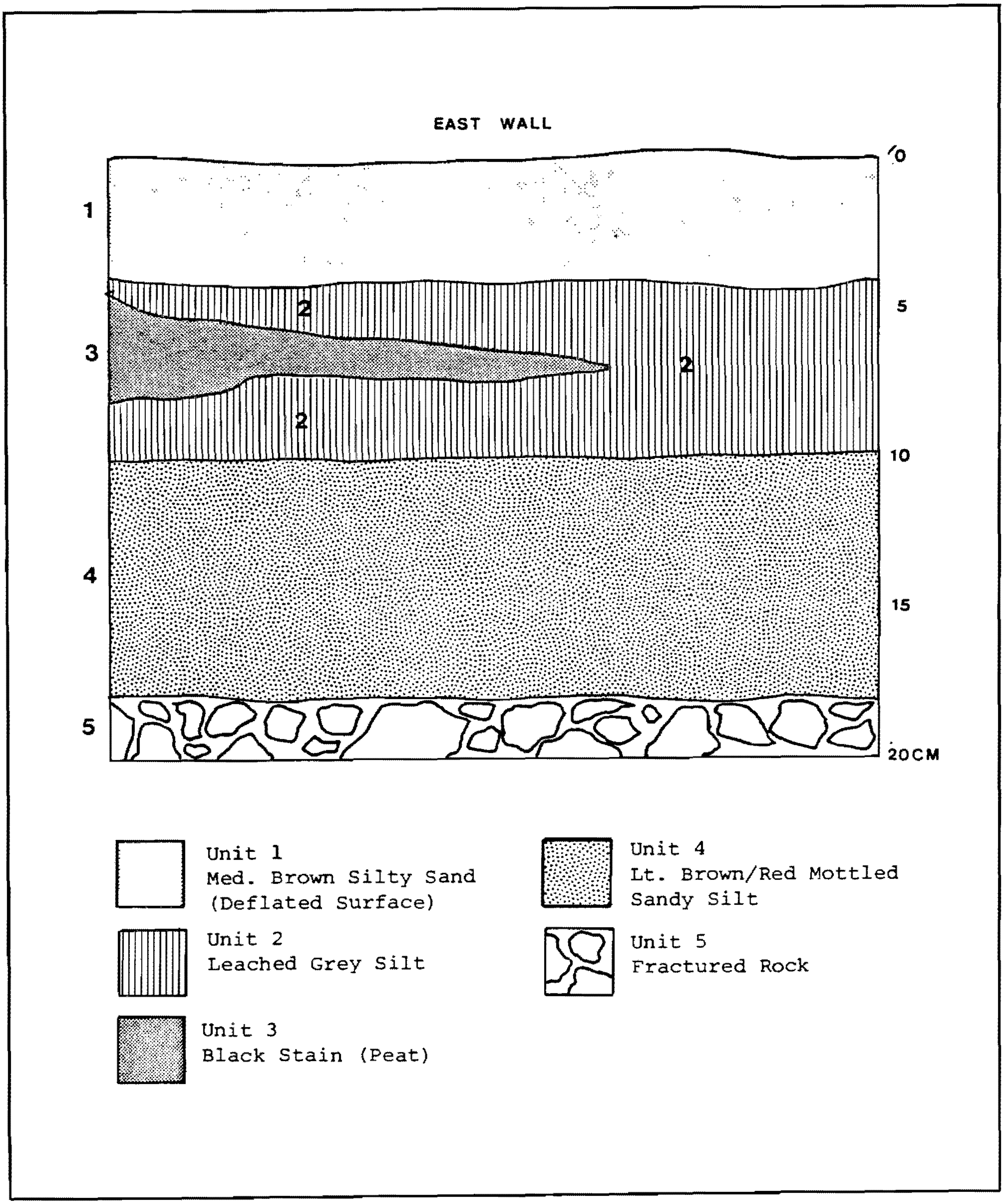


Figure 28.

Soil profile UA80-78 (TLM 031), test 1.

3.2.1.12 - Site UA80-79, State Number TLM 032

Area: Survey Locale 30

Area Map: Figure 101; Survey Locale Map: Figure 136

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 448200 Northing 6963500

Latitude 62°47'58" N., Longitude 148°01'05" W.

T. 31 N., R. 8 E., Seward Meridian

Sec. 6, SW¼SE¼SE¼

Site Map: Figure 29; Soil Profile: Figure 30

Setting: The site is located on a high plateau on the north side of the Susitna River approximately 4 km downriver from the mouth of Kosina Creek (Figure 136). A 1.5 km wide valley separates this plateau from higher mountains to the north. Located approximately 274 m (900 feet) above the level of the river at an elevation of 823 m (2700 feet asl), the site is situated in a system of hills and ridges surrounding several small kettle lakes. Six other sites were identified in this topographic context. This site is located approximately 200 m south of the southern point of the largest of three kettle lakes at the eastern end of the plateau (Figure 136). The only other known site within 1 km is site UA80-78, which is located to the northeast in similar topography, although separated from the lakes by an intervening ridge. Site UA80-79 is situated on a point of high relief at the eastern end of an 80 m long discrete ridge which is part of a longer east-west trending ridge system which slopes steeply to a small lake 150 m to the east. However, the lake is not visible from the site. The ridge upon which the site is located is one of numerous glacially abraded ridges characteristic of this high plateau. The largest of the kettle lakes is 200 m northeast of the site (approximately six hectares in size) and is 30 m lower in elevation and easily accessible from the site. Evidence of terracing approximately 3 m above the present level of the lake suggests former higher lake levels. Most of the margin of this large lake and another lake 500 m north of the site is visible from the site although the westernmost point of the largest lake and portions of the smaller lake are obscured by intervening topography. The view from the site is panoramic, but the view to the south is restricted by the rounded crest of the ridge line. The site location is unique, in that it is the point of highest topographic relief in the immediate vicinity of the largest of the three kettle lakes from which most of the lake is visible. To the east the Susitna River valley and portions of the river are visible, however, the site appears to be oriented toward the local accessible terrain. Due to its location on the deflated ridge crest among exposed bedrock outcrops, vegetation is limited to dwarf birch, willow shrubs, and low bush berries including cranberry, blueberry, and crowberry among others. A few scattered black spruce occur on the ridges, but are more numerous in the areas of low relief between ridges where alders, willows, and shrubs become denser. The terrain around the lakes is gently sloping to the shorelines where marshy areas covered with grasses and sedges are present along the lake margins.

Phase I Testing: The site is a six square m surface lithic scatter exposed among bedrock outcrops (Figure 29). The scatter is unique among surface sites discovered during the 1980 survey because it contains a high proportion of tools in comparison to flakes. All observed surface artifacts were collected. A single test in the immediate vicinity of the scatter (Figure 29, test 1) did not produce subsurface cultural material. A total of 12 artifacts were surface collected in the vicinity of this test (Figure 29). Several specimens were also collected that were subsequently determined to be non-cultural. Cultural material collected at the site includes six flakes, a white chalcedony core fragment, two chert pebble fragments, a quartzite endscraper (UA80-79-1; Figure 81, b), a quartzite endscraper (UA80-79-8; Figure 81, d), a retouched rhyolite flake (UA80-79-2; Figure 81, c) and a "notched" cobble that exhibits battering on one end (UA80-79-16; Figure 82). Lithologies represented at the site are diverse and include chalcedony, quartzite, basalt, red and black chert, and a distinctive blue-green chert.

Collected Artifact Inventory

Note: Surface artifacts are keyed to site map (Figure 29).

# on Key		
1	1	Quartzite endscraper
2	1	Grey rhyolite retouched flake
3	1	Quartzite rock
4	1	Grey rhyolite rock
5	1	Grey quartzite rock
6	1	Black chert pebble fragment
7	1	Yellow brown rhyolite rock fragment
8	1	Quartzite endscraper
9	1	Blue-green chert flake
10	1	Quartzite flake
11	1	Quartzite flake
12	1	White chalcedony core fragment
13	1	Red chert pebble
14	1	Black basalt flake
15	1	Black basalt flake
16	1	Basalt notched cobble

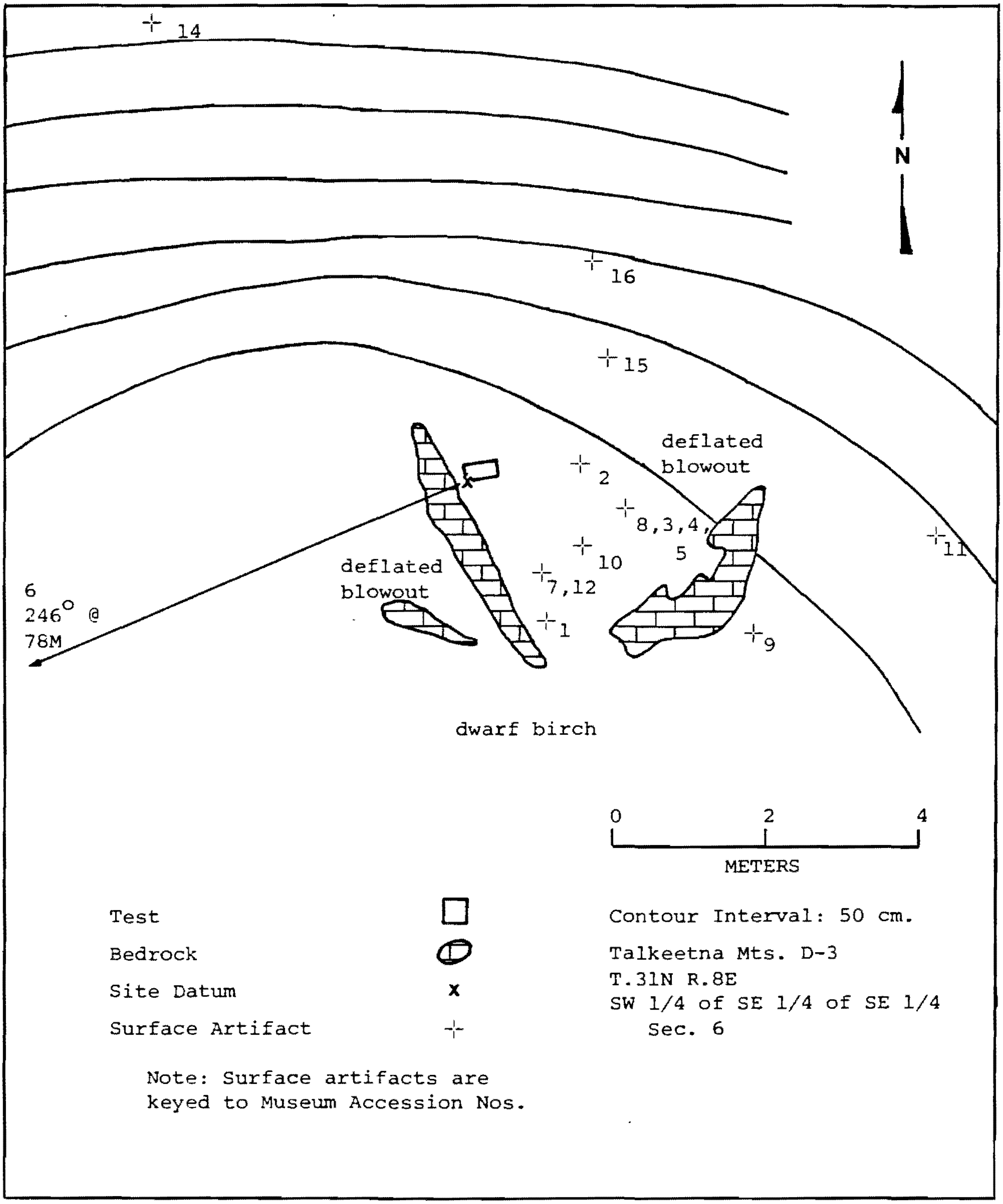


Figure 29.

Site map UA80-79 (TLM 032).

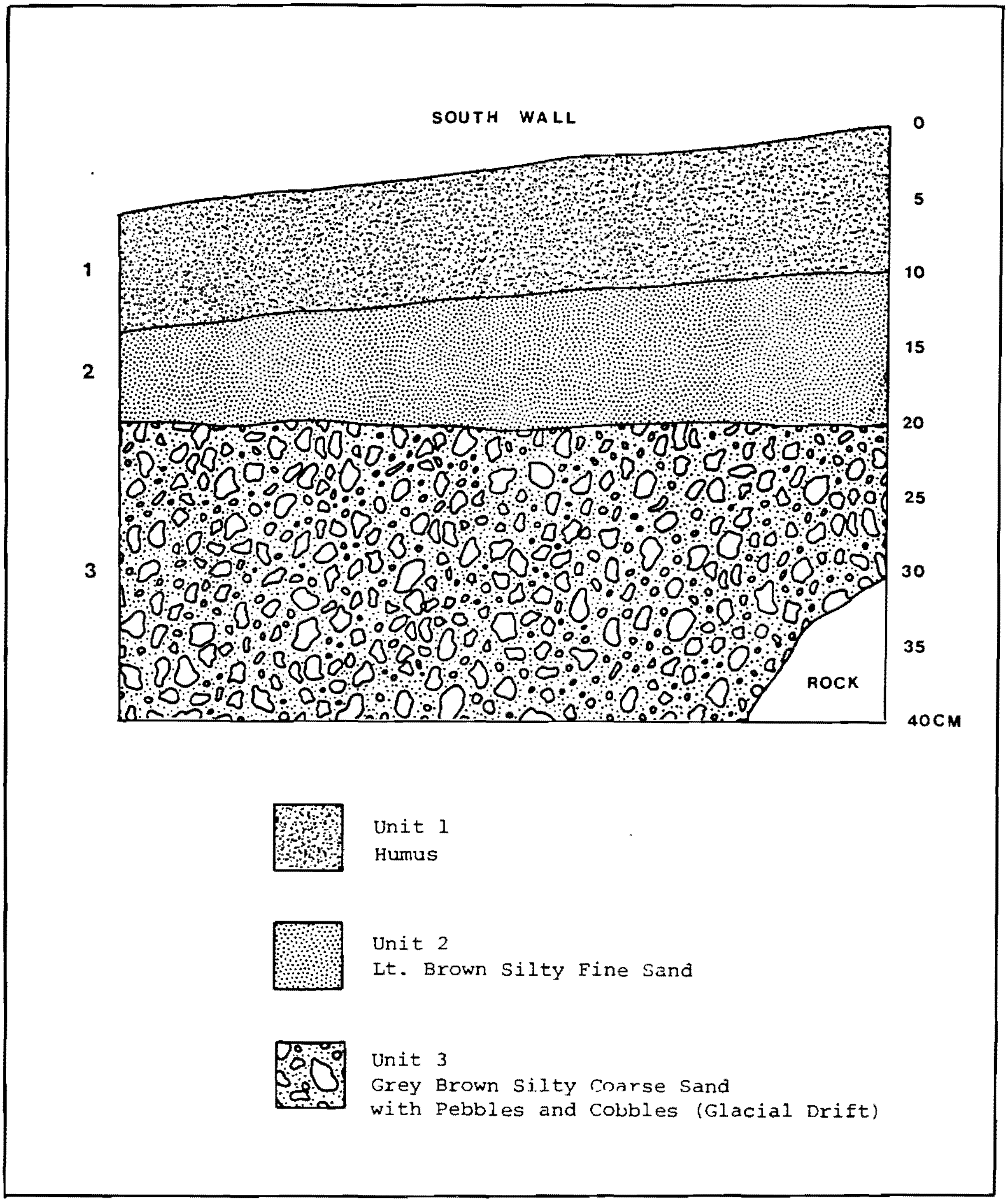


Figure 30.

Soil profile UA80-79 (TLM 032), test 1.

3.2.1.13 - Site UA80-80, State Number TLM 033

Area: Survey Locale 31

Area Map: Figure 101; Survey Locale Map: Figure 140

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 448250 Northing 6961950

Latitude 62°47'10" N., Longitude 148°00'52" W.

T. 31 N., R. 8 E., Seward Meridian

Sec. 7, SE¼SE¼SE¼

Site Map: Figure 31; Soil Profile: Figure 32

Setting: The site is near the outlet of a small lake located 400 m north of the Susitna River approximately 4 km downriver from the mouth of the Kosina River (Figure 140). Situated on the point of a flat terrace approximately 200 m northeast of the mouth of the outlet stream, the site overlooks the stream drainage to the northwest and west. Located at an elevation of 549 m (1800 feet asl), the site is approximately 30 m higher than the river and higher than most of the terrain in the immediate vicinty. The site is at the western point of a continuous terrace which lies south and parallel to the lake outlet stream and extends approximately 400 m northeast toward the lake outlet. The level, open, well-drained edge of the terrace forms a natural route for pedestrian travel from the lake to the mouth of the outlet stream. A second lower terrace exists approximately 20 m below and south of the site and there is evidence of additional terraces between the site and the river. The view from the site is best to the west and northwest overlooking the next lower terrace and the stream drainage, although the stream and its confluence with the Susitna are not visible. Visibility in other directions is restricted by topography and trees. The lake to the east of the site is not visible although it and the stream are easily accessible from the site. The immediate area around the site is relatively flat and open with scattered spruce and birch growing on the terrace edge. Ground vegetation consists of a mat of lichens and mosses with some low bush cranberry and dwarf willows. Spruce trees increase in number in all directions from the site. High brush, aspen, and birch also become dense away from the terrace edge and the slopes below the terrace. With respect to known sites in the upper Susitna Valley this site location is unique due to its proximity to lake outlet and stream confluence and its position on a point of high relief overlooking a stream drainage and lower terrace.

Phase I Testing: There is no surface indication of a site at this location, however a shovel probe (test 1) exposed a brown chert biface fragment (UA80-80-1; Figure 81, e) at the contact between two silt units (Figure 32, unit 3 and 4) 13 cmbs. A total of four tests were excavated along the terrace edge near the point of the terrace (Figure 31) but no further cultural material was recovered.

Collected Artifact Inventory

1 Dark brown chert biface fragment

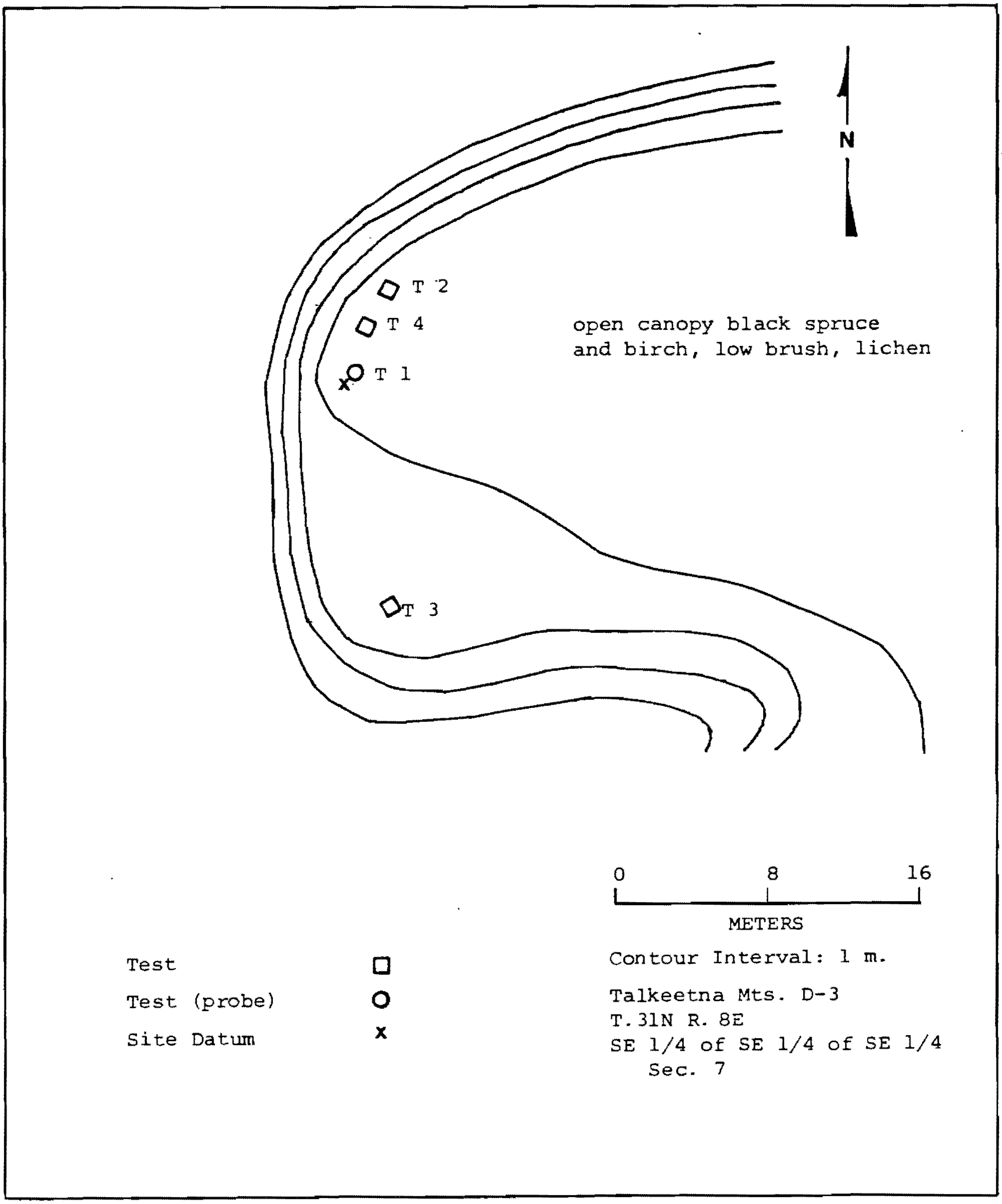


Figure 31.

Site map UA80-80 (TLM 033).

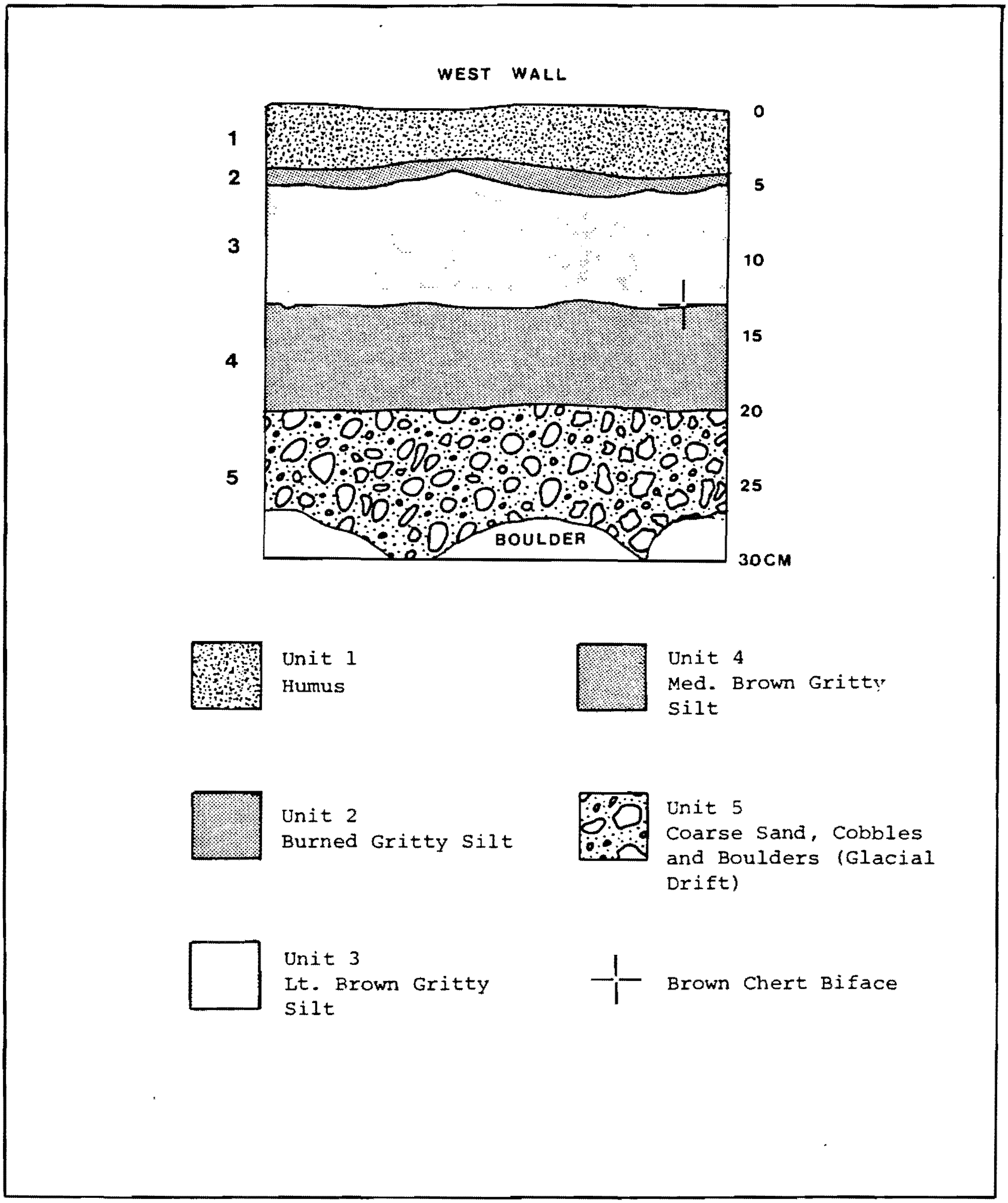


Figure 32.

Soil profile UA80-80 (TLM 033), test 1.

3.2.1.14 - Site UA80-141, State Number TLM 034

Area: Survey Locale 11

Area Map: Figure 100; Survey Locale Map: Figure 115

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 411750 Northing 6960400

Latitude 62°45'57" N., Longitude 148°43'45" W.

T. 31 N., R. 4 E, Seward Meridian

Sec. 21, NW¼SW¼NW¼

Site Map: Figure 33; Soil Profile: Figure 34

Setting: The site is located on the west side of the Susitna River approximately 1.5 km downriver from the mouth of Fog Creek and 600 m upriver from a sharp westward bend of the Susitna (Figure 100). Situated approximately 200 m west of the river margin at an elevation of 427 m (1400 feet asl), the site is located on an east-west ridge 30 m east of the junction of the ridge with a higher terrace. A small pond, 10 m lower in elevation, is located approximately 30 m northeast of the site (Figure 115). The site rests on a small, open, relatively flat location on the crest of the ridge from which the terrain slopes down 30° to the southwest, dropping 20 m to a broad alluvial river terrace. The ridge continues to the northeast bending around the pond. To the west the ridge terminates, joining with a slope at an elevation of approximately 40 m above the Susitna River. A game trail follows the crest of the ridge with side slopes ranging from 20° to 30° and ending on alluvial fans on either side of the ridge. Vegetation at the site location is sparse, limited to bog blueberry, sphagnum moss, and lichen. Scattered black spruce and birch grow on the slopes of the ridge and dense forests of predominantly black spruce occur to the north and south of the site. To the west, a stand of birch marks the termination of the ridge at which point it joins an uphill slope.

Phase I Testing: No cultural material was found on the surface at the site location. A shovel probe (test 1) produced the proximal end of a pale yellow rhyolite blade-like flake 6 cmbs in an orange-brown mottled silt directly under the humus (Figure 34, unit 2). A flake of similar lithology was found 11 cmbs in the same silt unit. A second test (test 2) did not reveal additional cultural material (Figure 33). Additional shovel probes along the ridge system away from the immediate vicinity of the site did not produce additional artifacts, and the site appears to be limited to the immediate area of test 1. Additional surface reconnaissance and shovel probes along the ridge and further subsurface testing at the site will be required to define site size.

Collected Artifact Inventory

1 Pale yellow rhyolite blade-like flake (proximal end)

1 Pale yellow rhyolite flake

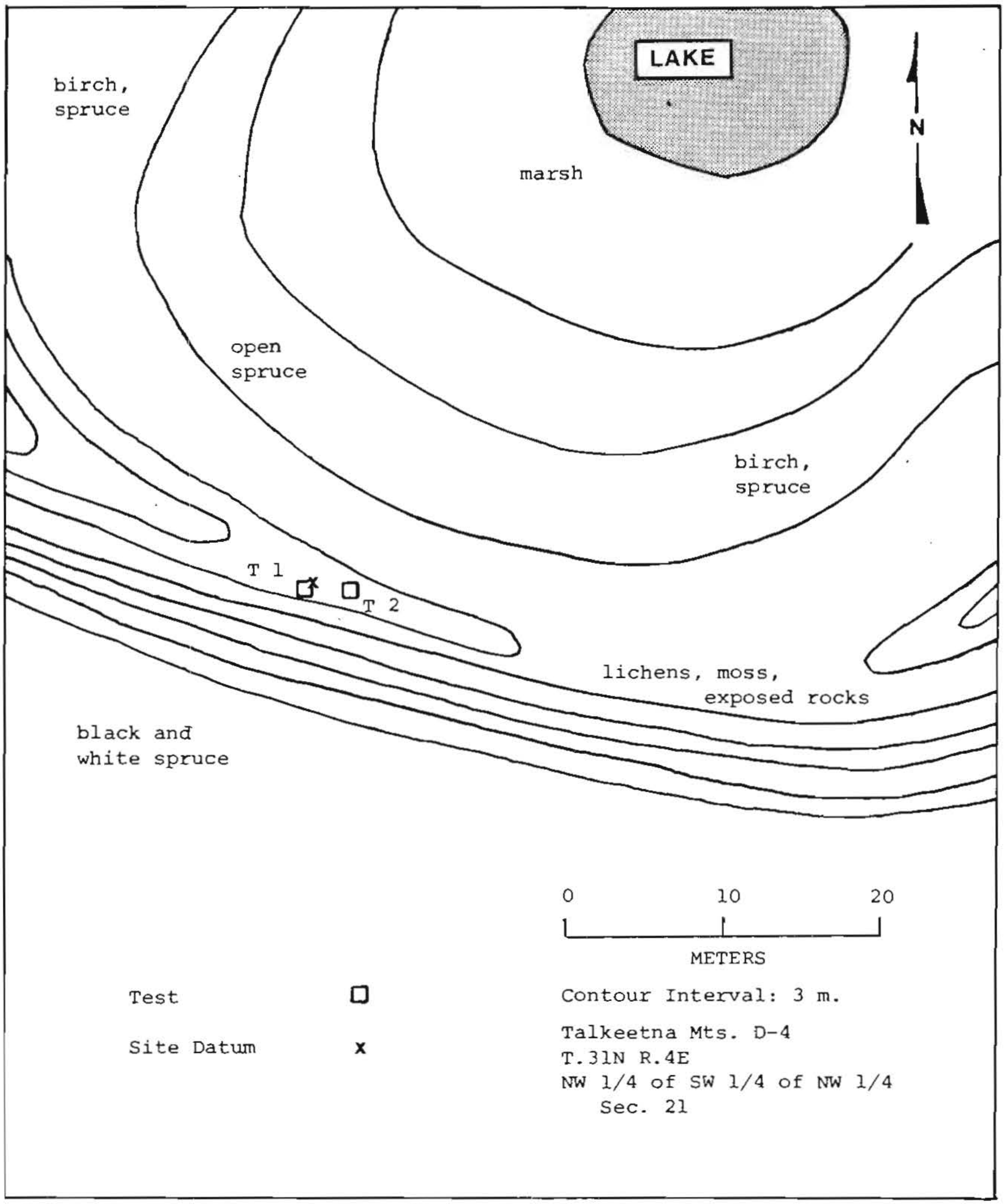


Figure 33.

Site map UA80-141 (TLM 034).

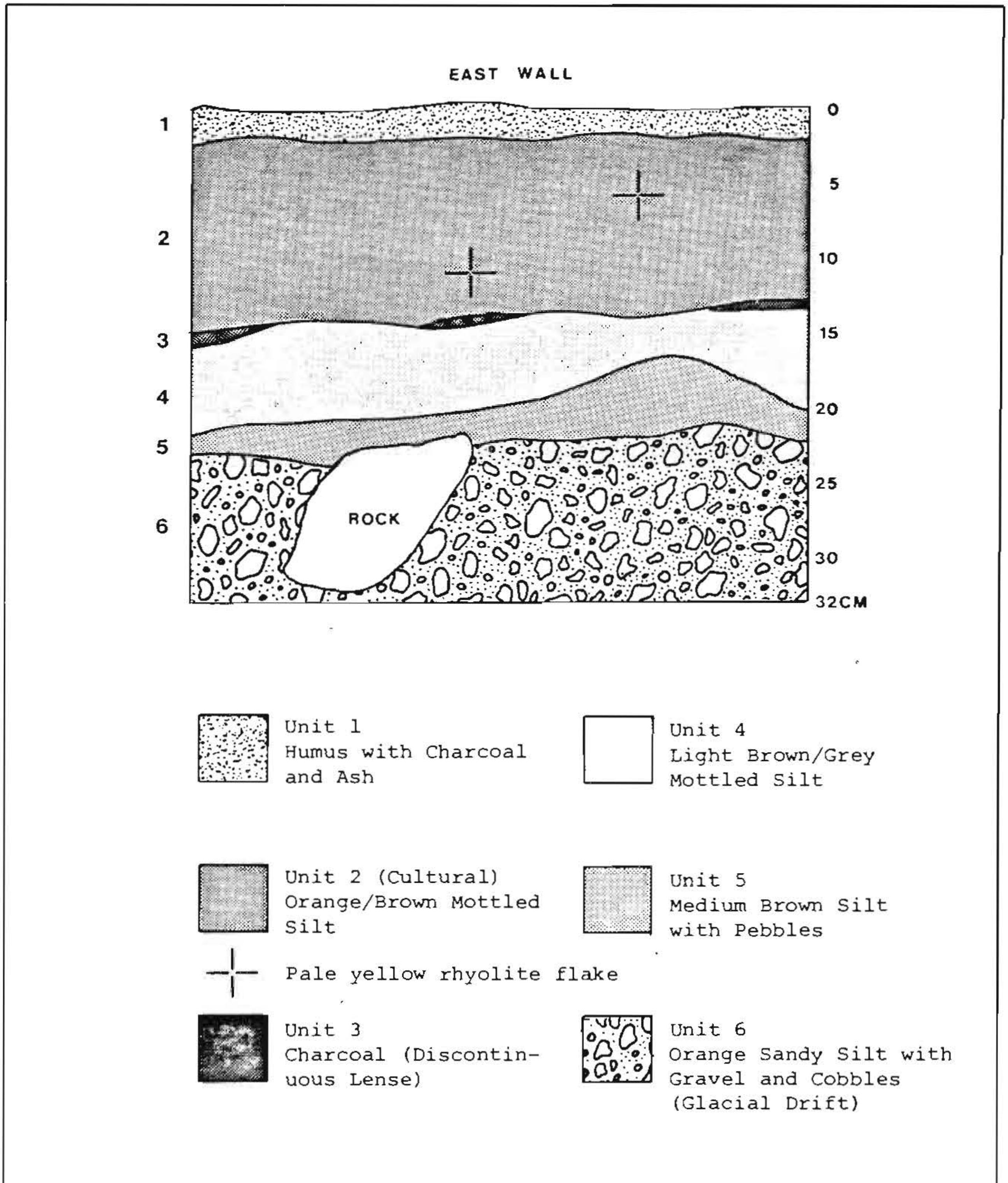


Figure 34.

Soil profile UA80-141 (TLM 034), test 1.

3.2.1.15 - Site UA80-142, State Number TLM 035

Area: Borrow E

Area Map: Figure 100; Location Map: Figure 173

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 418050 Northing 6967500

Latitude 62°49'52" N., Longitude 148°36'28" W.

T. 32 N., R. 5 E., Seward Meridian

Sec. 30, SW¼NW¼SE¼

Site Map: Figure 35; Soil Profile: Figure 36

Setting: The site is located on the west side of Tsusena Creek approximately 1 km upstream from its mouth (Figure 173). Situated on the rounded point of a high river terrace approximately 300 m west of Tsusena Creek, the site overlooks the Tsusena Creek drainage. The elevation of the terrace is 488 m (1600 feet asl) which is approximately 30 m above Tsusena Creek and 61 m above the Susitna River. The terrace is continuous for 100 m north and 50 m west of the site where it blends into surrounding slopes. Ridges to the north and west rise to over 610 m (2000 feet asl). Except for isolated openings in the tree cover, the view in all directions is severely restricted by the existing vegetation, however, with decreased vegetation denseness good visibility of up to 2 km eastward across Tsusena Creek, 1 km southward to the Susitna River, and along the Susitna westward for 4 km would be possible. The view to the north is blocked by an ascending ridge behind the site. Both the Susitna River and Tsusena Creek are in view and easily accessible, although the site appears to be oriented more toward Tsusena Creek. A well used game trail runs along the edge of the terrace traversing the site location. Scattered spruce and birch are found on the rounded, gradually sloping terrace with an understory including low bush cranberry, blueberry, Labrador tea, bearberry, sphagnum moss and lichen. Below the site spruce become denser and there are stands of birch. Wet marshy areas exist below the site and dryer, more tundra-like areas characterize the ridge system above the site.

Phase I Testing: A total of three subsurface tests were excavated at the rounded point of the terrace (Figure 35). There is no surface indication of a site at this location, however, shovel probe 3a (test 1) produced a pale yellow rhyolite flake 3 cmbs at the contact between a dark brown silt and a grey silt (Figure 36, unit 2 and 3). A second shovel probe (test 2) to the north of test 1 produced an additional basalt flake. Test 3 did not produce cultural material. A basalt rock fragment subsequently determined not to be culturally modified was also collected from test 1. Very little can be said concerning site function(s), spacial extent or temporal placement without further testing. Cultural material of two lithologies, from tests 10 m apart, although limited to only two flakes, may indicate that the site could be fairly extensive.

Collected Artifact Inventory

1 Pale yellow rhyolite flake
1 Grey basalt flake
1 Grey basalt rock

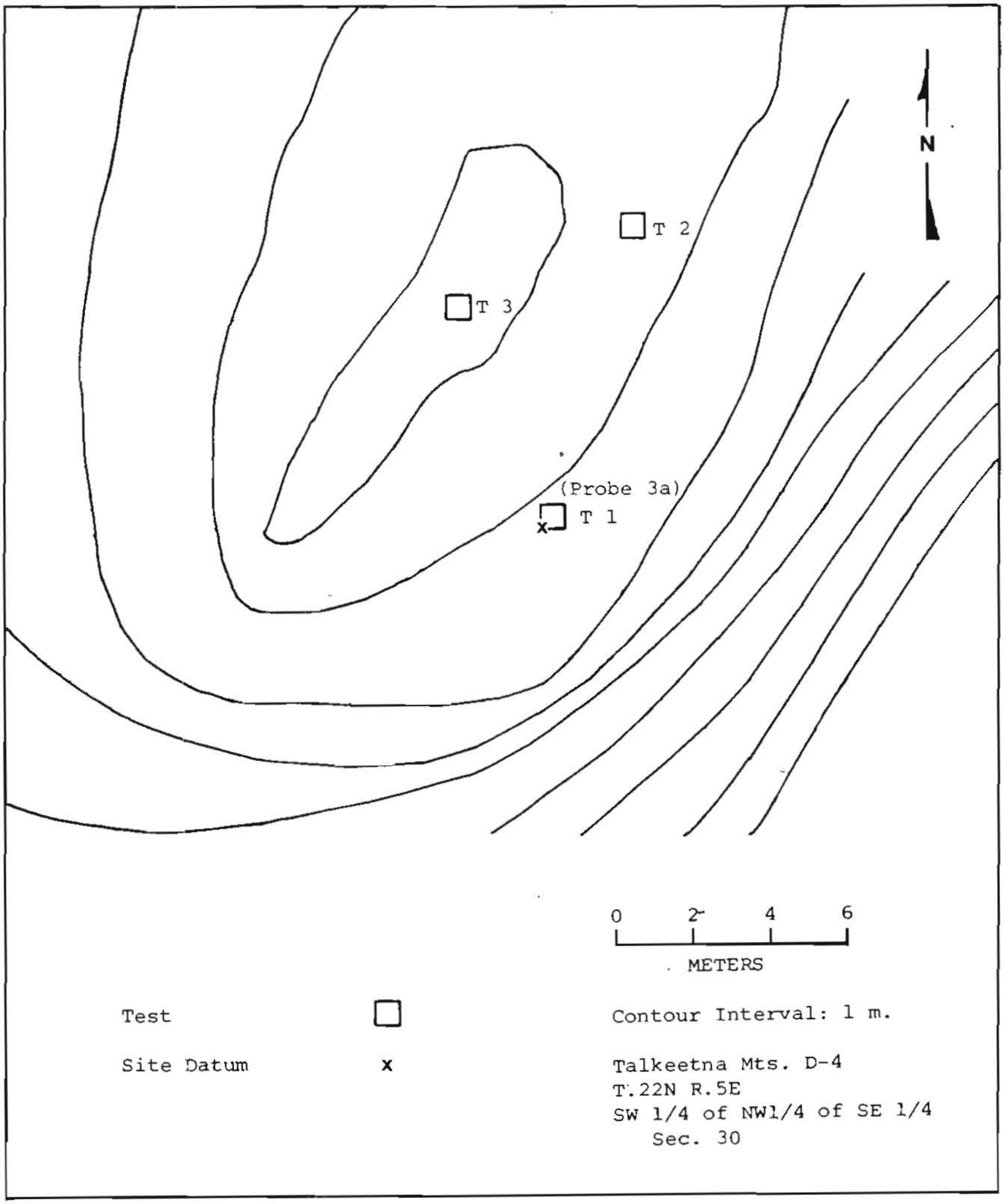


Figure 35.

Site map UA80-142 (TLM 035).

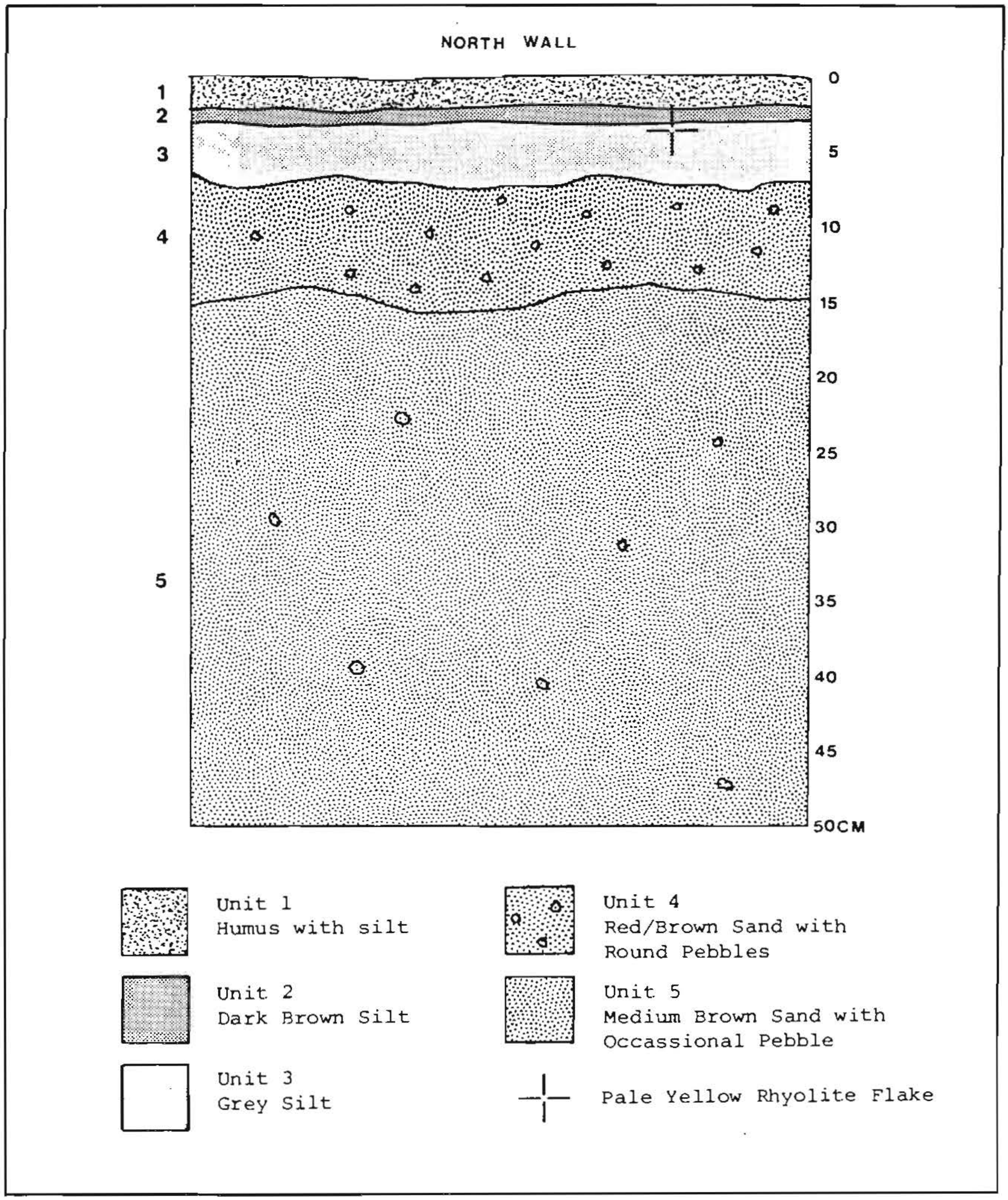


Figure 36.

Soil profile UA80-142 (TLM 035), probe 3A.

3.2.1.16 - <u>Site UA80-143, State Number TLM 036</u>

Area: Survey Locale 30
Area Map: Figure 102; Survey Locale Map: Figure 137
USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 449450 Northing 6964100

Latitude 62°48'22" N., Longitude 147°59'30" W.

<u>T. 31 N., R. 8 E., Seward Meridian</u>
Sec. 5, NE¼NW¼SE¼

Site Map: Figure 37; Soil Profile: Figure 38A

<u>Setting</u>: The site is located on a high plateau on the north side of the Susitna River approximately 3 km downriver from the mouth of Kosina Creek (Figure 102). A 1.5 km wide valley separates this plateau from higher mountains to the north. Located approximately 335 m (1100 feet) above the level of the Susitna River at an elevation of 853 m (2800 feet asl), the site is situated on the southwest side of a small knoll overlooking a south-facing slope leading down to the Susitna River. This knoll is connected to a higher knoll by a small "saddle" to the northeast. Higher rounded hills to the northwest mark the eastern border of a lake six hectares in size, which is not visible from the site. A small pond is located 300 m north but cannot be seen from the site. The ridge upon which the site is located is part of a regional system of discontinuous ridges which occur on this plateau above the 762 m (2500 feet asl) elevation. Each of the knolls and ridges which comprise this system exhibits numerous bedrock and drift exposures. High rolling hills above 762 m (2500 feet asl) in elevation exist to the east, north, west, and southwest within 1 km of the site. The Susitna

River lies approximately 2 km to the south and a small stream flows in the valley less than .5 km west of the site. The view from the site is panoramic but the principal view is of the lower open areas to the east, southeast, south, and southwest. Visibility varies from 1 km (southwest) to 5 km (southeast). Six additional archeological sites have been identified to date in the same local topographic context as UA80-143. The only recorded site within 1 km of UA80-143 is site UA80-151 (TLM 044) located to the northeast. Vegetation at UA80-143 is transitional alpine tundra, with spruce, dwarf birch, moss, and lichens. At elevations below 762 m (2500 feet asl) spruce become more common, and above this elevation low shrubs, moss, and lichen prevail.

Phase I Testing: The site consists of a surface lithic scatter exposed in a blowout measuring approximately 8 m by 12 m (Figure 37). A dark red-brown chert unifacially worked scraper with flake scars over the entire dorsal surface (Figure 81, f) was surface collected from this blowout along with a single light grey chert flake found 72 cm east-northeast (62°) from the scraper. No other cultural material was observed on the surface. A single test (Figure 37) at the site did not reveal any subsurface cultural material and encountered bedrock within 10 cmbs (Figure 38A).

Collected Artifact Inventory

Note: Surface artifacts are keyed to site map (Figure 37)

# on Key	
1	1 Dark red-brown chert unifacially worked scraper
2	1 Light grey chert flake

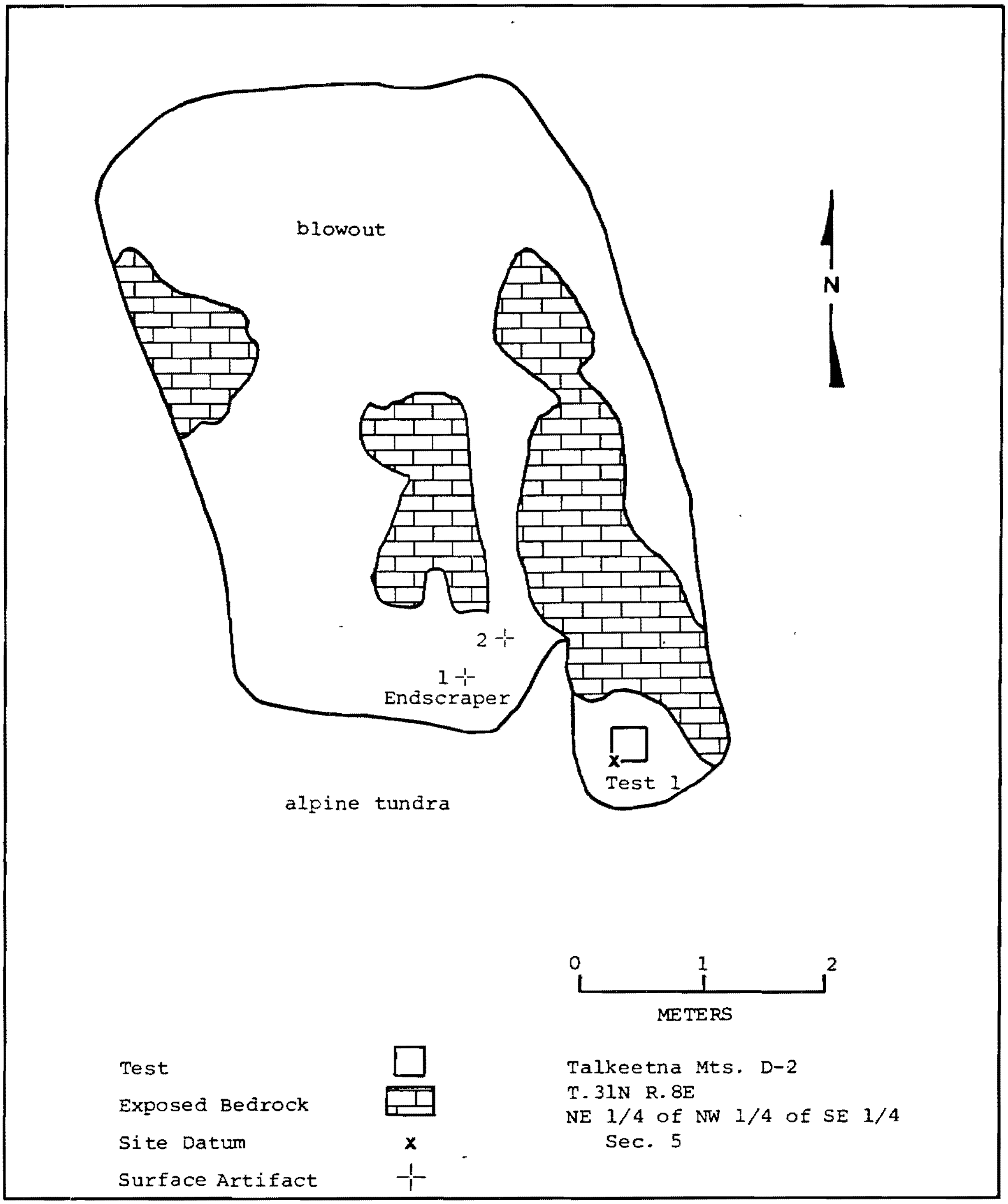


Figure 37.

Site map UA80-143 (TLM 036).

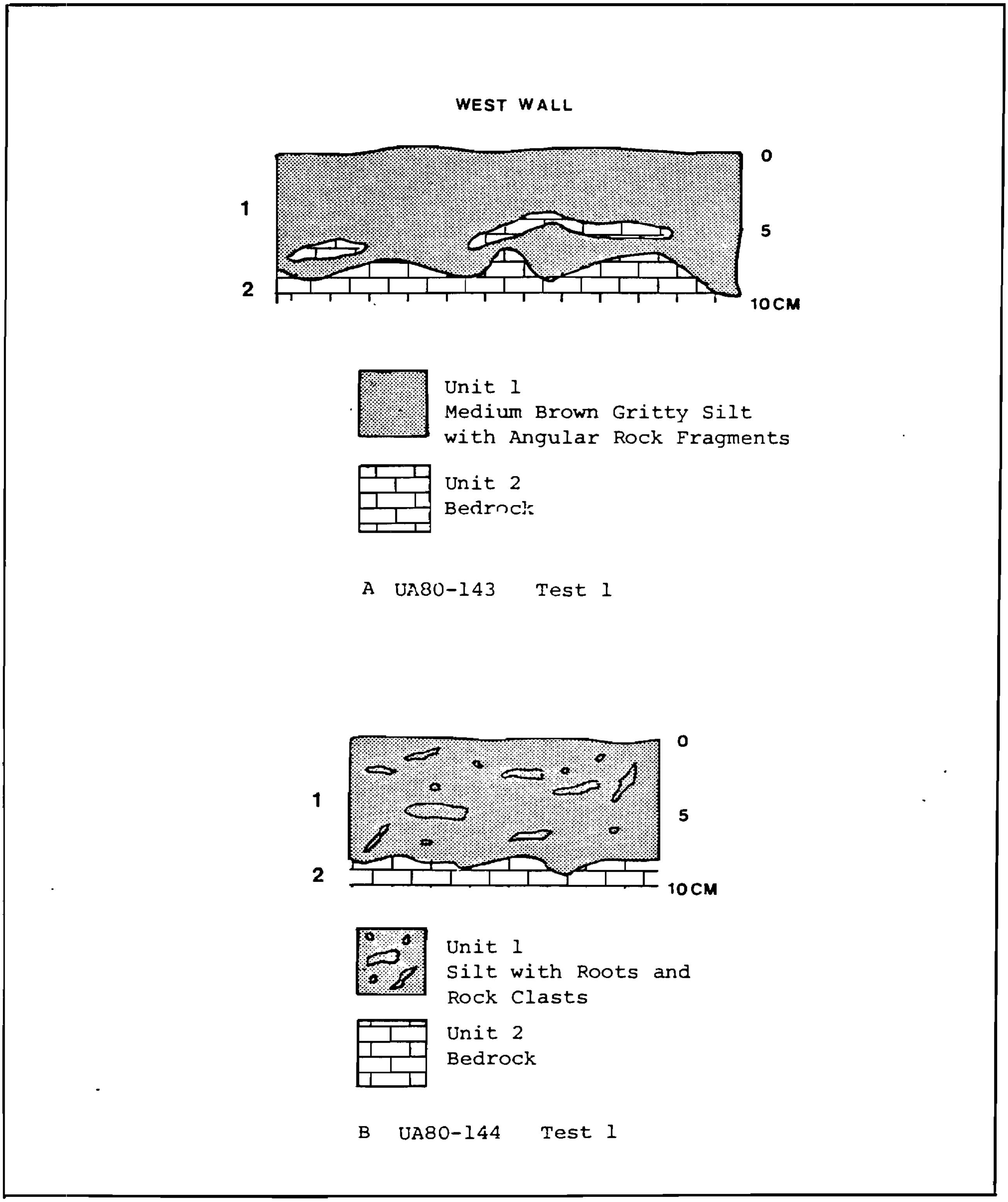


Figure 38.

Soil profiles UA80-143 (TLM 036), test 1 and UA80-144 (TLM 037), test 1.

3.2.1.17 - Site UA80-144, State Number TLM 037

Area: Survey Locale 30
Area Map: Figure 101; Survey Locale Map: Figure 136
USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 448650 Northing 6964600

Latitude 62°48'36" N., Longitude 148°00'30" W.

T. 31 N., R. 8 E., Seward Meridian
Sec. 5, SE¼NW¼NW¼

Site Map: Figure 39; Soil Profile: Figure 38B

Setting: The site is located on a high plateau on the north side of the Susitna River approximately 4 km downriver from the mouth of Kosina Creek (Figure 136). A 1.5 km wide valley separates this plateau from higher mountains to the north. Located approximately 396 m (1300 feet) above the Susitna River at an elevation of 914 m (3000 feet asl), the site is situated on a southwest slope, 5 m below the top of the second highest knoll on a ridge approximately 900 m northeast of the largest of three kettle lakes (Figure 136). The ridge upon which the stie is located is one of numerous east-west trending glacially scoured ridges with exposed bedrock and drift characteristic of this high plateau. The site affords an excellent view of two kettle lakes to the southwest, the smallest lake is approximately 800 m distant and 61 m lower in elevation, while the larger lake is approximately 850 m distant and 91 m lower in elevation. Most of the accessible terrain in view from the site is 30 to 50 m lower in elevation and consists of undulating ridges and knolls without high relief. The view from the site is panoramic but the more accessible terrain to which the site appears to be oriented lies to the south and west and includes the kettle lakes, the north slopes and crests of a series of ridges running generally east-west and descending in elevation to the south, and a major northeast-southwest trending ridge which lies to the southwest of the site. Six additional archeological sites have been identified to date in the same local topographic context. Other sites within a 1 km radius of site UA80-144 are site UA80-78 (TLM 031) approximately 1 km to the south, and site UA80-143 (TLM 036) approximately 900 m to the southeast. Vegetation at the site is sparse and consists of low bush cranberry, bearberry, mosses, and lichens with occasional spruce present in more sheltered locations at lower elevations. Surrounding vegetation is alpine tundra with low shrubs. In the site vicinity spruce occur infrequently in saddles and on less exposed slopes but are generally absent on ridge crests and the tops of knolls.

Phase I Testing: The site consists of a surface lithic scatter exposed in a blowout measuring approximately 40 m by 50 m in which bedrock exposures occur (Figure 39). A total of four flakes were observed on the deflated surface, two of which were collected (Figure 39). One of the collected flakes is grey chert and the other fine grained black basalt. The two uncollected flakes appeared to be of similar lithology as the grey chert flake. No other cultural material was observed on the surface. Test 1, excavated to the north of the blowout, did not reveal any subsurface cultural material (Figure 39). Soil deposition in the vicinity of the site is shallow and bedrock was encountered within less than 10 cmbs (Figure 38B).

Collected Artifact Inventory

1 Grey chert flake
1 Fine grained black basalt flake

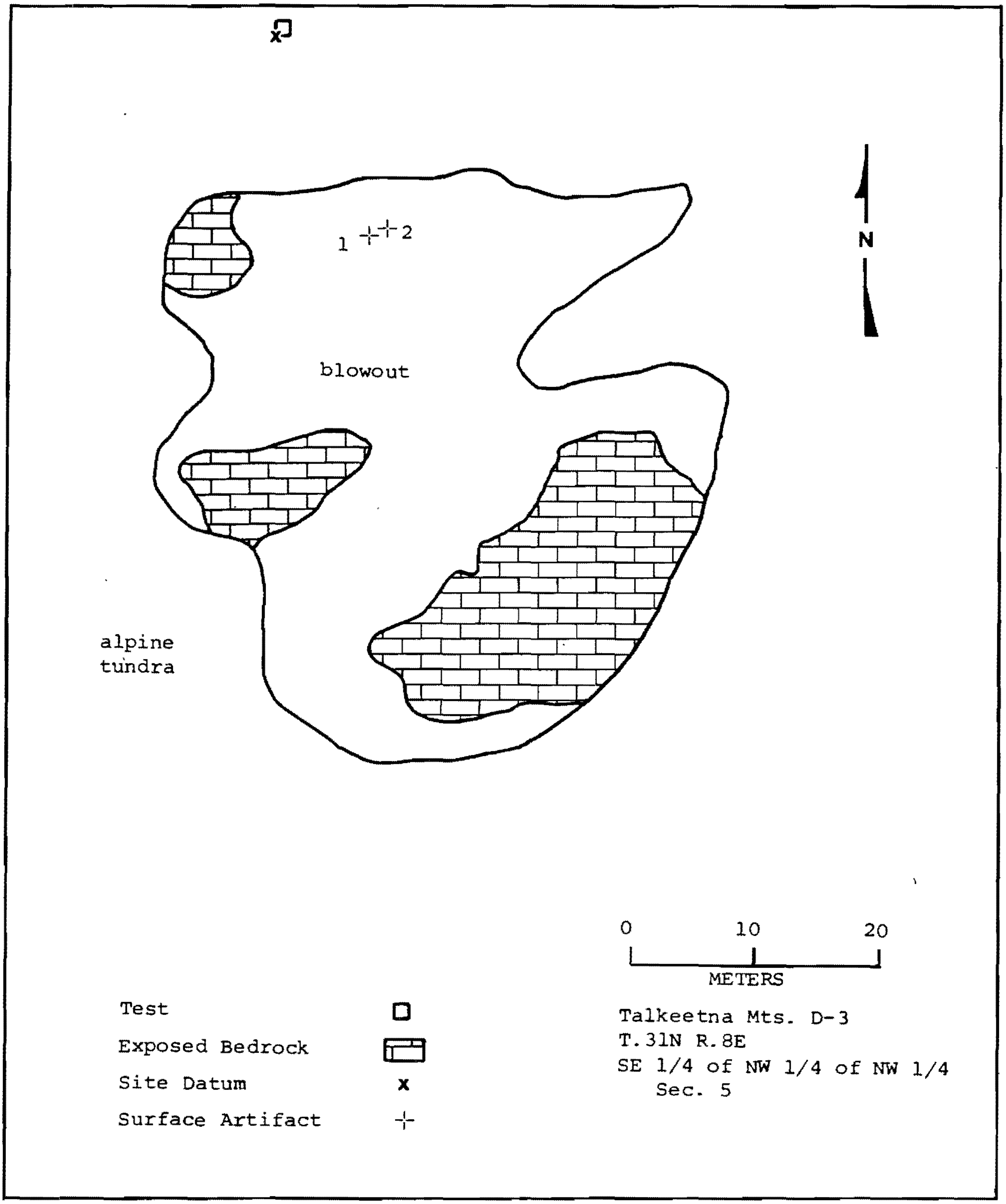


Figure 39.

Site map UA80-144 (TLM 047).

3.2.1.18 - Site UA80-145, State Number TLM 038

Area: Survey Locale 26

Area Map: Figure 101; Survey Locale Map: Figure 131

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 442600 Northing 6974800

Latitude 62°54'02" N., Longitude 148°07'45" W.

T. 33 N., R. 7 E., Seward Meridian

Sec. 33, SW¼SE¼SE¼

Site Map: Figure 40; Soil Profile: Figure 41

Setting: The site is located approximately 10 km upstream from the mouth of Watana Creek on the eastern edge of a plain overlooking the creek from the west (Figure 131). Watana Creek is approximately 600 m east of the site and 152 m (500 feet) lower in elevation. A major unnamed tributary joins Watana Creek from the north approximately 700 m northeast of the site. Located at an elevation of 762 m (2500 feet asl), the site is situated on a small discrete lobe of the continuous edge of the plain which trends east-west for .5 km before trending northward. The site overlooks a large stream terrace to the north and northeast approximately 61 m (200 feet) lower in elevation, and the confluence of the unnamed major tributary and Watana Creek to the northeast. Approximately 100 m east of the site the plain terminates and a sharp ridge with a series of prominent knolls descends 61 m to the level of the large alluvial terrace below the site. Access to the lower terrace and Watana Creek is possible but quite steep and difficult or impossible in places where downcutting has resulted in cliffs and steep bedrock exposures. The view from the site encompasses the relatively level plain westward from the site and the lower alluvial terrace and portions of Watana Creek and its tributary to the north and northeast. Only a small portion of Watana Creek above the confluence is visible from the site. Visibility in other directions is restricted by spruce forest and by slightly higher terrain to the south. Although not much higher than the surrounding plain, the site location affords a better view in more directions than other slightly lower lobes along the edge of the plain. The difference in view-capability between this and other lobes (which were tested without finding cultural material) is subtle but apparently significant in terms of site location. On the north face of the lobe, a 2 m by 2 m blowout has exposed whitish-grey sand approximately 2 m below the site. Vegetation at the site consists of alpine tundra and high brush and a single isolated black spruce. Dwarf birch and willow, low bush cranberry, crowberry, bearberry, moss and lichens form the major ground vegetation. Scattered black spruce occur on the plain approximately 30 m southeast of the site and alder occupy the ravines between lobes along the edge of the plain. On the lower terrace to the northeast of the site spruce are denser and areas of muskeg are present.

Phase I Testing: No surface cultural material was observed at the site location. However, backdirt from shovel probe 1 revealed 4 calcined long bone fragments from a medium to large sized mammal. Three additional probes and a test (test 1) were excavated in the immediate vicinity of probe 1 and one test (test 2) was placed 11.5 m southwest of test 1 (Figure 40). Probe 2 and test 2 did not reveal cultural material, however, probes 3 and 4 and test 1 revealed extensive subsurface calcined faunal material in association with charcoal. No cultural lithic material was revealed by any of the subsurface tests. Test 1 revealed 86 long bone fragments, 2 flat bone fragments, 1 metacarpal and 1 carpal fragment, 1 rib fragment, and 1 tooth in addition to approximately 500 very small bone fragments. The metacarpal fragment was identified as caribou (Rangifer tarandus) and the tooth as either caribou (Rangifer tarandus) or moose (Alces alces). These bone fragments were recovered between 10 to 35 cmbs in a grey and dark brown silty sand (Figure 41, units 2 and 4). Probe 3 revealed 12 long bone fragments and 1 carpal fragment, identified as caribou (Rangifer tarandus), between 13 and 20 cmbs. Probe 4 revealed 44 long bone fragments, 1 flat bone fragment, 1 rib fragment, and approximately 300 very small bone fragments between 5 and 30 cmbs. The majority of bone fragments are probably from a medium to large size mammal(s) although some small mammals appear to be represented. All of the bone fragments occur in pockets of charcoal or charred earth within silty sand units (Figure 41) and most fragments show evidence of burning. Not enough charcoal was collected to provide a radiometric date for the site, however the possibility of obtaining a sufficient sample is quite probable, with further testing. Although test 2 did not reveal cultural material it did contain a charcoal lens at approximately the same level as the charcoal noted in test 1. More testing is required to determine if the charcoal associated with the burned faunal material represents a hearth or is natural in origin.

Collected Faunal Material

Test 1 (Probe 1) Backdirt:	4 long bone fragments, calcined, medium-large mammal
Test 1, 10-15 cmbs:	14 long bone fragments, calcined, medium-large mammal
	1 flat bone fragment, calcined, medium-large mammal
	4 long bone fragments, calcined, small-large mammal
	ca. 200 very small bone fragments, calcined, small-large mammal
	5 long bone fragments, heavily burned, medium-large mammal
	6 long bone fragments, heavily burned, small-large mammal

Test 1, 15-20 cmbs: 1 rib fragment, heavily burned, large mammal
1 metacarpal, proximal 1/5, heavily burned, caribou (*Rangifer tarandus*)
5 long bone fragments, heavily burned, large mammal
1 flat bone fragment, heavily burned, large mammal
9 long bone fragments, heavily burned, medium-large mammal
5 long bone fragments, heavily burned, small-large mammal
1 tooth (molar) fragment, large mammal, caribou (*Rangifer tarandus*) or moose (*Alces alces*)
7 long bone fragments, calcined, large mammal
15 long bone fragments, calcined, medium-large mammal
6 long bone fragments, calcined, small-large mammal
ca. 300 small fragments, calcined, small-large mammal

20-30 cmbs: 2 long bone fragments, heavily burned, large mammal
3 long bone fragments, heavily burned, medium-large mammal
5 long bone fragments, calcined, medium-large mammal

Test 3 (Probe 3), 13-20 cmbs:
1 carpal, heavily burned, large mammal, caribou (*Rangifer tarandus*)
2 long bone fragments, calcined, large mammal
1 long bone fragment, heavily burned, large mammal
1 long bone fragment, heavily burned, medium-large mammal
6 long bone fragments, calcined, medium-large mammal
2 long bone fragments, calcined, small-large mammal

Test 4 (Probe 4), 5-10 cmbs:
1 long bone fragment, large mammal

10-15 cmbs: 1 long bone fragment, calcined, large mammal
1 flat bone fragment, calcined, large mammal
7 long bone fragments, calcined, medium-large mammal
8 long bone fragments, heavily burned, medium-large mammal
ca. 60 small fragments, calcined, medium-large mammal

ca. 70 small fragments, calcined, heavily burned, small-large mammal
1 rib fragment, heavily burned, large mammal

Test 4 (Probe 4), 15-20 cmbs:
5 long bone fragments, calcined, medium-large mammal
ca. 90 small fragments, calcined, small-large mammal

20-25 cmbs:
1 long bone fragment, large mammal
1 long bone fragment, calcined, large mammal
12 long bone fragments, calcined, medium-large mammal
6 long bone fragments, heavily burned, medium-large mammal
ca. 80 fragments, calcined, small-large mammal

25-30 cmbs:
1 long bone fragment, heavily burned, medium-large mammal

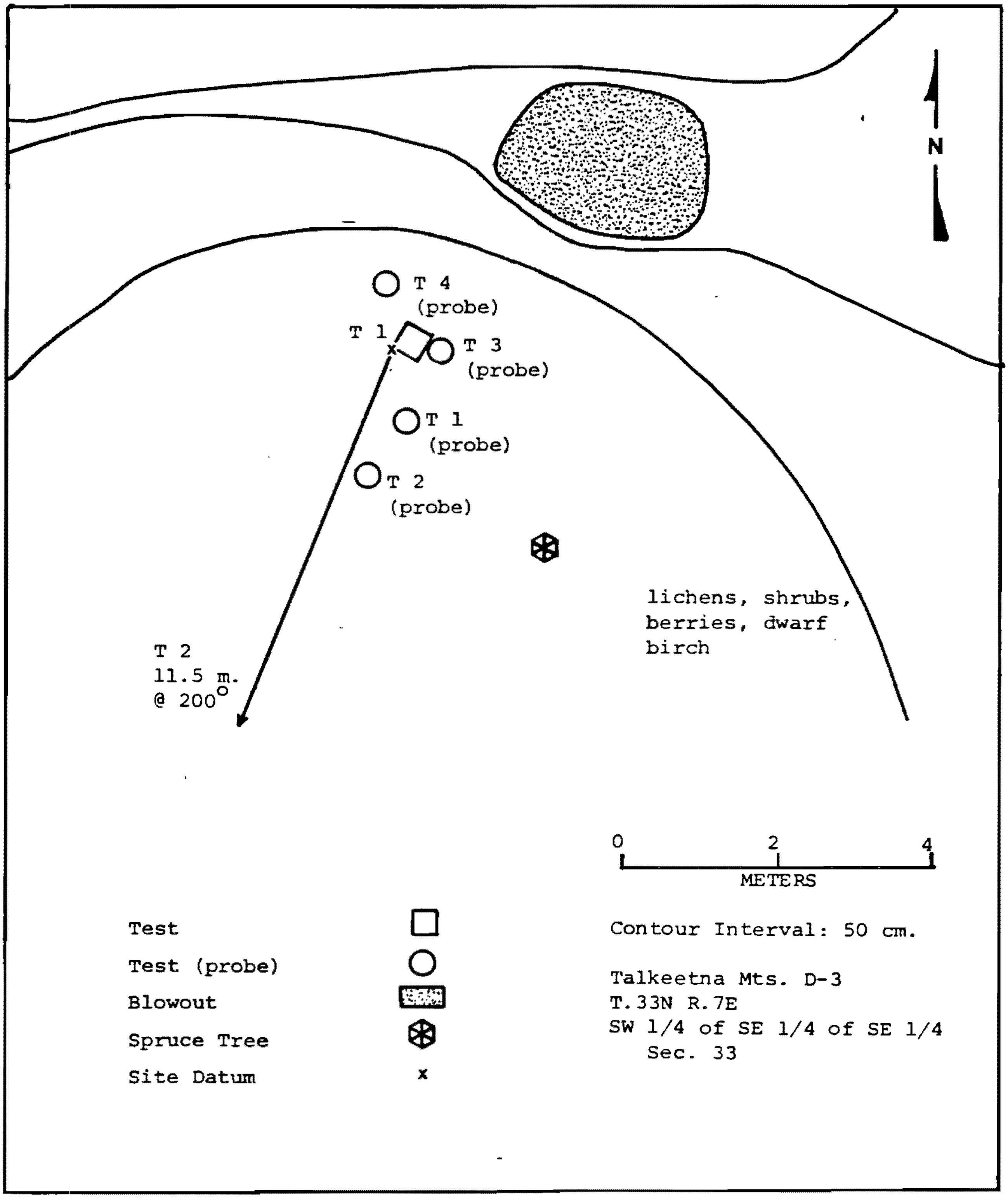


Figure 40.

Site map UA80-145 (TLM 038).

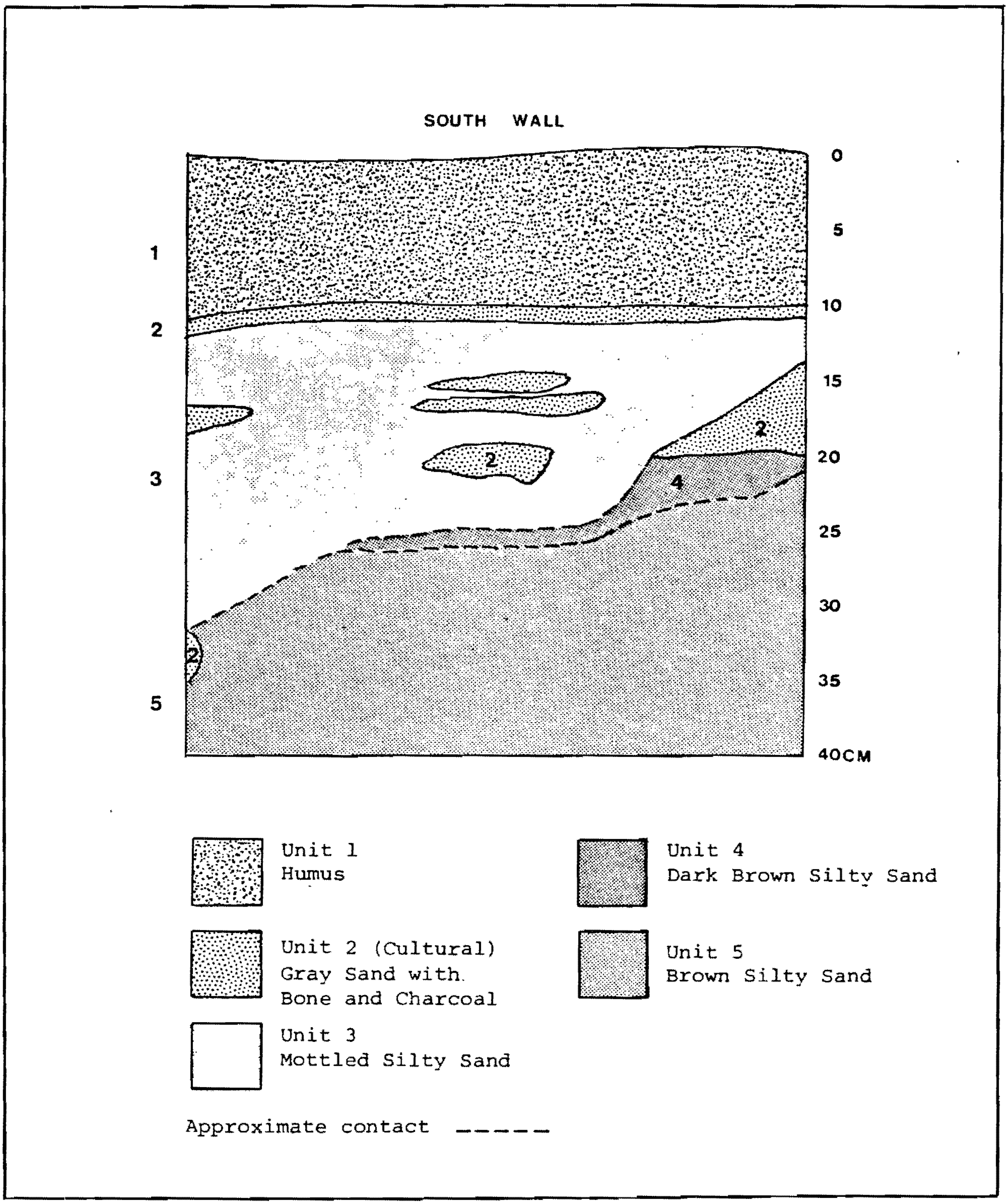


Figure 41.

Soil profile UA80-145 (TLM 038), test 1.

3.2.1.19 - Site UA80-146, State Number TLM 039

Area: Survey Locale 27

Area Map: Figure 101; Survey Locale Map: Figure 132

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 439800 Northing 6967300

Latitude 62°49'57" N., Longitude 148°10'58" W.

T. 32 N., R. 7 E., Seward Meridian

Sec. 29, SW¼NE¼SE¼

Site Map: Figure 42; Soil Profile: Figure 43

Setting: The site is located on the western margin of an 18 hectare lake approximately 3.7 km east of the mouth of Watana Creek on the north side of the Susitna River (Figure 132). Situated at an elevation of 610 m (2000 feet asl) on top of a knoll at the southern end of the lake where the shoreline curves to the southwest, the site is located at the highest point on the perimeter of the lake. This knoll is at the northeast end of an 800 m long discrete ridge system oriented northeast to southwest. The knoll rises approximately 20 m above the lake as well as most of the surrounding terrain. The view from the top of the knoll is panoramic, encompassing the entire lake and surrounding accessible terrain up to a distance of approximately 3 km. It is the only location on the lake from which the entire lake is visible. This lake is the largest one within a 10 km radius and is a natural attraction for wildlife and waterfowl. Moose (*Alces alces*), black bear (*Ursus americanus*), and grizzly bear (*Ursus arctos*) were observed around the lake margin and both grayling (*Thymallus arcticus*) and trout (*Salmo* spp. and *Salvelinus* spp.) are in the lake. The Susitna River is 1.3 km southwest at its closest point and approximately 152 m (500 feet) lower in elevation. An outlet stream drains the north end of the lake. Access to Watana Creek, approximately 2.5 km distant, along this stream is relatively easy. Site UA80-155 (TLM 048) is also located on this lake, at the northern end near the outlet stream. Vegetation at site UA80-146 consists of scattered spruce, birch, and dwarf willow with ground vegetation including blueberry, bearberry, Labrador tea, wild rose, sphagnum moss, and lichen. Exposed soil and rock are found at the crest of the knoll on the eastern side where deflation is most pronounced. Surrounding vegetation is generally similar except that black spruce and birch are denser, especially closer to the lake margin, and willows are much denser in less well drained areas between knolls and ridges.

Phase I Testing: The site is comprised of a subsurface lithic scatter. No cultural material was observed on the surface. A total of three tests were excavated at the site, test 1 approximately 5 m southeast of the highest point of the knoll, test 2 at the highest point of the knoll, and test 3 on the crest of a ridge line approximately 10 m southeast of the highest point of the knoll (Figure 42). Only test 1 revealed subsurface cultural material. A total of 14 fine grained quartzite flakes and a primary burin spall of black chert (UA80-146-1; Figure 83, a) were excavated between 3 to 16 cmbs. Preliminary analysis suggests that the site is multicomponent with a possible upper component consisting of very small fine grained dark quartzite flakes occurring in or just under the humus layer at a depth of 3 to 6 cmbs and a possible lower component consisting primarily of larger fine grained light grey quartzite flakes occurring between 12 to 16 cmbs. The deeper flakes appear to be associated with the contact between a light brown silt and a grey leached silt (Figure 43, units 4 and 5). The black chert primary burin spall (UA80-146-1; Figure 83, a) was found at a depth of 12 cmbs associated with several flakes. Two sterile silt units (Figure 43, units 2b and 3) may separate the two possible components, however, further testing is required to determine if there are two separate components or if cryoturbation or solifluction may be responsible for the multicomponent appearance of the site.

<u>Collected Artifact Inventory</u>

4 Dark quartzite flakes
10 Light grey quartzite flakes
1 Black chert primary burin spall

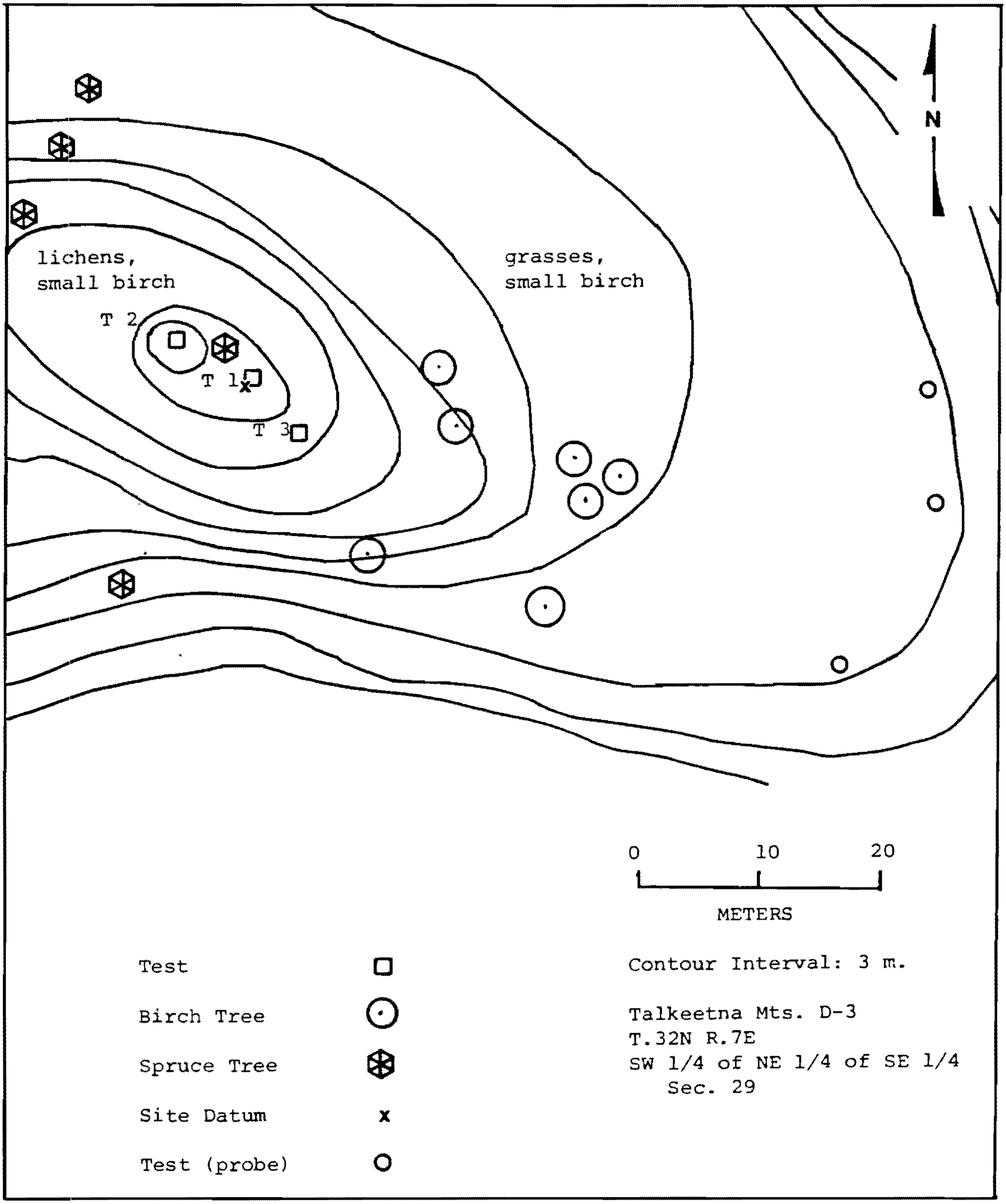


Figure 42.

Site map UA80-146 (TLM 039).

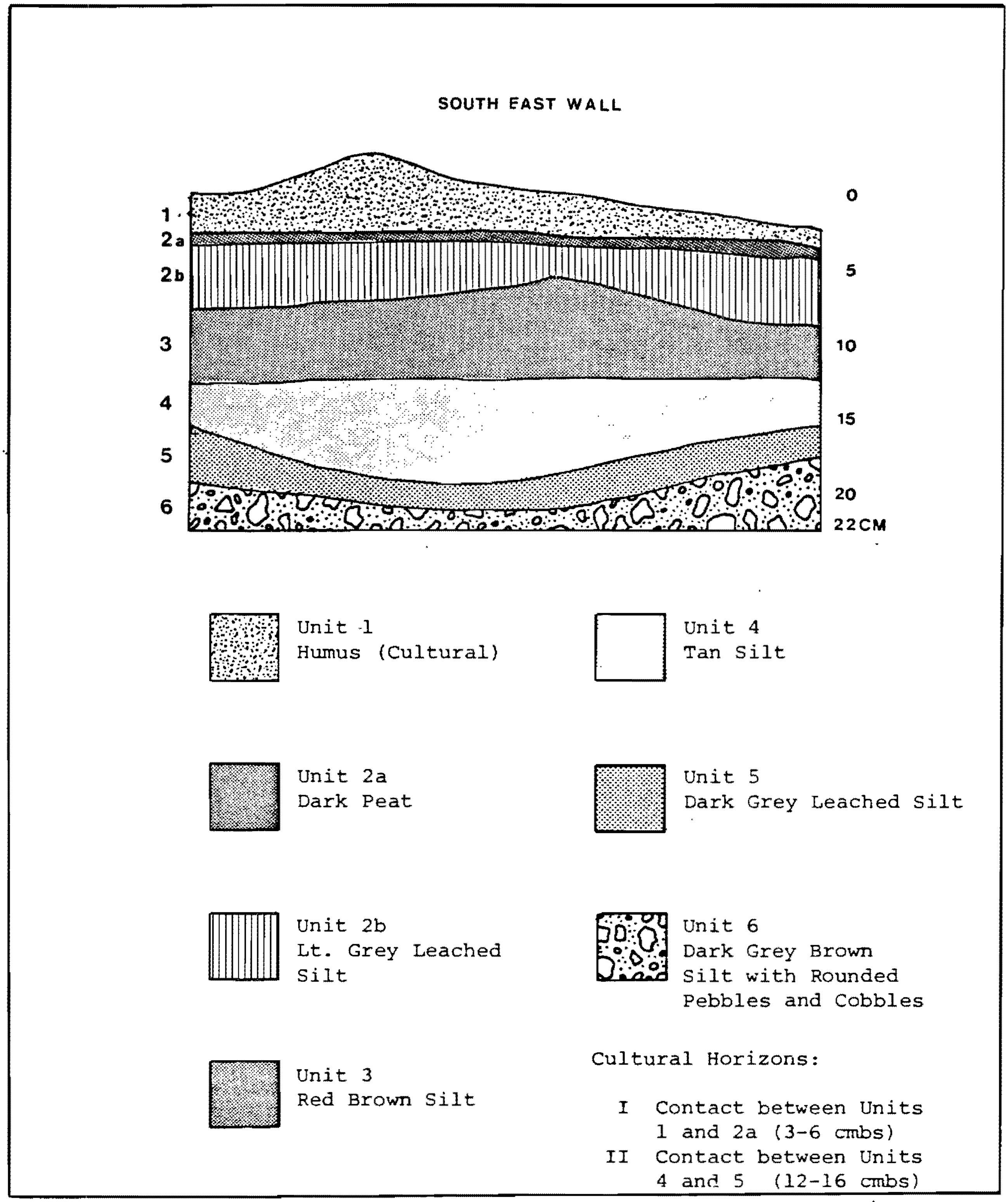


Figure 43.

Soil profile UA80-146 (TLM 039), test 1.

3.2.1.20 - Site UA80-147, State Number TLM 040

Area: Survey Locale 29

Area Map: Figure 101; Survey Locale Map: Figure 134

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 445050 Northing 6963350

Latitude 62°47'57" N., Longitude 148°04'35' W.

T. 31 N., R. 7 E., Seward Meridian

Sec. 11, NE¼NE¼NE¼

Site Map: Figure 44; Soil Profile: Figure 45

Setting: The site is located at an elevation of 518 m (1700 feet asl) at the point of highest relief on an old river terrace on the south margin of the Susitna River, approximately 8 km downriver from the mouth of Kosina Creek (Figure 134). This terrace is approximately 80 m long by 10 m wide, and is situated approximately 30 m west of the Susitna River. It is approximately 20 m above the Susitna and primarily oriented northwest-southeast parallel to the river. The site is approximately equidistant from either end of this terrace remnant. Degree of slope varies downward in all directions from the site with a maximum slope of 25° to the east and a minimum of 5° to the north. The view is obstructed in all directions by vegetation although the Susitna River is visible to the north, east, and south through the trees. With lower vegetation the view would be panoramic. Access to the Susitna, although possible, is less than ideal due to bedrock exposures and steep alluvial slopes, however, access may have been easier in the past when the river flowed at a higher elevation. A small stream .5 m wide, which drains a marshy area to the northwest, is approximately

50 m south of the site. A lower alluvial terrace to the south is located approximately 5 m below and parallels the upper terrace. These two terraces appear to be part of a larger terrace system visible to the northwest and southeast for approximately 1 km in either direction from the site. Vegetation in the vicinity of the site is lowland spruce-hardwood forest with scattered birch and spruce near the site, however the site itself is clear of trees and is covered by sphagnum moss, lichens, grasses, Labrador tea and low bush cranberry. Surrounding vegetation is similar except tree cover is denser, especially west of the site where a dense stand of black spruce occupies what appears to be an old river channel.

Phase I Testing: No surface artifacts were observed at the site. The backdirt from a shovel probe (test 1) revealed a red-brown chert blade-like flake with retouch on two margins (UA80-147-1; Figure 83, b) and a tuffacious rhyolite flake. The chert blade-like flake came from either a burned soil or a medium brown silt at a depth of 5 to 22 cmbs (Figure 45, units 2a and 3). A total of two tests were excavated at the site (Figure 44). The initial shovel probe was enlarged into test 1 and a second test (test 2) was excavated 4.1 m northwest of test 1 (Figure 44). No additional artifacts were recovered from either test, however, charcoal was present in the northeastern corner of test 1 at a depth of 27 to 34 cmbs (Figure 45, unit 2b). Not enough charcoal was present to warrant collection for radiometric dating and it could not be ascertained whether the artifacts recovered from test 1 were associated with the charcoal. A possible ash layer (Figure 45, unit 4a) which included a pocket of charcoal was also noted at a depth of 27 to 34 cmbs in the northeastern corner of test 1. The possibility of recovering additional artifacts which may be associated with datable organics make further testing at this site desirable.

Collected Artifact Inventory

1 Red-brown chert blade-like flake with retouch on two margins

1 White tuffacious rhyolite flake

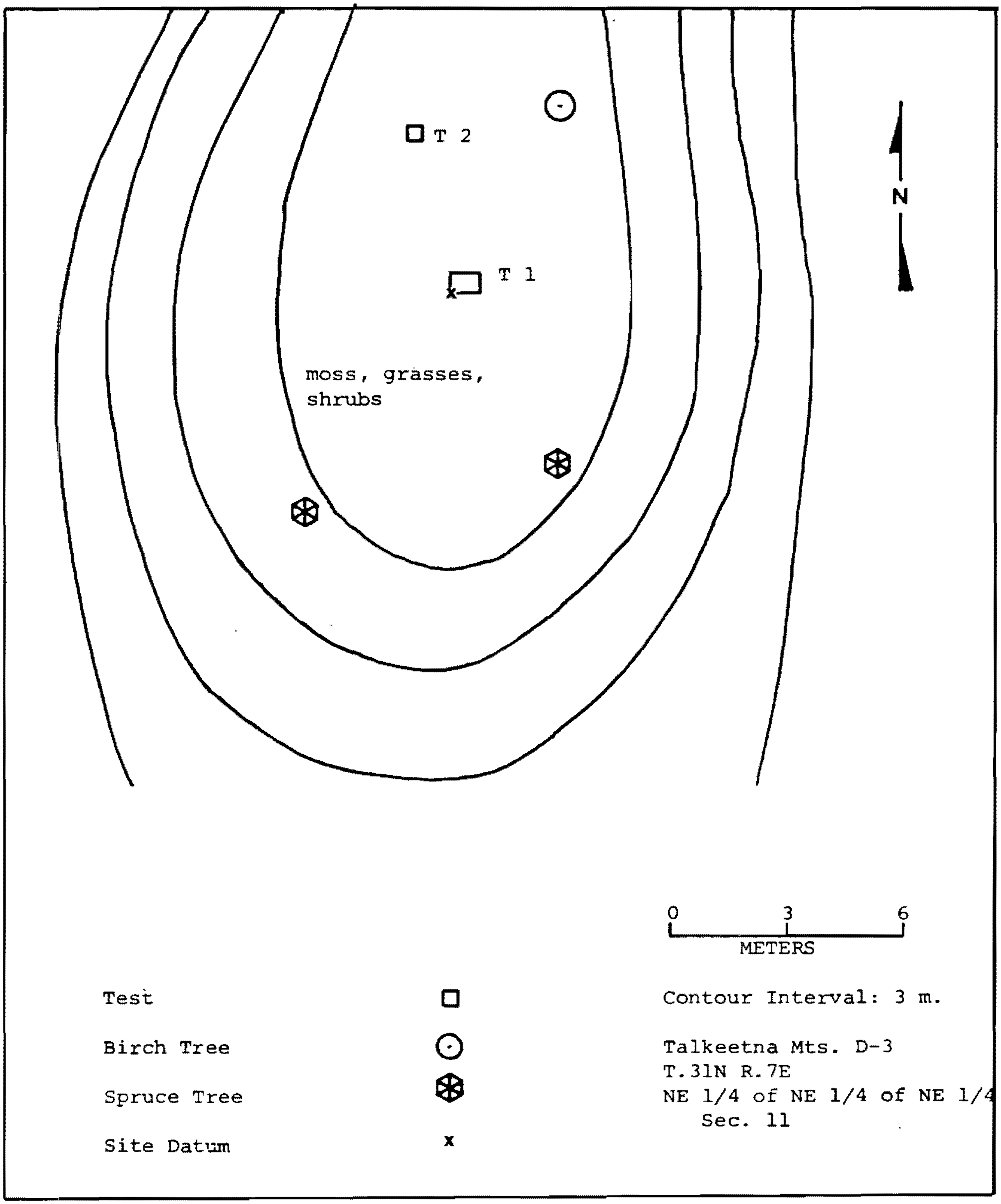


Figure 44.

Site map UA80-147 (TLM 040).

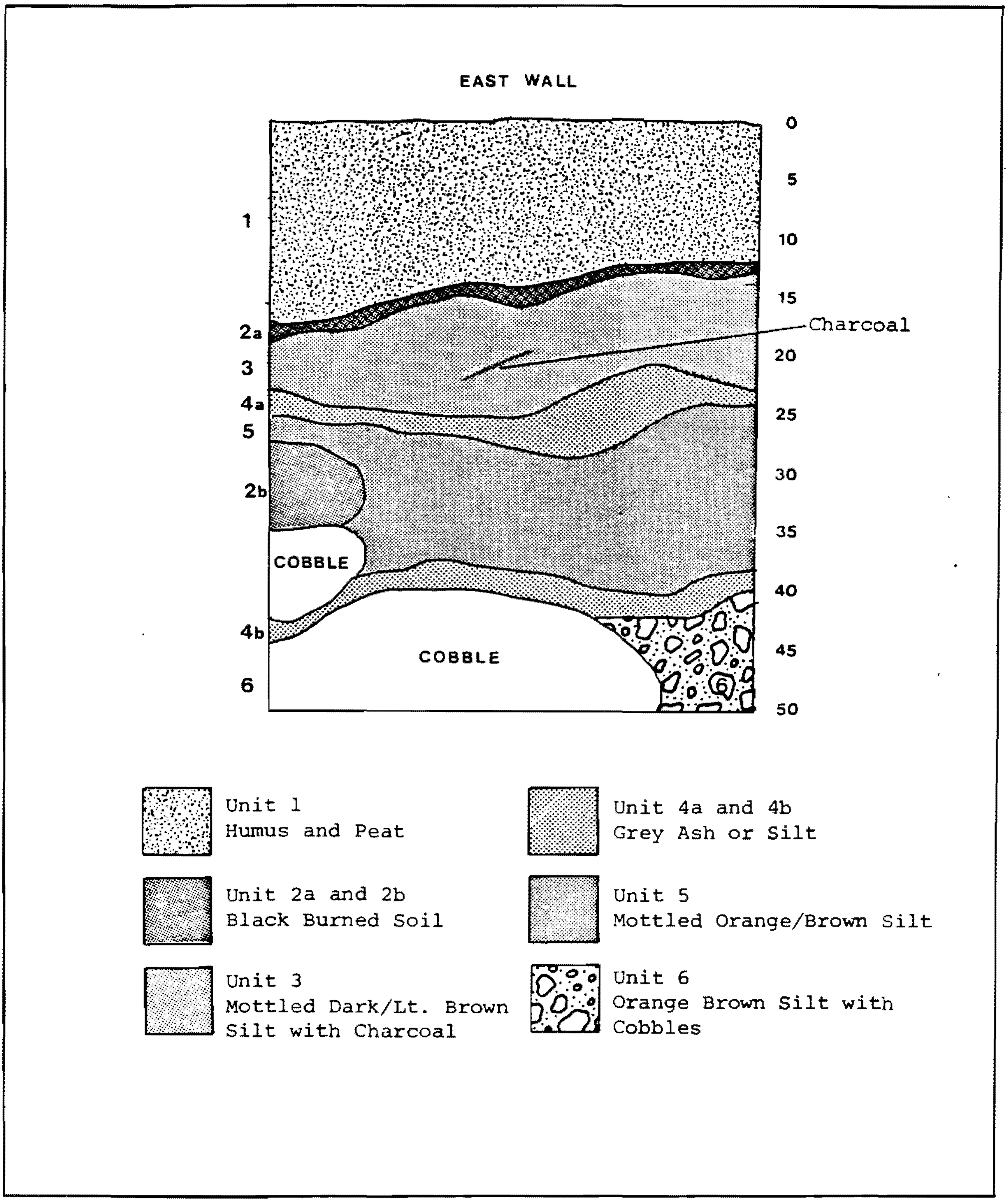


Figure 45.

Soil profile UA80-147 (TLM 040), test 1.

3.2.1.21 - Site UA80-148, State Number TLM 041

Area: Upper Fog Creek

Area Map: Figure 100; Location Map: Figure 179

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 417800 Northing 6959750

Latitude 62°45'00" N., Longitude 148°37'25" W.

T. 31 N., R. 4 E., Seward Meridian

Sec. 25, NE¼SW¼NE¼

Site Map: Figure 46

Setting: The site is located on a high flat plain south of the Susitna River at an elevation of 747 m (2450 feet asl) and approximately 1.8 km southwest of the confluence of a large tributary which joins Fog Creek approximately 8 km upstream from its mouth (Figure 100). The site is situated on a 4 m to 6 m high knob on a broad northeast-southwest sloping grassy plain (Figure 179). The terrain slopes to the north, east, and south but rises gradually to the west to a maximum elevation of 775 m (2542 feet asl) approximately 600 m southwest of the site. Despite low topographic relief, the site location affords an unobstructed panoramic view of an open plain 300 m to 400 m wide (northwest-southeast) and approximately 1 km long (northeast-southwest). This knob is a discrete topographic feature, one of a series of four or more such features situated approximately 200 m apart on the plain. Exposed fractured bedrock occurs in the immediate vicinity of the site and frost-fractured rock is evident on the surface. The site is at the highest part of the knoll which diffuses into the general slope of the ground to the southeast. The total area on top of the knob is approximately 10 m (east-west) by 20 m (north-south). Fog Creek is 1.3 km northeast and 183 m (600 feet) lower in elevation at its closest point and the large unnamed tributary to Fog Creek is 800 m southeast and 91 m (300 feet) lower in elevation at its closest point. The Susitna River is 5 km distant to the northwest and 335 m (1100 feet) lower in elevation. Vegetation at the site consists of dwarf birch and willow on the slopes of the knob and crowberry, moss, and lichens grow on the surface. The surrounding vegetation on the plain consists of dwarf willow and birch with berries and grasses. Black spruce occur on the surrounding slopes below the plain.

Phase I Testing: The site was identified by geologist Jerry Williams of Woodward and Clyde, a subcontractor of Acres American Inc. Mr. Williams removed a large tuffacious rhyolite flake from the surface at the site and gave it to the project archeologists. Mr. Williams later overflew the site with the archeologists and identified the approximate location at which the flake was found. A subsequent intensive surface reconnaissance and two subsurface tests failed to reveal additional cultural material. Test 1 (Figure 46) revealed fractured bedrock to be within 10 cmbs directly under the vegetative mat. The exact location at which the flake was found was never identified and because no additional cultural material was found, this site remains to be verified.

Collected Artifact Inventory

1 Pale green tuffacious rhyolite flake (lichen covered dorsal surface)

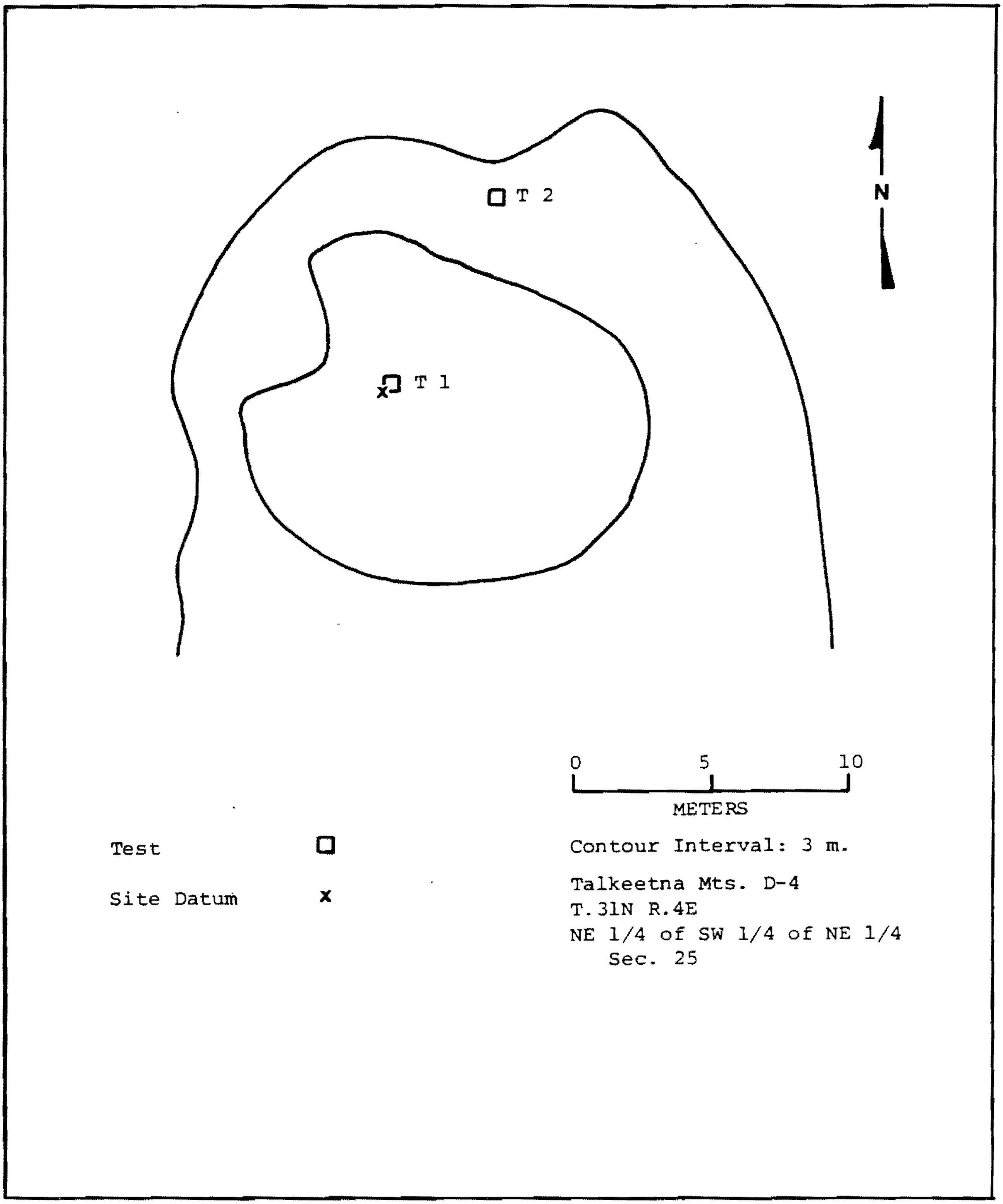


Figure 46.

Site map UA80-148 (TLM 041).

3.2.1.22 - Site UA80-149, State Number TLM 042

Area: Survey Locale 45
Area Map: Figure 104; Survey Locale Map: Figure 156
USGS Map: Talkeetna Mts. C-1, Scale 1:63,360

Site Location: UTM Zone 6 Easting 478550 Northing 6946400 (Locus A)
Easting 478750 Northing 6946450 (Locus B)

Latitude 62°38'58" N., Longitude 147°25'00" W. (Locus A)
Latitude 62°38'59" N., Longitude 147°24'52" W. (Locus B)

T. 30 N., R. 11 E., Seward Meridian
Sec. 33, NW¼SW¼NW¼ (Locus A)
Sec. 33, NE¼SW¼NW¼ (Locus B)

Site Map: Figure 47; Soil Profile: Figure 49 (Locus A)
Site Map: Figure 48; Soil Profile: Figure 50 (Locus B)

Setting: The site, comprised of two loci (A and B), is located on the north side of the Susitna River on a 1.5 km long peninsula directly across from the mouth of Goose Creek (Figure 156). Located at an elevation of 686 m (2250 feet asl), both loci are situated on the southeastern crest of a high river terrace which forms the peninsula, or point, around which the Susitna River makes a tight bend, changing its general direction from southwest to northwest. Eroded and exposed bluffs of 30° to 40° form the northwest and southeast banks of this terrace, however, the top is relatively level and varies between 100 m to 300 m in width.

Locus A: Locus A, located approximately 900 m northeast of the point of the peninsula, is situated on the southeastern edge of the northeast to southwest trending terrace and overlooks a crescentshaped alluvial terrace to the southeast which is approximately 46 m lower in elevation. Locus A is on the deflated crest of a relatively flat continuous terrace edge at a point where there is a 4 m drop resulting in a discrete point of relief overlooking both the relatively flat .5 km of peninsula above the 686 m elevation (2250 feet asl) to the southwest and the lower alluvial terrace to the southeast. The view from the locus is primarily to the southeast and approximately 1 km of the Susitna River (upriver) is in view. The view downriver is blocked by the peninsula itself. At its closest point the Susitna River is 300 m southeast of locus A and access is fairly easy. Locus A appears to be oriented toward the alluvial terrace directly below which is entirely in view and easily accessible. Vegetation immediately northwest of locus A, on the level terrace, is composed of black and white spruce, alder, dwarf birch, willow, and various low bush berries in addition to moss and lichen. The locus itself is relatively open and well drained with no vegetation restricting the view to the southeast. The terrace level below the site is poorly drained with dense black spruce and areas of muskeg and marsh containing sphagnum moss, sedges, and grasses.

Locus B: Locus B, approximately 150 m east-northeast of locus A, is also located on the edge of the terrace overlooking the same lower alluvial terrace which, from locus B is to the south and approximately 60 to 70 m lower. At locus B the terrace edge is oriented east-west having curved eastward from locus A. Locus B is located at the highest point on the terrace approximately 50 m west of a low saddle (possibly a former river channel) to the east of which the terrace terminates and the terrain rises steeply to the northeast to an elevation of 762 m (2500 feet asl). To the southwest the top of the terrace drops slightly in elevation towards locus A. The view from locus B, like that of locus A, is primarily to the south and southeast overlooking the lower alluvial terrace and the Susitna River approximately 300 m distant.

Like locus A, locus B appears to be oriented towards the immediately accessible lower alluvial terrace and river margin to the south and southeast. Ground vegetation at locus B is similar to that of locus A. At locus B a single large white spruce (the site datum) dominates the other vegetation. Spruce are dense on the descending slopes east of the locus and also on the top of the terrace to the west. Willows and other hardwood species are the predominant vegetation on the slopes surrounding the north and west sides of the open muskeg and marsh areas on the lower alluvial terrace.

Phase I Testing:

Locus A: At locus A both surface and subsurface cultural material was found. Approximately 60 siltstone and basalt flakes were exposed in the eroding bluff edge encompassing an area approximately 2 m by 4 m (Figure 47) on the steep slope below the terrace edge. Approximately half of the surface artifacts were collected from this eroded surface. These included a siltstone biface fragment (UA80-149-2; Figure 83, c), a basalt biface fragment (UA80-149-32), and two medial fragments of siltstone blade-like flakes (UA80-149-3 and 4; Figure 83, d and e). In addition, 21 siltstone and 2 basalt flakes were surface collected. A single siltstone flake was surface collected 9.5 m below the exposure where it had apparently been transported by slumping or solifluction. Apparently erosion has transported many, if not all, of the surface artifacts downslope from the edge of the terrace. Two tests were excavated at the top of the slope in an attempt to locate the origin of the artifacts found downslope (Figure 47). Test 2, approximately 5 m from the edge of the slope, did not reveal any subsurface cultural material, but test 1, located at the edge of the terrace, revealed 5 flakes and two fragments of the distal end of a blade-like flake at a depth of 0 to 3 cmbs, in and just under the humus at the contact between the humus and a red-grey mottled silt (Figure 49). Apparently erosion has exposed only part of the activity area and further testing may reveal additional artifacts in stratigraphic context.

Locus B: Locus B, also consisting of both surface and subsurface cultural material, is very similar to locus A in that surface artifacts are exposed along the eroding bluff edge on a 35° slope just below the edge of the terrace (Figure 48). Artifacts surface collected from locus B include a side-notched basalt projectile point base (UA80-149-31; Figure 83, g), a chert flake retouched along one margin (UA80-149-30; Figure 83, f), a basalt flake core fragment, and a dark grey chert flake.

Five basalt flakes were observed on the surface but not collected. Flakes were observed on the ground surface outside the perimeter of the eroding bluff edge (Figure 48) and apparently slumping and erosion have disturbed the original context of the surface artifacts. Two subsurface tests were excavated north of the eroding bluff edge and at a slightly higher elevation (Figure 48). Test 2 did not reveal cultural material but test 1 produced a basalt endscraper fragment (UA80-149-34; Figure 83, h) at a depth of 15 to 16 cmbs in a light brown silt (Figure 50, unit 2). A possible paleosol (Figure 50, unit 3) containing charcoal and organics occurs below unit 2 at a depth of 16 to 20 cmbs. A possible volcanic ash, not apparent in the east wall profile, was recorded below unit 3 at a depth of 5 to 10 cmbs in the west wall of test 1.

Collected Artifact Inventory

Locus A

Surface:

1	Black basalt biface fragment
1	Light brown siltstone biface fragment
2	Grey siltstone blade-like flake fragments (medial sections)
7	Grey siltstone flakes
16	Light brown siltstone flakes
2	Black basalt flakes

Subsurface:

Test 1:	2	Grey siltstone blade-like flake fragments (articulating)
	5	Grey siltstone flakes

Locus B

Surface:

1	Black basalt flake core fragment
1	Grey chert flake
1	Black basalt side-notched projectile point base
1	Dark grey retouched chert flake

Subsurface:

Test 1:	1	Black basalt endscraper fragment

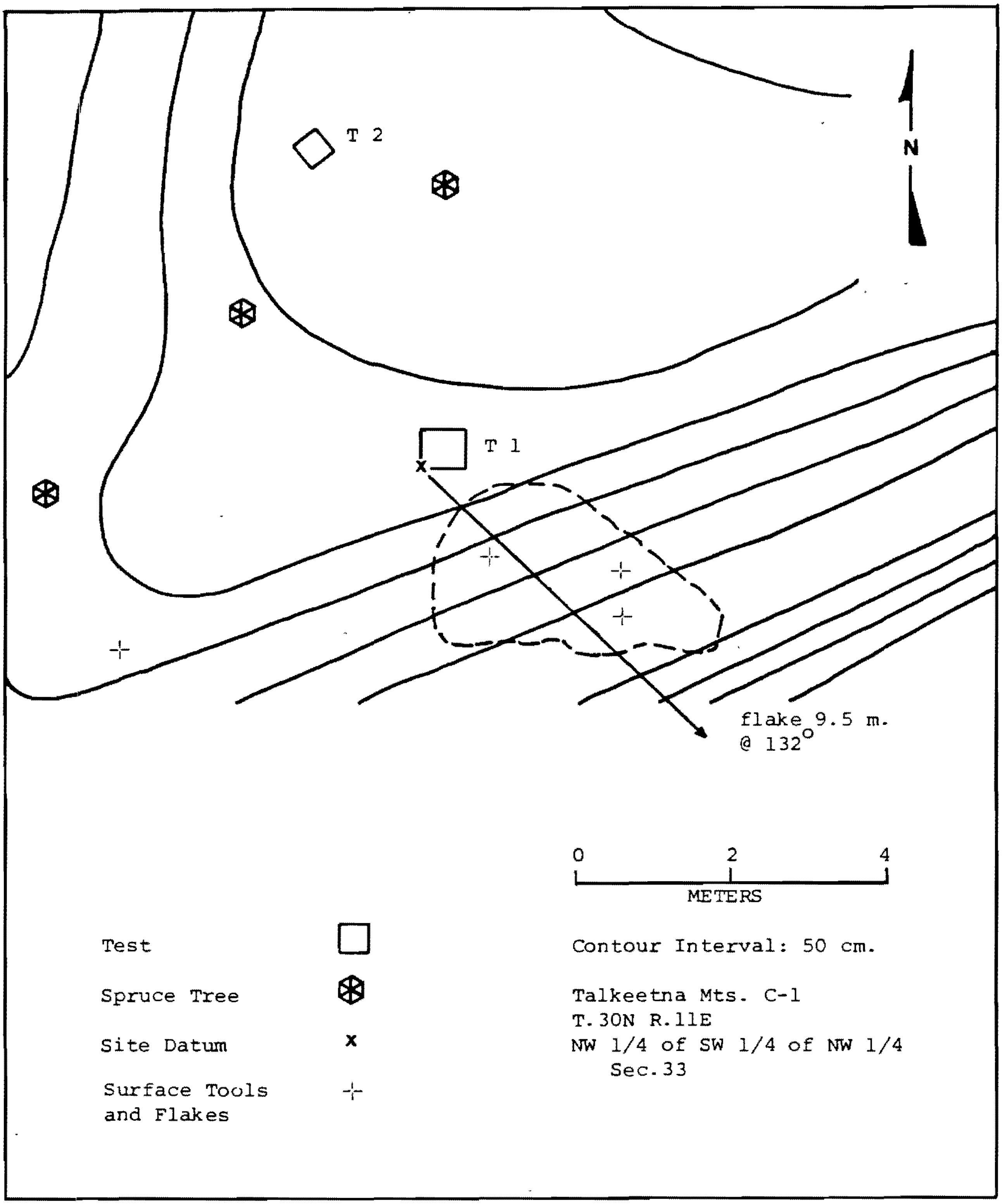


Figure 47.

Site map UA80-149 (TLM 042), locus A.

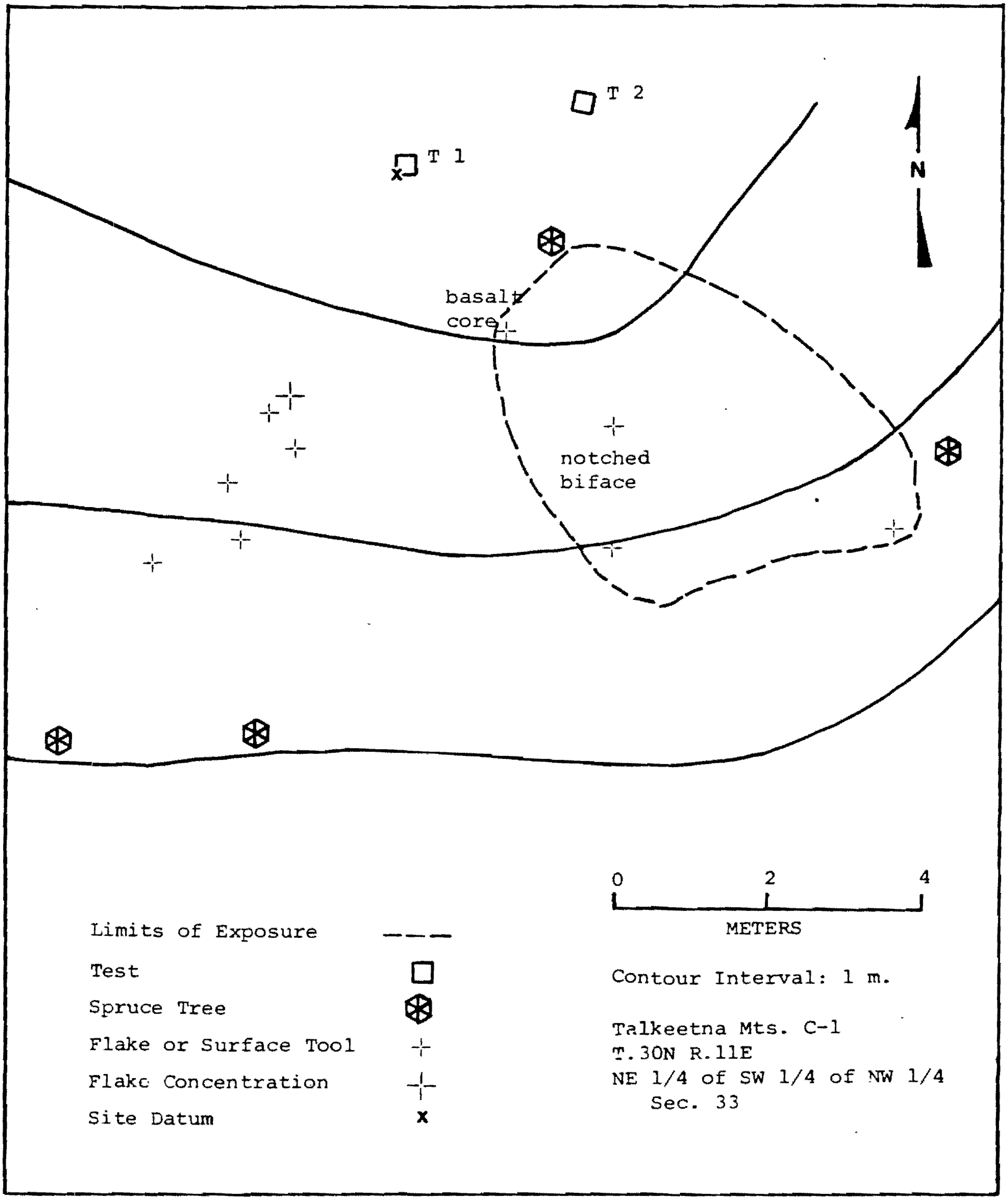


Figure 48.

Site map UA80-149 (TLM 042), locus B.

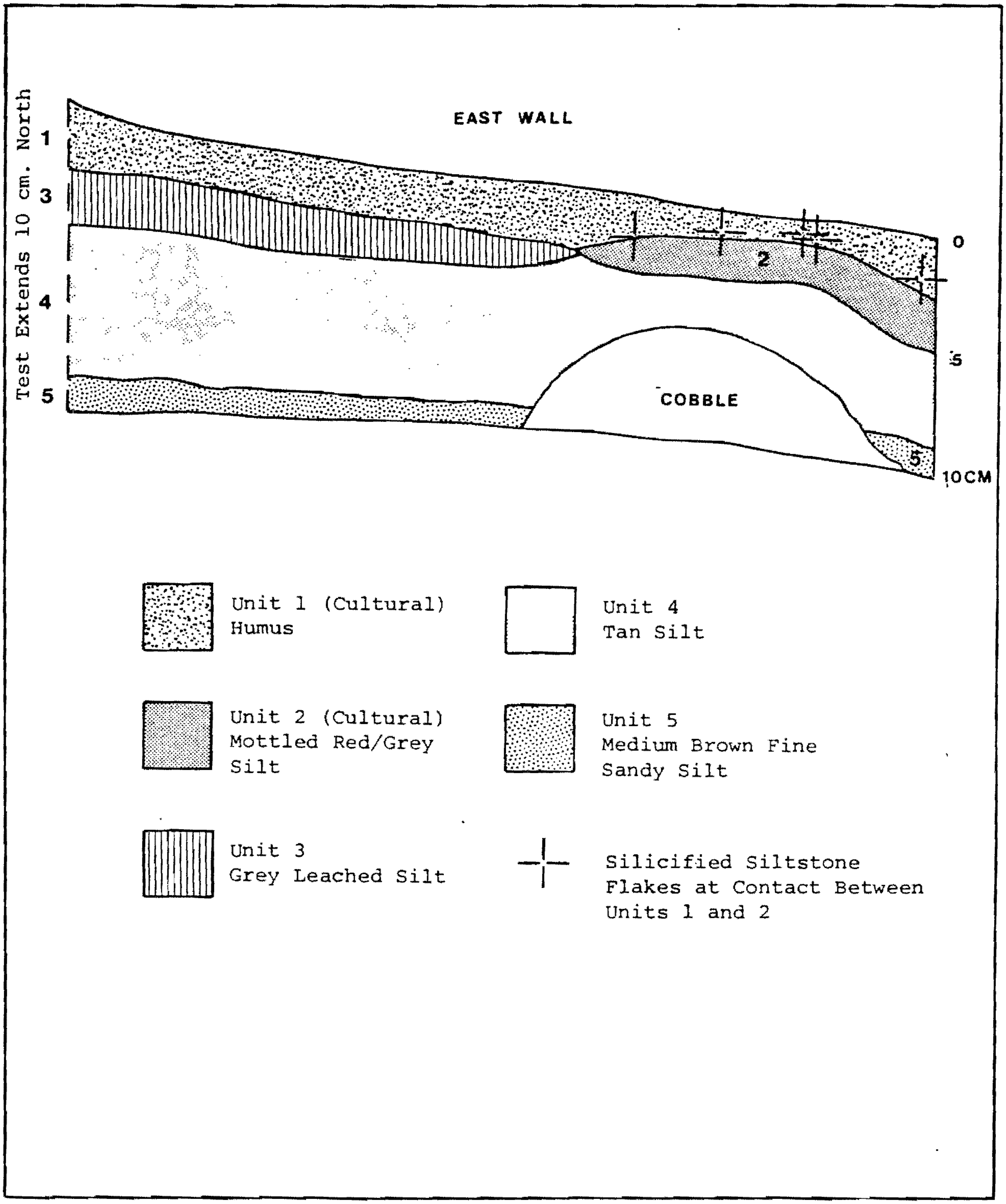


Figure 49.

Soil profile UA80-149 (TLM 042), locus A, test 1.

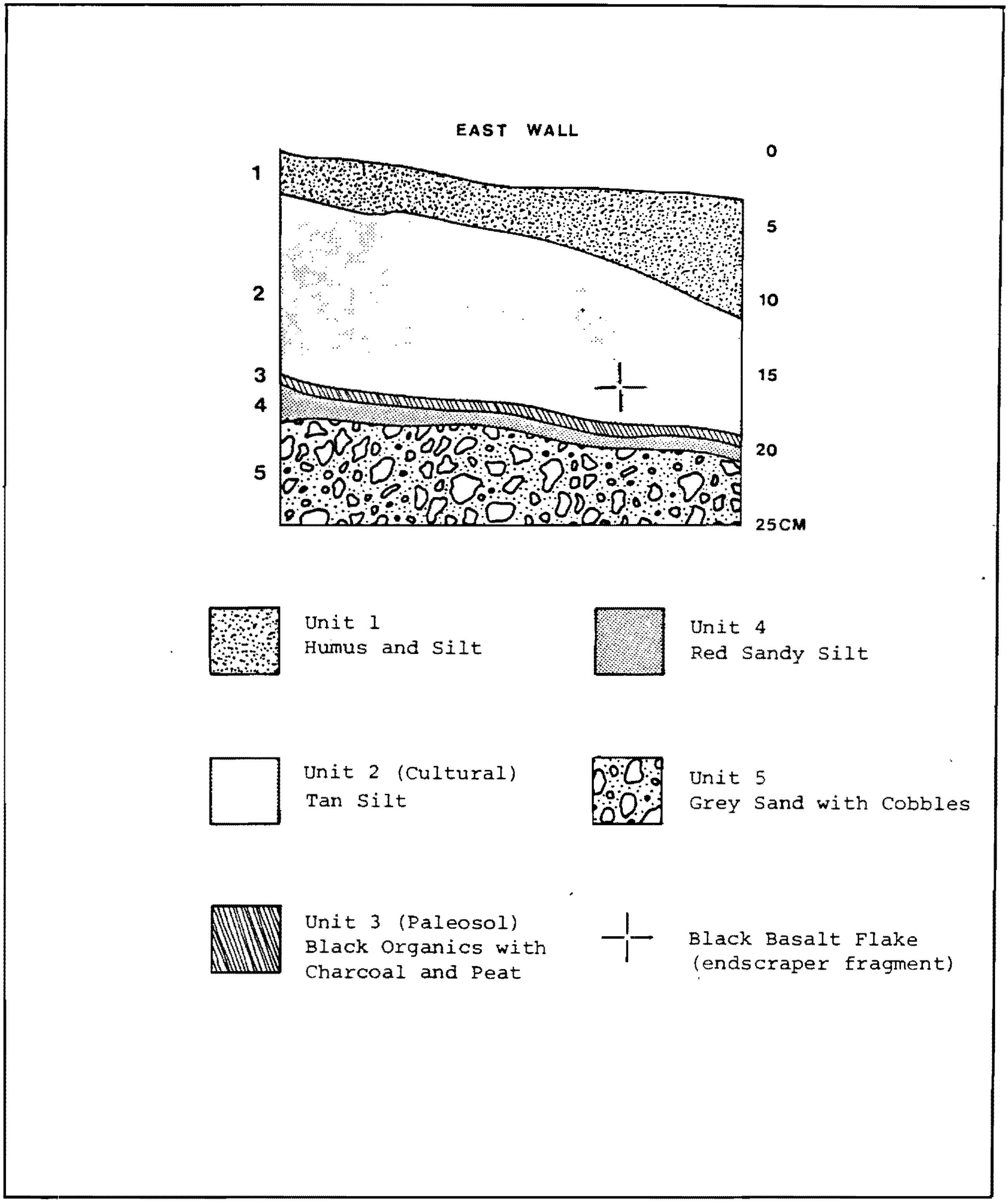


Figure 50.

Soil profile UA80-149 (TLM 042), locus B, test 1.

3.2.1.23 - Site UA80-150, State Number TLM 043

Area: Survey Locale 21

Area Map: Figure 101; Survey Locale Map: Figure 126

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 432800 Northing 6968100

Latitude 62°50'20" N., Longitude 148°19'10" W.

T. 32 N., R. 6 E., Seward Meridian

Sec. 27, NE¼SW¼NW¼

Site Map: Figure 51; Soil Profile: Figure 52

Setting: The site is located on a river terrace on the north side of the Susitna River, 200 m west of a tributary creek that joins the Susitna River from the north, approximately 3 km downriver from the mouth of Watana Creek (Figure 126). The site is approximately 400 m north of the Susitna River, between 488 m and 518 m asl (1600 to 1700 feet asl), and is approximately 23 m above the river. The orientation of the terrace is northwest-southeast and the site is located on a relatively flat surface approximately equidistant from the northeast and southwest edges. A higher ridge system is located to the north, northwest, and west of the site which is situated approximately 20 m from the point where these higher slopes meet the terrace. The site area is open but the view is restricted to approximately 30 m in all directions by trees which limit visibility to the immediate clearing. Both the Susitna River and the unnamed tributary creek to the east are easily accessible from the site and the mouth of the tributary lies approximately .5 km to the southeast. The clear water tributary is fast but shallow, draining several lakes northwest and northeast of the site. Vegetation on the site consists of willow, Labrador tea, blueberry, and sphagnum moss with black and white spruce scattered around the perimeter. Birch is present on the slopes of the terrace and birch and spruce become denser in all directions from the site with the understory becoming thicker closer to the creek and river.

Phase I Testing: There was no cultural material observed on the surface at the site location. A shovel probe (Figure 51, test 1) revealed a dense concentration of bone fragments at a depth of 7 to 11 cmbs in silty sand directly below the humus (Figure 52, unit 2). A total of 48 long bone fragments, 1 rib fragment, 3 caribou (Rangifer tarandus) phalanges, and approximately 380 very small bone fragments were recovered from test 1. A dark stain immediately below the sediment containing the faunal material appears to be a paleosol (Figure 52, unit 3). Two additional tests were excavated in the immediate vicinity of test 1 (Figure 51, tests 2 and 3). No additional faunal material was recovered from test 2 and only one bone fragment, found 11 cmbs, was recovered from test 3. None of the three subsurface tests at the site revealed lithic cultural material and no charcoal was observed in the tests.

Inventory of Collected Faunal Material

Test 1, 7-11 cmbs:	3 phalanges, distal portions, calcined, large mammal, caribou (Rangifer tarandus)
	4 long bone fragments, calcined, large mammal
	43 long bone fragments, calcined, medium-large mammal
	1 rib fragment, calcined, medium-large mammal
	1 long bone fragment, heavily burned, medium-large mammal
	ca. 380 small fragments, calcined, small-large mammal
Test 3, 11 cmbs:	1 small fragment, calcined, small-large mammal

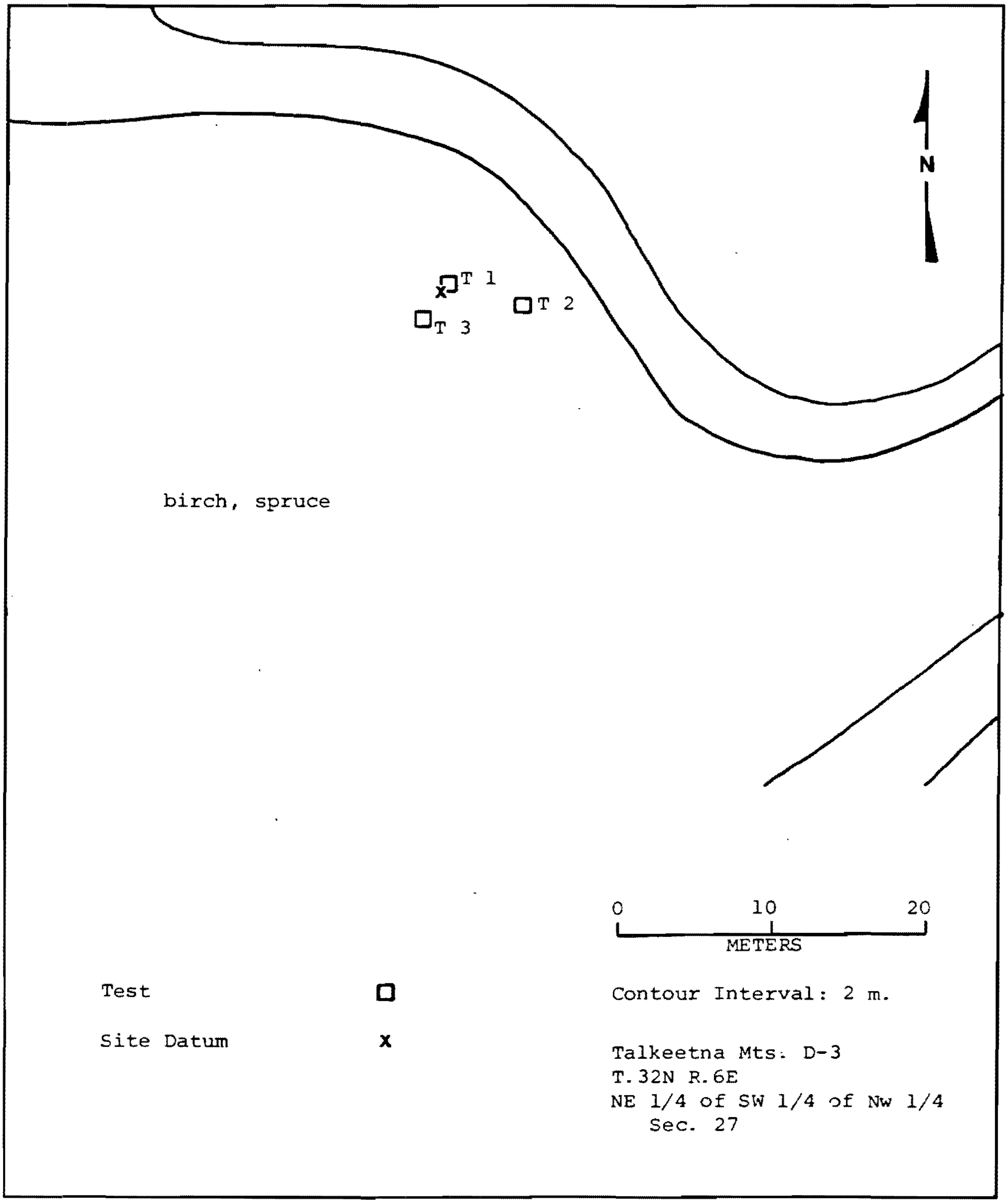


Figure 51.

Site map UA80-150 (TLM 043).

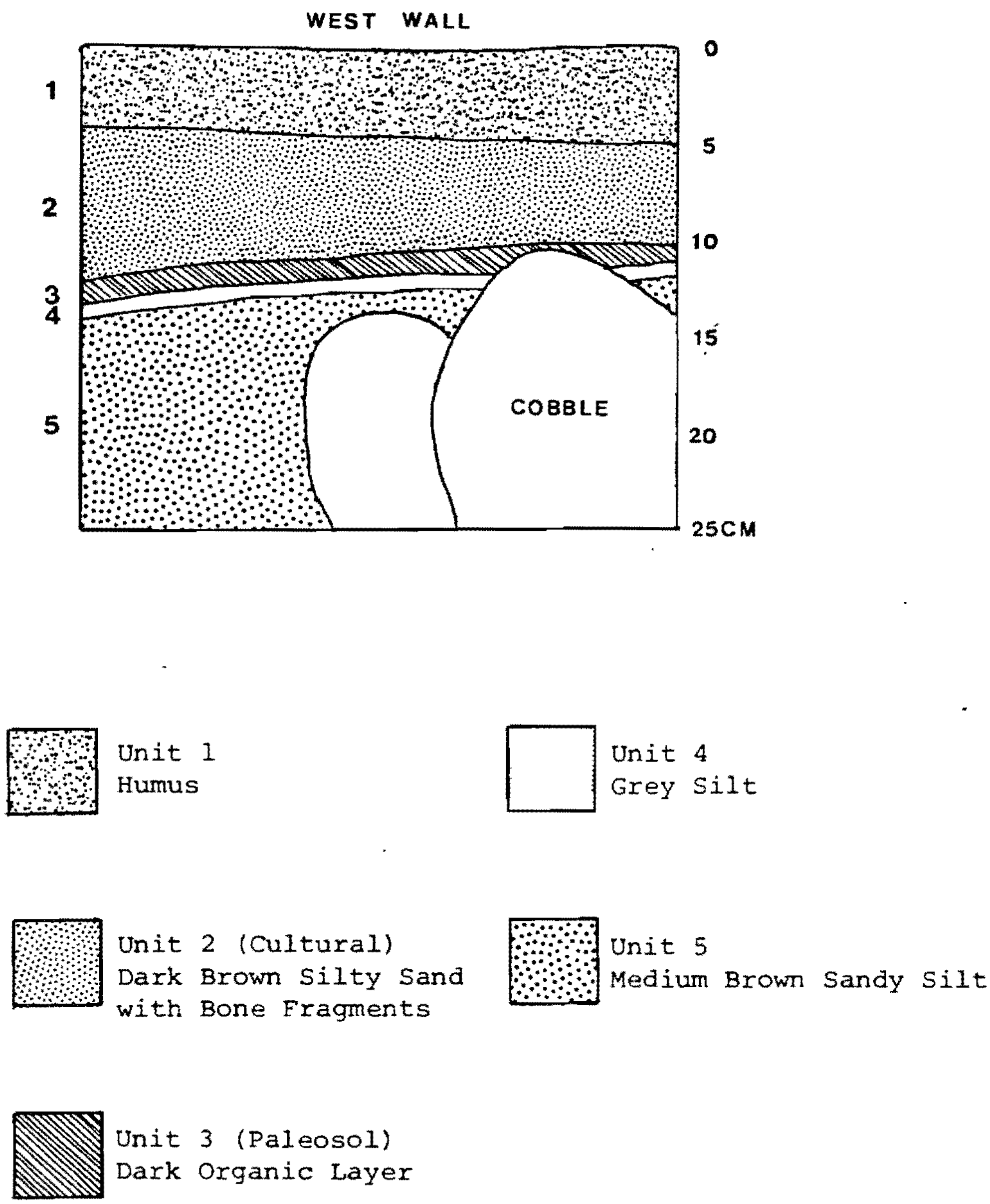


Figure 52.

Soil profile UA80-150 (TLM 043), test 1.

3.2.1.24 - Site UA80-151, State Number TLM 044

Area: Survey Locale 30
Area Map: Figure 102; Survey Locale Map: Figure 138
USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 450300 Northing 6964800

Latitude 62°48'45" N., Longitude 147°58'30" W.

T. 31 N., R. 8 E., Seward Meridian
Sec. 4, NE¼NW¼NW¼

Site Map: Figure 53; Soil Profile: Figure 54

Setting: The site, reported to project archeologists by Jo Fehyle, is located on a high plateau approximately 2.5 km north of the Susitna River about 6 km west of Jay Creek (Figure 138). A 1 km wide valley and lake system separates this plateau from higher mountains to the north. The site is situated at an elevation of 884 m (2900 feet asl) at the point of highest relief on the approximately 80 m long by 35 m wide deflated and exposed top of a discrete knoll. This knoll is one of a series of similar knolls, oriented generally northeast-southwest, which comprise a system of glacially scoured hills and ridges characteristic of this high plateau. The summit of the knoll is directly exposed to high winds and numerous blowouts are present. High relief affords a panoramic view of the surrounding terrain including the valley to the north, 122 m (400 feet) lower in elevation, which contains several small lakes approximately 800 m distant which are easily accessible from the site. Several kettle lakes are also visible at lower elevations to the southwest, the closest of which is 1 hectare in size and is located approximately 400 m southwest and 61 m lower in elevation. To the south, the Susitna River is not in view, and although access would not be difficult, the site appears to be primarily oriented towards the wide valley and lake system to the north. Vegetation is transitional between upland spruce-hardwood and alpine tundra. Vegetation on the site consists primarily of moss and lichens with scattered dwarf birch and willow. Black spruce occupy slopes of the knoll, increasing in density with lower elevation. Areas between knolls are marshy and poorly drained. Six additional sites have been identified to date in the same topographic context as site UA80-151. Other sites within 1 km are UA80-152 (TLM 045) and UA80-153 (TLM 046), and both are located on knolls immediately northeast of UA80-151.

Phase I Testing: Both surface and subsurface cultural material was observed at the site. Five surface lithic scatters are exposed in blowouts near the highest elevation of the knoll (Figure 53). A total of 22 flakes, 1 complete lanceolate projectile point, 1 retouched flake, 1 biface fragment, 1 uniface fragment, and 19 bone fragments were surface collected. Test 1, the only subsurface test (Figure 53) at scatter 1, revealed flakes and bone associated charcoal between the surface and with 8 cmbs.

Scatter 1: A total of 8 flakes were surface collected and 25 observed flakes were lift *in situ*. Test 1, excavated near the center of the scatter (Figure 53) produced 14 basalt flakes between the surface and 5 cmbs associated with burned bone. Dark stained earth containing concentrated burned bone and a single flake was found between 5 to 8 cmbs in this test (Figure 54, unit 2). The dark stain may suggest a hearth or similar feature, however, initial testing did not reveal charcoal. All of the flakes from test 1 were dark basalt. In addition to basalt, other lithologies represented in the surface artifacts are rhyolite, chert and chalcedony.

Scatter 2: Scatter 2 (Figure 53) consisted of three flakes only one of which, a quartzite flake, was collected.

Scatter 3: All of the observed artifacts at scatter 3 (Figure 53) were surface collected. These consisted of a complete lanceolate projectile point (UA80-151-1; Figure 84, a) of highly siliceous rhyodacite and 5 flakes of rhyolite and chert. In addition, 19 bone fragments were surface collected.

Scatter 4: All of the observed artifacts at scatter 4 (Figure 53) were surface collected. These consisted of only two flakes, a basalt flake with possible retouch along one margin (UA80-151-40; Figure 84, b) and a rhyolite flake.

Scatter 5: A total of 8 specimens were surface collected and 1 flake left *in situ* at scatter 5 (Figure 53). Collected artifacts consisted of a black chert biface fragment (UA80-151-42, Figure 84, c), a black chert uniface fragment (UA80-151-43, Figure 84, d) and 6 flakes. Brown and grey chert and black basalt are represented in the lithologies of the flakes.

Inventory of Collected Artifacts

Scatter 1

Surface:

4	Black basalt flakes
2	Grey rhyolite flakes
1	Clear chalcedony flake
1	Black chert flake

Subsurface:
Test 1, 0-8 cmbs:

15	Black basalt flakes

Scatter 2

1	White quartzite flake

Scatter 3

4 Grey rhyolite flakes
1 Grey chert flake
1 Grey siliceous rhyodacite complete lancoleolate projectile point

Scatter 4

1 Black basalt flake, possibly retouched
1 Light brown rhyolite flake

Scatter 5

1 Black chert biface fragment
1 Black chert uniface fragment
1 Black chert flake
1 Grey chert flake
4 Black basalt flakes

Inventory of Collected Faunal Material

Scatter 1
Test 1, 0-5 cmbs:
24 small long bone fragments, calcined, small-large mammal
5-8 cmbs:
ca. 45 small long bone fragments, calcined, small-large mammal

Scatter 3

Surface: 2 long bone fragments, calcined, medium-large mammal
17 small long bone fragments, calcined, small-large mammal

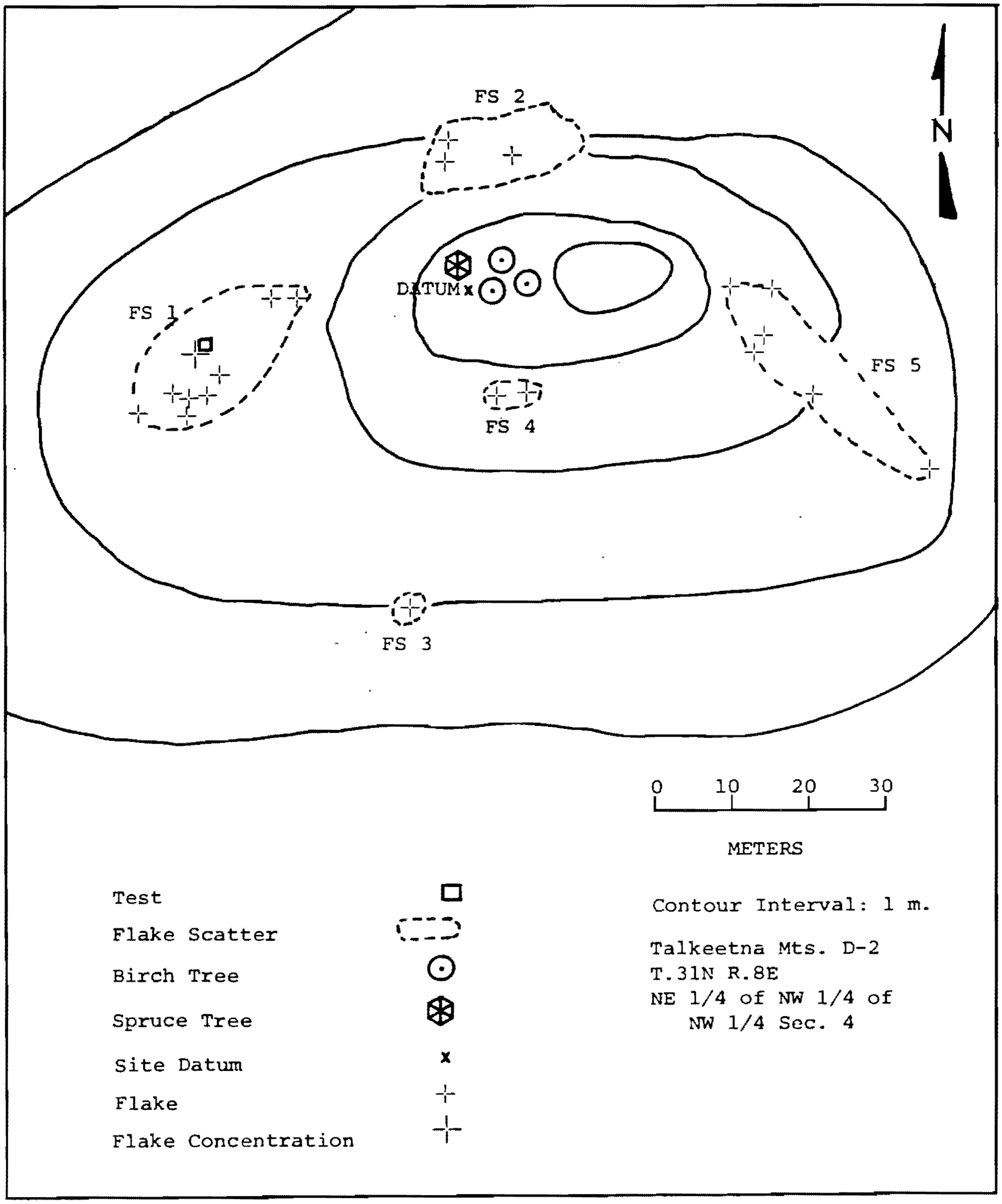


Figure 53.

Site map UA80-151 (TLM 044).

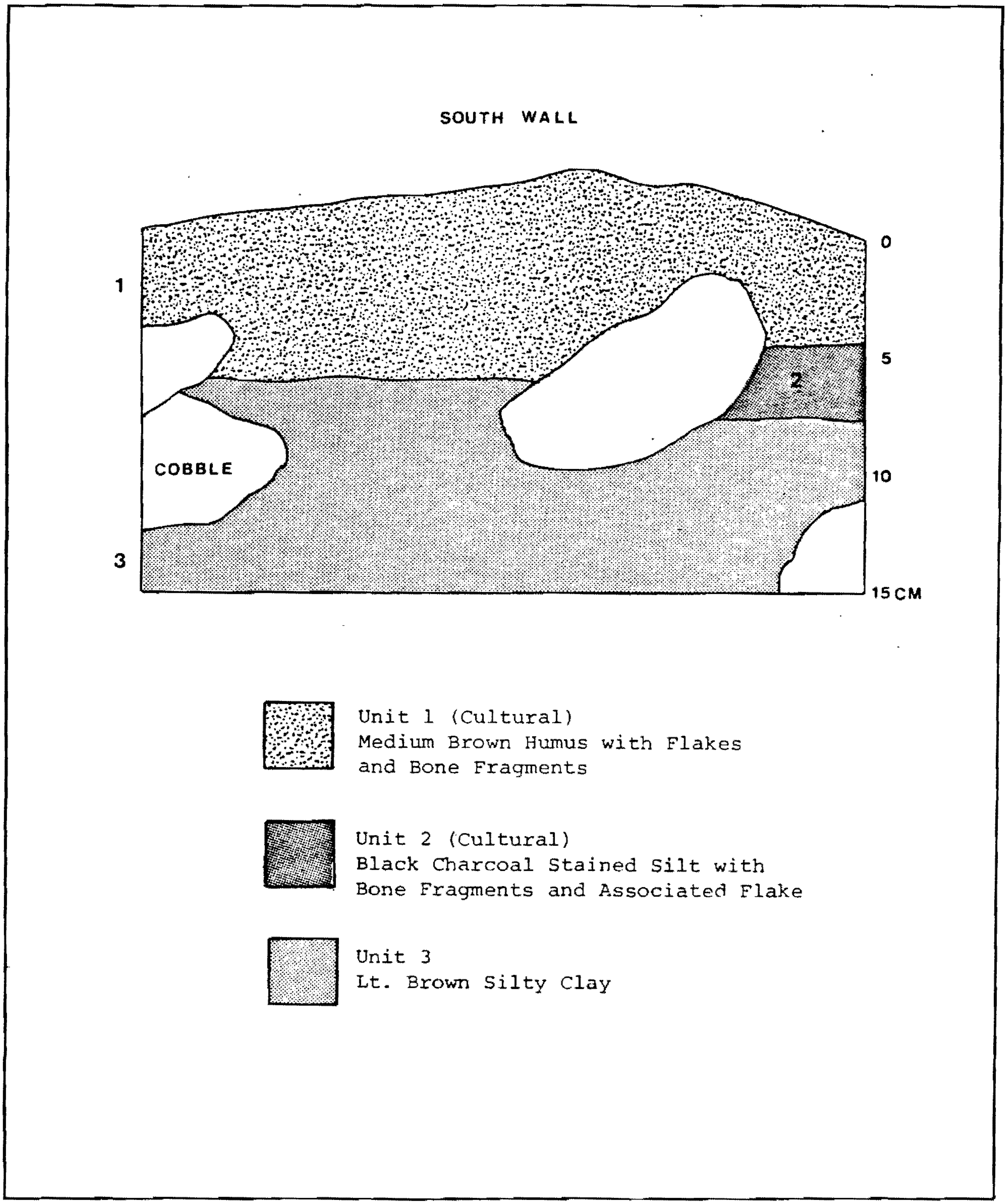


Figure 54.

Soil profile UA80-151 (TLM 044), scatter 1, test 1.

3.2.1.25 - <u>Site UA80-152, State Number TLM 045</u>

Area: Survey Locale 30
Area Map: Figure 102; Survey Locale Map: Figure 138
USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 450200 Northing 6965050 (Locus A)
Easting 450300 Northing 6965050 (Locus B)

Latitide 62°48'54" N., Longitude 147°58'20" W. (Locus A)
Latitude 62°48'54" N., Longitude 147°58'15" W. (Locus B)

<u>T. 32 N., R. 8 E., Seward Meridian</u>
Sec. 33, SW¼SE¼SW¼ (Locus A and B)

Site Map: Figure 55; Soil Profile: Figure 57 (Locus A)
Site Map: Figure 56 (Locus B)

<u>Setting</u>: The general location, elevation and topographic setting of site UA80-152 (Figure 138) is similar to that of UA80-151 (TLM 044). The site, consisting of two loci (A and B), is located on the south and east facing slopes of a knoll approximately 300 m northeast of site UA80-151 and slightly lower in elevation. Both knolls are connected to the same ridge line by a low broad saddle of approximately the same elevation as the lower knoll.

<u>Locus A</u> is situated on the southern slope of the knoll, just below the 10 m by 20 m flat summit (Figure 138). The northern and northwestern slopes of the knoll drop off steeply approximately 107 m (340 feet) to the elevation of the valley and lake system to the north. The view from the immediate vicinity of locus A is to the south and is limited by intervening topography to less than 100 m. However, from the top of the knoll, only a few m away, a panoramic

view is available which overlooks the broad valley, lakes, and connecting outlet streams to the north. One possible reason for locus A to be located slightly below the exposed summit of the knoll is that strong winds are apparently quite frequent in this vicinity and prehistoric hunters may have sought shelter from these.

Locus B is situated 15 m lower in elevation and 104.5 m east of the summit on an east facing slope overlooking a small valley (Figure 138). The view from this location includes both the valley to the north and low marshy areas and kettle lakes to the southeast. A 3 hectare lake is visible and easily accessible approximately 1.3 km to the southwest. Numerous bedrock and glacial drift exposures are present in the immediate vicinity of the site. Dwarf willow, crowberry, grasses, moss, and lichen form the predominant vegetation at the site and a few isolated spruce are present. Upland spruce forest occupies the low lying valley to the north with areas of marsh and muskeg occurring at the lowest elevations in the valley. To the east and west spruce increase in frequency as elevation decreases. Site UA80-153 (TLM 046) is located approximately 200 m to the northeast.

Phase I Testing: Both surface and subsurface cultural material was recovered from three flake scatters comprising two loci (A and B) situated approximately 104 m apart (Figures 55 and 56). A complete projectile point, a complete microblade, a microblade fragment, a retouched flake, and 62 bone fragments were surface collected at the site. In addition, a total of 63 flakes were surface collected and approximately 126 observed surface flakes were left *in situ*. A subsurface test at scatter 1 (Figure 55, test 1) produced 3 flakes, bone, charcoal, and possible fire-cracked rock at a depth of 5 to 17 cmbs.

Locus A

Scatter 1: Scatter 1 is located in a blowout 4 m south of the site datum (Figure 55). One translucent chalcedony microblade fragment and one complete microblade of the same material (UA80-152-3 and 5; Figure 84, e and f) were surface collected from this blowout. Four basalt flakes were also surface collected and six basalt flakes were left in situ.

Scatter 2: Scatter 2 is located in a blowout 7 m southeast of the site datum (Figure 55). A dark brown chert flake retouched on one margin (UA80-152-15), 28 flakes, and 22 bone fragments were surface collected from this blowout and an additional 77 flakes were left in situ. Most of the collected and observed flakes are basalt but other lithologies represented include brown and grey chert and rhyolite. Test 1, excavated near the northern edge of the blowout (Figure 55), produced 1 rhyolite and 2 basalt flakes between 6 and 10 cmbs from a grey silt (Figure 57, unit 2) and burned bone and charcoal between 5 to 17 cmbs were probably associated with the flakes. In addition, rock exhibiting possible thermal cracking and discoloration (UA80-152-178) was recovered between 10 to 12 cmbs in this test. This probable hearth in test 1 extended throughout the 40 cm by 40 cm test and was more deeply buried in the southwest corner. Twenty-five small basalt and rhyolite flakes, about 280 very small bone fragments, and charcoal were recovered from four soil samples (UA80-152-74, 75, 76, and 77) collected from test 1 between 10 to 12 cmbs.

Locus B

Locus B, located in a blowout 104.5 m east of the site datum (Figure 56), is a surface lithic scatter. A complete grey chert projectile point (UA80-152-37; Figure 84, g) with a constricted, thinned, straight base was surface collected from this blowout. In addition, 31 flakes, primarily of light and dark grey chert but including brown chert and clear obsidian, were surface collected. Approximately 44 light brown rhyolite flakes were left *in situ*. Faunal material surface collected consisted of 41 bone fragments. These included 1 unidentified phalanx, 1 phalanx identified as caribou (*Rangifer tarandus*), 1 possible caribou (*Rangifer tarandus*) tarsal fragment, and a right and left maxilla identified as arctic ground squirrel (*Spermophilus parryi*).

Collected Artifact Inventory

Locus A
Scatter 1
Surface:

4	Black basalt flakes
1	Distal end translucent chalcedony microblade
1	Complete translucent chalcedony microblade

Scatter 2
Surface:

21	Black basalt flakes
5	Grey chert flakes
1	Yellowish brown chert flake
1	Pale brown rhyolite flake
1	Dark brown chert flake retouched on one margin

Subsurface:
Test 1, 6-17 cmbs:

2	Black basalt flakes
1	Grey rhyolite flake
4	Soil samples (containing ca. 290 bone fragments and 25 flakes)
16	Rock fragments (possible thermal fracture and discoloration)

Locus B
Surface:

1	Grey chert complete projectile point with a constricted, thinned, straight base
15	Grey chert flakes
7	Yellowish grey chert flakes
8	Light brown chert flakes
1	Clear obsidian flake

Collected Faunal Material Inventory

Locus A
Scatter 2
Surface:

2 Long bone fragments, calcined, medium-large mammal
20 Unidentified, calcined, small-large mammal

Subsurface:
Test 1, 5-17 cmbs:

1 Unidentified, calcined, small-large mammal
1 Phalanx fragment, calcined, large mammal
1 Flat bone fragment, calcined, medium-large mammal
1 Tarsal fragment, calcined, large mammal, possibly caribou (Rangifer tarandus)
12 Long bone fragments, calcined, medium-large mammal
ca. 280 small fragments, calcined, small-large mammal

Locus B
Surface:

1 Phalanx, proximal 1/5, large mammal, caribou (Rangifer tarandus)
1 Maxilla right fragment with teeth, small mammal, Arctic ground squirrel (Spermophilus parryi)
1 Maxilla left fragment with teeth, Arctic ground squirrel (Spermophilus parryi))
22 Small fragments, calcined, small-large mammal

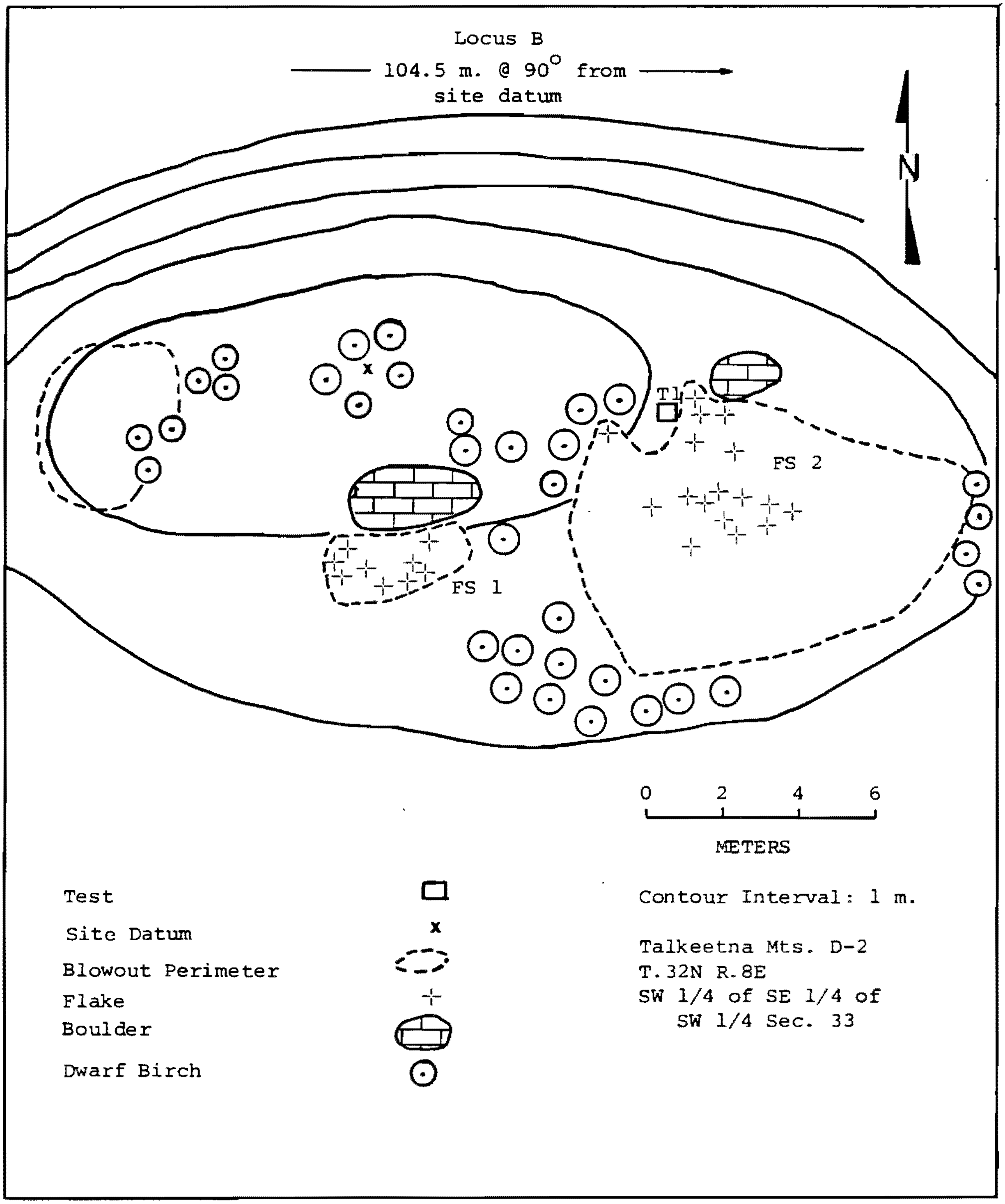


Figure 55.

Site map UA80-152 (TLM 045), locus A.

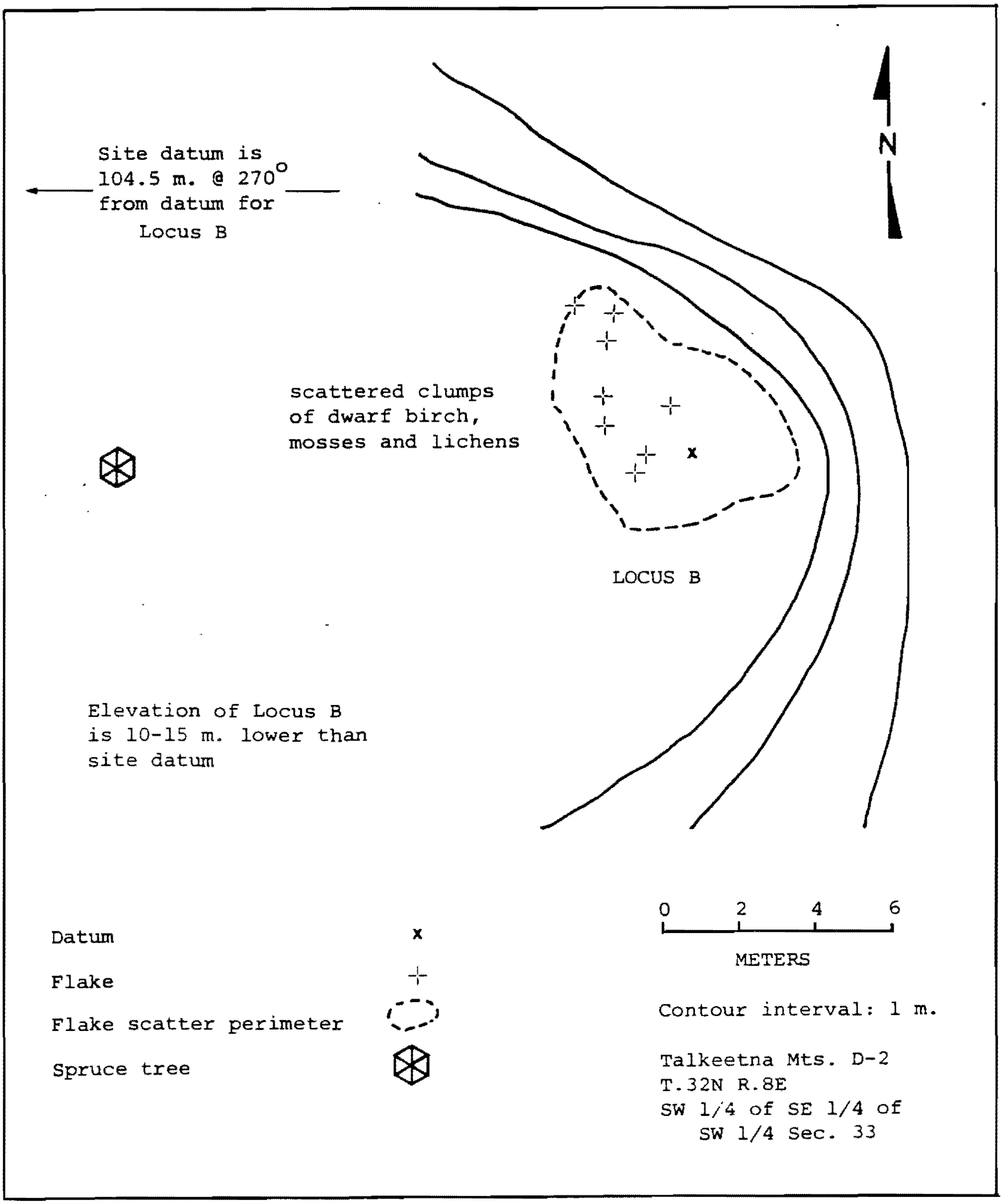
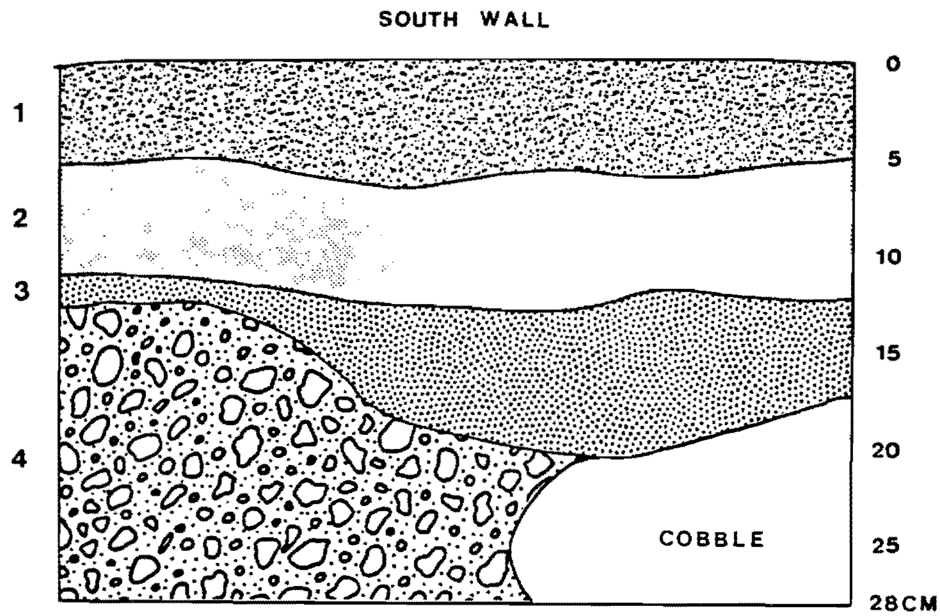
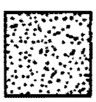


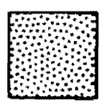
Figure 56.

Site map UA80-152 (TLM 045), locus B.

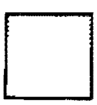




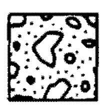
Unit 1
Dark Brown Humus



Unit 3 (Cultural)
Dark Red Brown Sandy Silt with Bone Fragments and Possible Fire Cracked Rock



Unit 2 (Cultural)
Grey Silt with Basalt Flakes, Bone Fragments and Possible Fire Cracked Rock



Unit 4
Medium Brown Sand with Gravel, Pebbles and Small Cobbles

Figure 57.

Soil profile UA80-152 (TLM 045), locus A, test 1.

3.2.1.26 - Site UA80-153, State Number TLM 046

Area: Survey Locale 30

Area Map: Figure 102; Survey Locale Map: Figure 138

USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 450750 Northing 6965100

Latitude 62°48'58" N., Longitude 147°58'00" W.

T. 32 N., R. 8 E., Seward Meridian

Sec. 33, E½SE¼SW¼

Site Map: Figure 58; Soil Profile: Figure 59

Setting: The general location, elevation, and topographic setting of site UA80-153 (Figure 138) is similar to that of UA80-151 (TLM 044) and UA80-152 (TLM 045). Site UA80-153 is situated on the top of the easternmost and highest of three knolls, all of which are slightly above the 884 m (2900 feet asl) elevation. Sites UA80-151 (TLM 044) and UA80-152 (TLM 045) are located on the lower knolls to the southwest and are both within 500 m of site UA80-153 (Figure 138). All three knolls are part of the same general landform and the western slope of the highest knoll joins the ridge upon which the two lower knolls are situated. Site UA80-153 is located at the northern end of a north-south oriented knoll which affords the most commanding panoramic view of any of the surrounding terrain features. The view encompasses both the valley to the north with its series of interconnected lakes, and the lower elevations to the east and southeast with kettle lakes approximately 1 km southeast and 700 m southwest. All of the lakes and streams visible from the site are easily accessible. Like the other knolls in the vicinity, exposed bedrock and deflated surfaces occur over much of the site. There are no trees on top of the knoll and what vegetation there is consists of moss, lichen, and very low brush. Vegetation becomes denser with decrease in elevation in all directions. Scattered spruce are present in low wet areas below the site with alder and willow forming the primary vegetation on better drained areas on the slopes of ridges and knolls.

Phase I Testing: Both surface and subsurface cultural material was recovered from four flake scatters covering an area approximately 40 m by 110 m at the summit of the knoll (Figure 58). Two projectile point bases, an endscraper fragment, 48 flakes, and about 200 bone fragments were surface collected at the site. Some surface bone and 43 observed flakes were left *in situ*. Three subsurface tests were excavated, only one of which (test 2) produced cultural material (Figure 58). Test 2, at scatter 1, revealed a possible hearth associated with flakes and burned bone. Artifact lithologies at the site include basalt, red and grey chert, rhyolite, quartzite, and obsidian.

Scatter 1: Scatter 1, exposed on the deflated edge at the extreme northern end of the knoll, is approximately 20 m northwest of the site datum (Figure 58). A total of 17 flakes were surface collected at scatter 1 and two basalt flakes were left *in situ*. Test 2 (Figure 58) produced 30 flakes between the surface and 16 cmbs and revealed charcoal and burned bone between 5 to 16 cmbs (Figure 59). A radiocarbon determination of 2340 ± 145 years B.P.: 390 B.C. (DIC-1903) was obtained on a charcoal sample (UA80-153-38a) from this hearth. Three black obsidian flakes were recovered from the same depth as the hearth (Figure 59) and a fourth black obsidian flake was found between 5 and 10 cmbs. Other lithologies present at scatter 1 include basalt, grey and white chert, and rhyolite.

Scatter 2: Scatter 2, located 15 m southwest of scatter 1 and just north of the site datum (Figure 58), contains both lithic and bone material on the surface. No test was excavated at this scatter. Surface collected artifacts include the concave base of a basally-thinned basalt projectile point (UA80-153-50; Figure 85, a), a fragment of a grey chert projectile point base (UA80-153-53; Figure 85, b), one basalt flake, one quartzite flake, and about 100 small bone fragments. Two basalt flakes and a single rhyolite flake were left in situ.

Scatter 3: Scatter 3, located 15 m south of the site datum, consists of surface lithics and bone (Figure 58). Test 1, excavated at the northwestern edge of the scatter did not reveal subsurface cultural material (Figure 58). Artifacts collected from the surface of scatter 3 include a unifacial black basalt endscraper fragment (UA80-153-55; Figure 85, c), 28 flakes, and about 100 small bone fragments. Artifacts left in situ include 29 basalt, 5 rhyolite, and 3 chert flakes in addition to faunal material.

Scatter 4: Scatter 4, located 107 m southeast of the site datum, was a surface lithic scatter from which all of the observed cultural material was collected. A black chert endscraper fragment (UA80-153-87) and 3 flakes were surface collected. Lithologies represented at scatter 4 include basalt, chert, and rhyolite. Test 3 excavated at scatter 4 produced no subsurface cultural material.

Collected Artifact Inventory

Scatter 1
Surface:

8	Black basalt flakes
4	Whitish grey rhyolite flakes
2	Grey rhyolite flakes
1	White chert flake
1	Banded chert flake
1	Grey chert flake

Test 2, 0-16 cmbs:
- 21 Black basalt flakes
- 1 Whitish grey rhyolite flake
- 2 Grey rhyolite flakes
- 1 Grey chert flake
- 1 Light brown rhyolite flake
- 4 Black obsidian flakes

Scatter 2
Surface:
- 1 Black basalt projectile point base (basally-thinned, concave base)
- 1 Grey chert projectile point base fragment (basally-thinned)
- 1 Black basalt flake
- 1 White quartzite flake

Scatter 3
Surface:
- 1 Black basalt unifacial endscraper fragment
- 5 Black basalt flakes
- 16 Whitish grey rhyolite flakes
- 3 Grey rhyolite flakes
- 1 Translucent quartz flake
- 3 Red chert flakes

Scatter 4
Surface:
- 1 Black chert endscraper fragment
- 1 Black basalt flake
- 1 Light brown rhyolite flake
- 1 Dark red chert flake

Collected Faunal Material Inventory

Scatter 1
Test 2, 5-10 cmbs:
- 4 long bone fragments, calcined, medium-large mammal

10-16 cmbs:
- 4 small long bone fragments, 2 calcined, 2 heavily burned, medium-large mammal

Scatter 2
Surface:
- 7 Long bone fragments, calcined, medium-large mammal
- 1 Long bone fragment, calcined, small-large mammal
- ca. 100 small fragments, calcined, small-large mammal

Scatter 3
Surface:
- 1 Carpal and tarsal fragment, calcined, medium-large mammal
- 4 Long bone fragments, calcined, medium-large mammal
- ca. 100 small fragments, calcined, small-large mammal

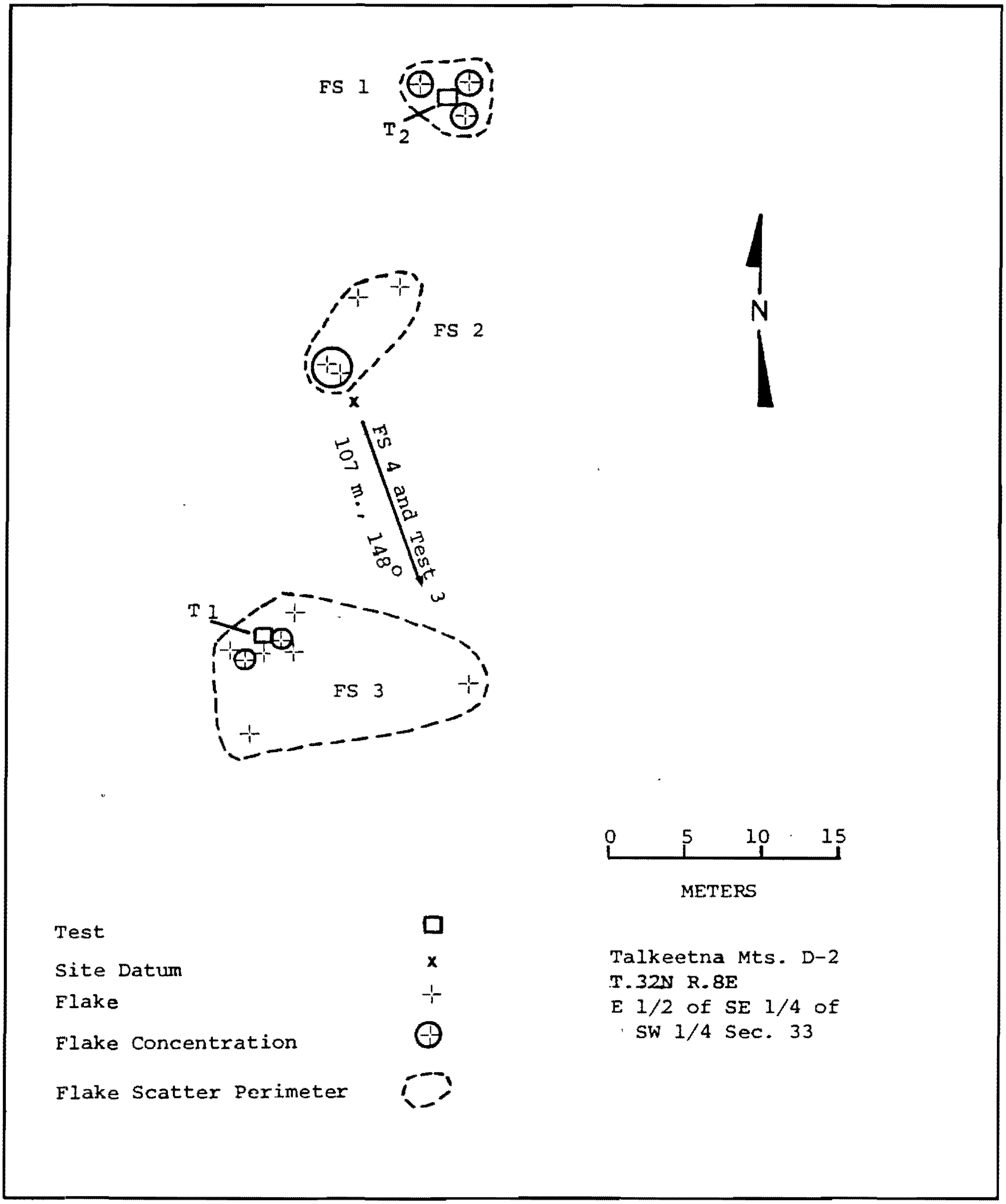


Figure 58.

Site map UA80-153 (TLM 046).

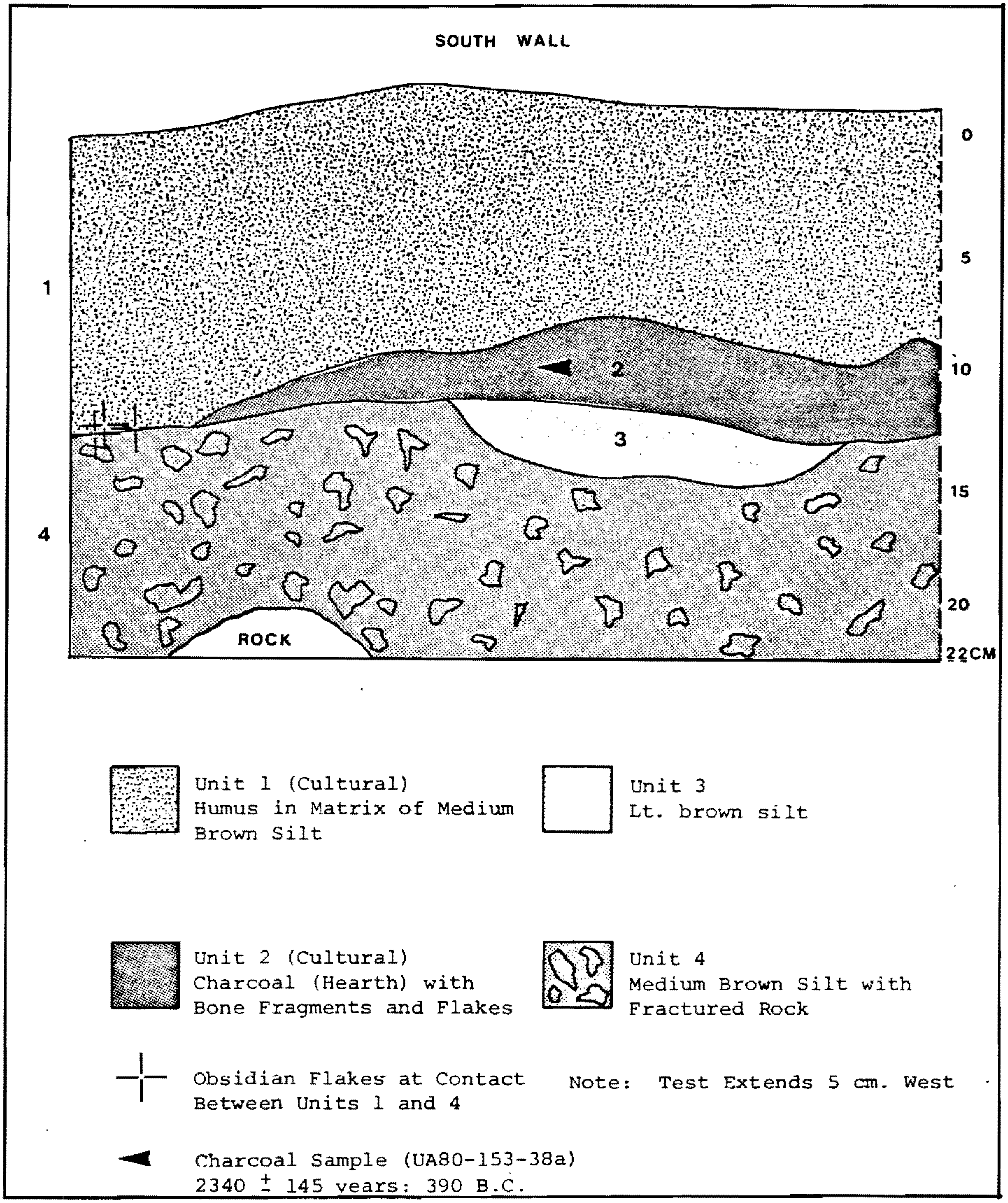


Figure 59.

Soil profile UA80-153 (TLM 046), scatter 1, test 2.

3.2.1.27 - Site UA80-154, State Number TLM 047

Area: Survey Locale 34

Area Map: Figure 103; Survey Locale Map: Figure 144

USGS Map: Talkeetna Mts. C-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 465100 Northing 6954600

Latitude 62°43'20" N., Longitude 147°40'58" W.

T. 30 N., R. 9 E., Seward Meridian

Sec. 1, NW¼SW¼NE¼

Site Map: Figure 60; Soil Profile: Figure 61

Setting: The site is located at an elevation of 853 m (2800 feet asl) on the west side of the Susitna River approximately 9 km downstream from Vee Canyon (Figure 103). Situated on the north end of a north-south oriented bedrock ridge approximately 274 m (900 feet) above the Susitna River, the site is approximately 800 m west of the river. To the west of the site a sheer bedrock cliff drops approximately 30 m to an old river channel which is occupied by a small pond surrounded by marsh. The pond is directly below and southwest of the site (Figure 144). Located on the western edge of the northern point of the ridge overlooking this pond, the site is situated on the only relatively level part of the ridge. The site location is also the only part of the ridge where there is appreciable soil accumulation. The rest of the ridge crest, which extends south for approximately 125 m, is primarily exposed bedrock. Beyond the deeply incised old stream channel immediately west of the site, the terrain continues to rise to an elevation of 1040 m (3422 feet asl). To the east a steep slope descends to the Susitna River. The Susitna River valley and the river itself is visible to the north, east, and south but the view to the west is restricted by bedrock cliffs and higher terrain. The site is located on a deflated gravel exposure with dwarf willow, low berry bushes, moss, and grasses scattered along the ridge where soil is sufficient to support vegetation. Vegetation is sparse on the sheer western slope of the ridge, but where the slope can support them, both birch and spruce are present. To the east spruce become denser with decrease in elevation and proximity to the river.

Phase I Testing: The site consists of a 3 meter by 10 meter surface lithic scatter exposed on the deflated crest of a bedrock ridge (Figure 60). Artifacts surface collected from the site include a grey chert biface fragment (UA80-154-5; Figure 85, d), the distal end of a light brown chert microblade (UA80-154-5; Figure 85, e) and a light brown chert flake retouched along one margin (UA80-154-14; Figure 85, f).

In addition 24 flakes were surface collected and about 70 light brown rhyolite flakes were left *in situ*. Two tests excavated at the site (tests 1 and 2) did not reveal subsurface cultural material (Figure 60). Test 2 (Figure 60) revealed glacial drift and fractured rock at a depth of 25 to 30 cmbs overlain by 20 to 25 cm of silt and sandy silt. Intensive surface reconnaissance and subsurface testing (where possible) along the entire ridgetop failed to reveal additional cultural material and the site appears to be limited to only the extreme northern end of the ridge.

Collected Artifact Inventory

1	Light grey chert biface fragment
1	Light brown chert microblade fragment, distal end
1	Light brown chert flake with retouch on one margin
21	Light brown rhyolite flakes
1	Grey rhyolite flake
2	Black basalt flakes

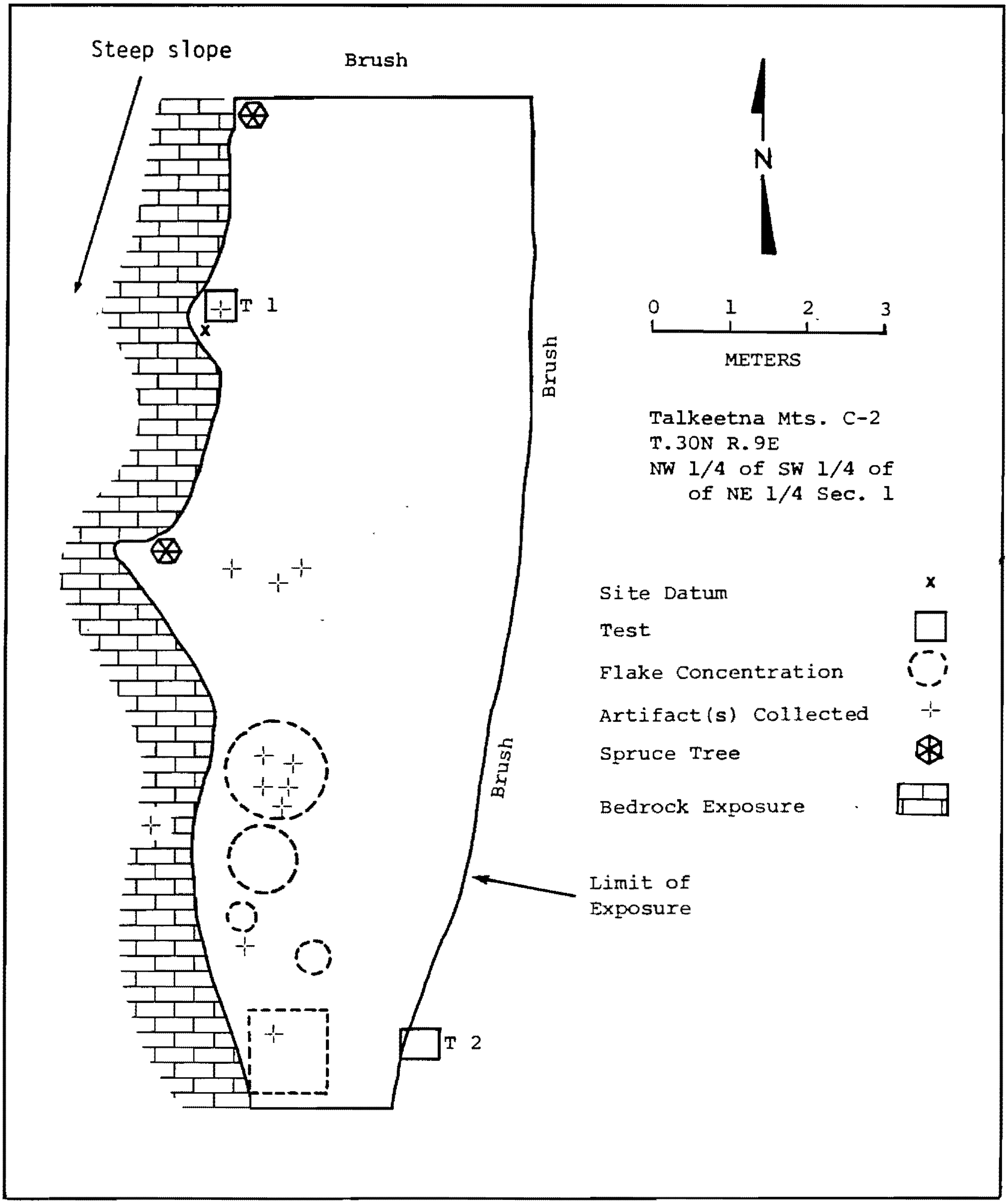


Figure 60.

Site map UA80-154 (TLM 047).

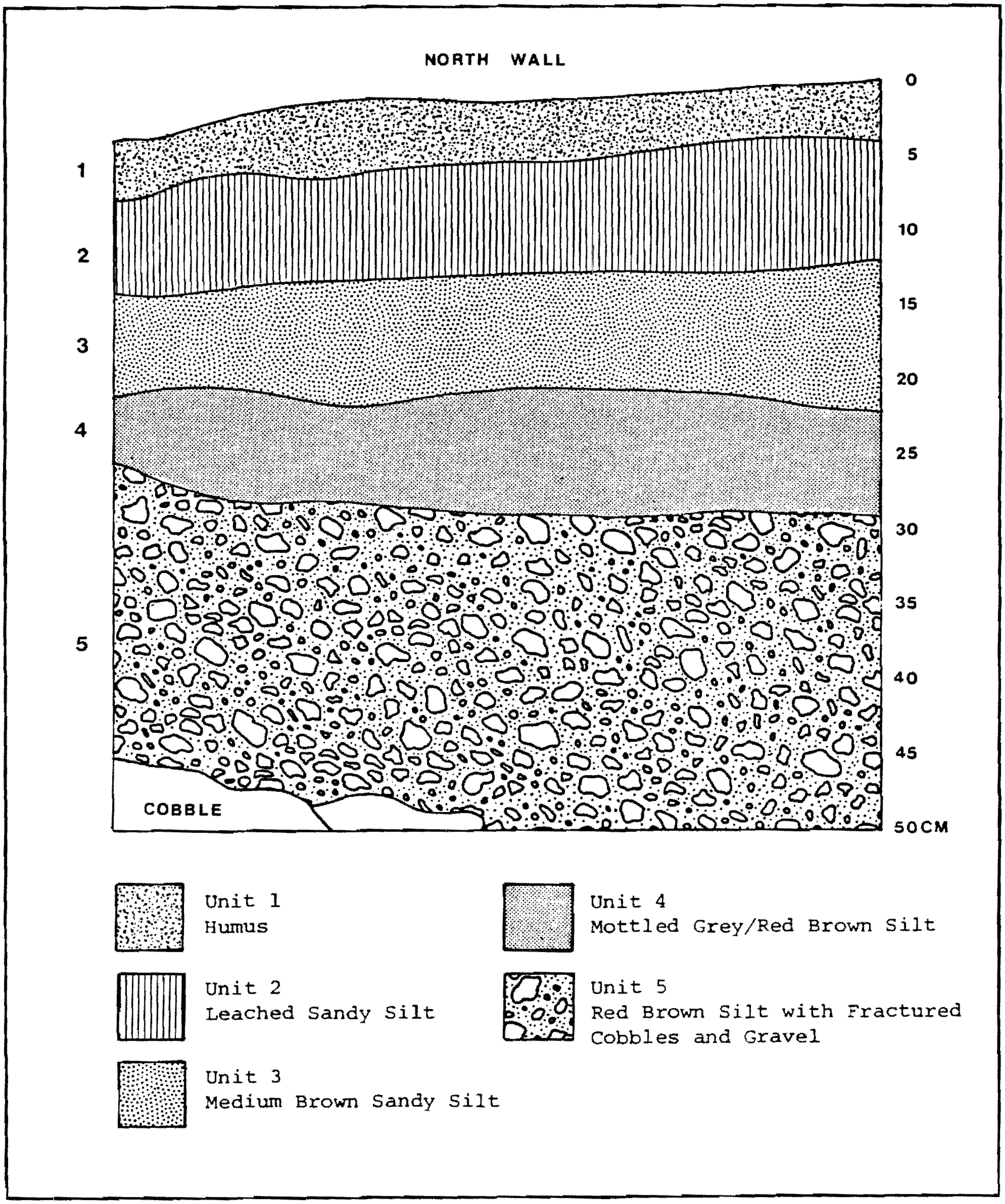


Figure 61.

Soil profile UA80-154 (TLM 047), test 2.

3.2.1.28 - Site UA80-155, State Number TLM 048

Area: Survey Locale 27

Area Map: Figure 101; Survey Locale Map: Figure 132

USGS Map: Talkeetna Mts. D-3, Scale: 1:63,360

Site Location: UTM Zone 6 Easting 439650 Northing 6967950

Latitude 62°50'18" N., Longitude 148°11'10" W.

T. 32 N., R. 7 E., Seward Meridian

Sec. 29, SW¼NW¼NE¼

Site Map: Figure 62; Soil Profile: Figure 63

Setting: The site, at an elevation of approximately 640 m (2100 feet asl), is located at the northern end of an 18 hectare lake approximately 3 km east of Watana Creek and 1.1 km north of the Susitna River (Figure 132). Situated at the top of a 20 m high discrete rounded knoll, approximately 100 m east of the lake's outlet stream, the site is located at the point of highest relief on the relatively flat summit at the northwestern end of the knoll. The knoll itself is approximately 100 m long by 40 m wide and is oriented to the northwest. The view from the site is panoramic and varies in distance from .5 km to 1 km depending on topography. To the west and south, the view encompasses the outlet stream and the entire northern margin of the lake and to the northeast it includes a low marshy area where the lake outlet stream joins a small slow-moving creek. Access to the lake, outlet stream, and all of the immediate surrounding terrain is excellent and access to Watana Creek would be fairly easy by following the outlet stream which joins Watana Creek approximately 2.6 km northwest of the site. The knoll upon which the site is located is one of several knolls around the lake which offers excellent views of the lake and the surrounding kettle and kame topography. Site UA80-146 (TLM 039) is located at the southeastern end of the lake on the highest knoll on the lake margin (Figure 132). The immediate vicinity of the site is well drained with ground vegetation consisting primarily of dwarf birch, Labrador tea, low bush cranberry, crowberry, and a deep mat of moss and lichen. A few scattered white spruce and birch occupy the top of the knoll. Brush on the slopes of the knoll is higher and much denser than on the relatively open summit. The surrounding terrain varies from well drained ridges and knolls with white spruce, birch, and high brush to low marshy areas with muskeg, sphagnum moss, grasses, and dense black spruce.

Phase I Testing: No cultural material was observed on the surface at the site location. A total of three shovel probes and two tests were excavated on the summit of the knoll (Figure 62). Shovel probes 1 and 2 did not produce cultural material, however, shovel probe 3, expanded into test 1, produced a grey chert biface (UA80-155-1; Figure 85, g) between 15 to 20 cmbs associated with a dark grey volcanic ash (Figure 63, unit 6). Glacial drift was encountered below the ash. An ash sample (UA80-155-2) was collected. A dark organic lens, possibly a paleosol, was present directly above the ash between 12 to 17 cmbs (Figure 63, unit 5). Test 2, located 6 m northwest of test 1, did not reveal additional cultural material. The relatively flat summit of this knoll makes available a large surface area which could have been utilized and the site may be more extensive than initial testing indicates.

Collected Artifact Inventory

1	Grey chert biface
1	Ash sample

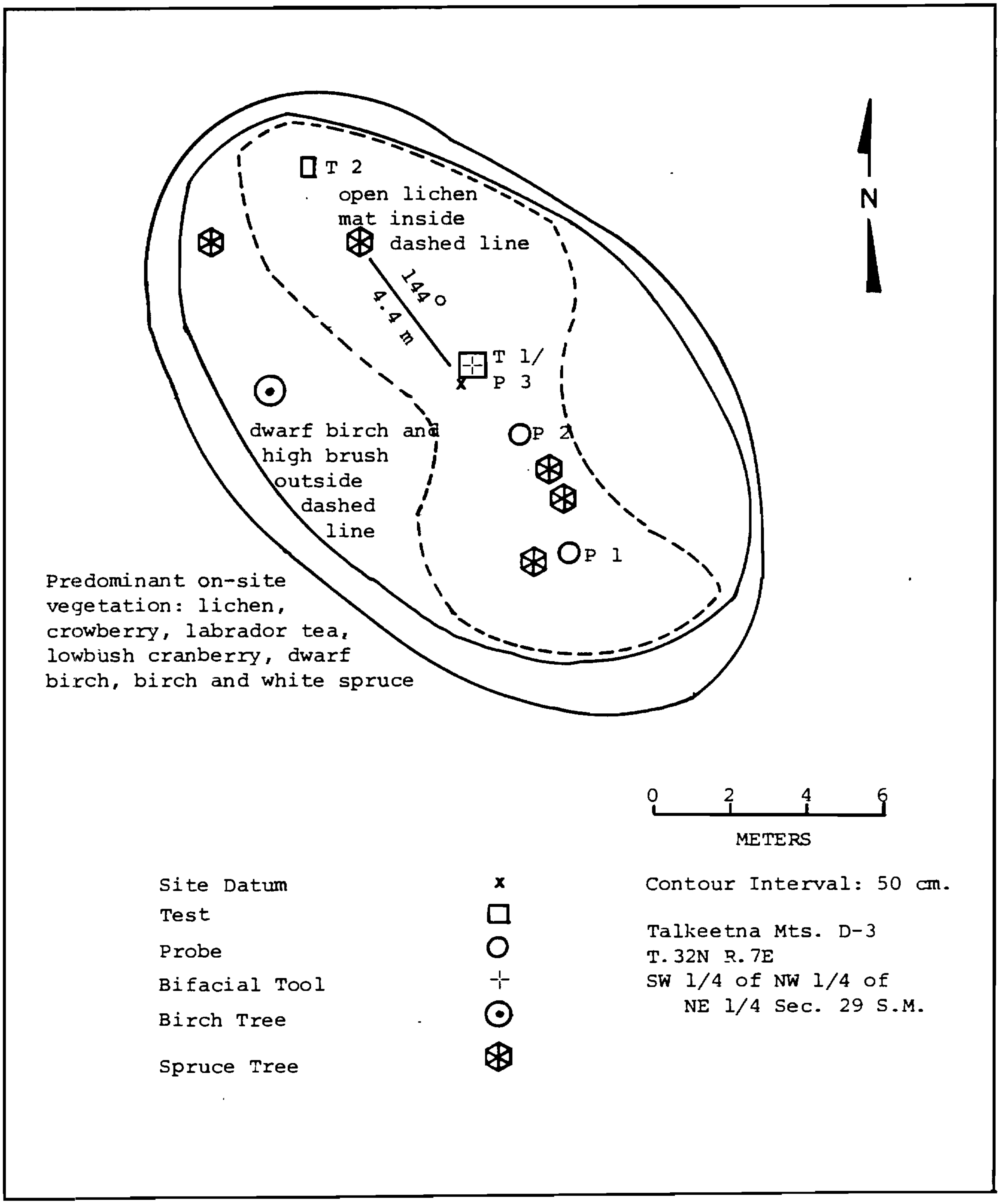


Figure 62.

Site map UA80-155 (TLM 048).

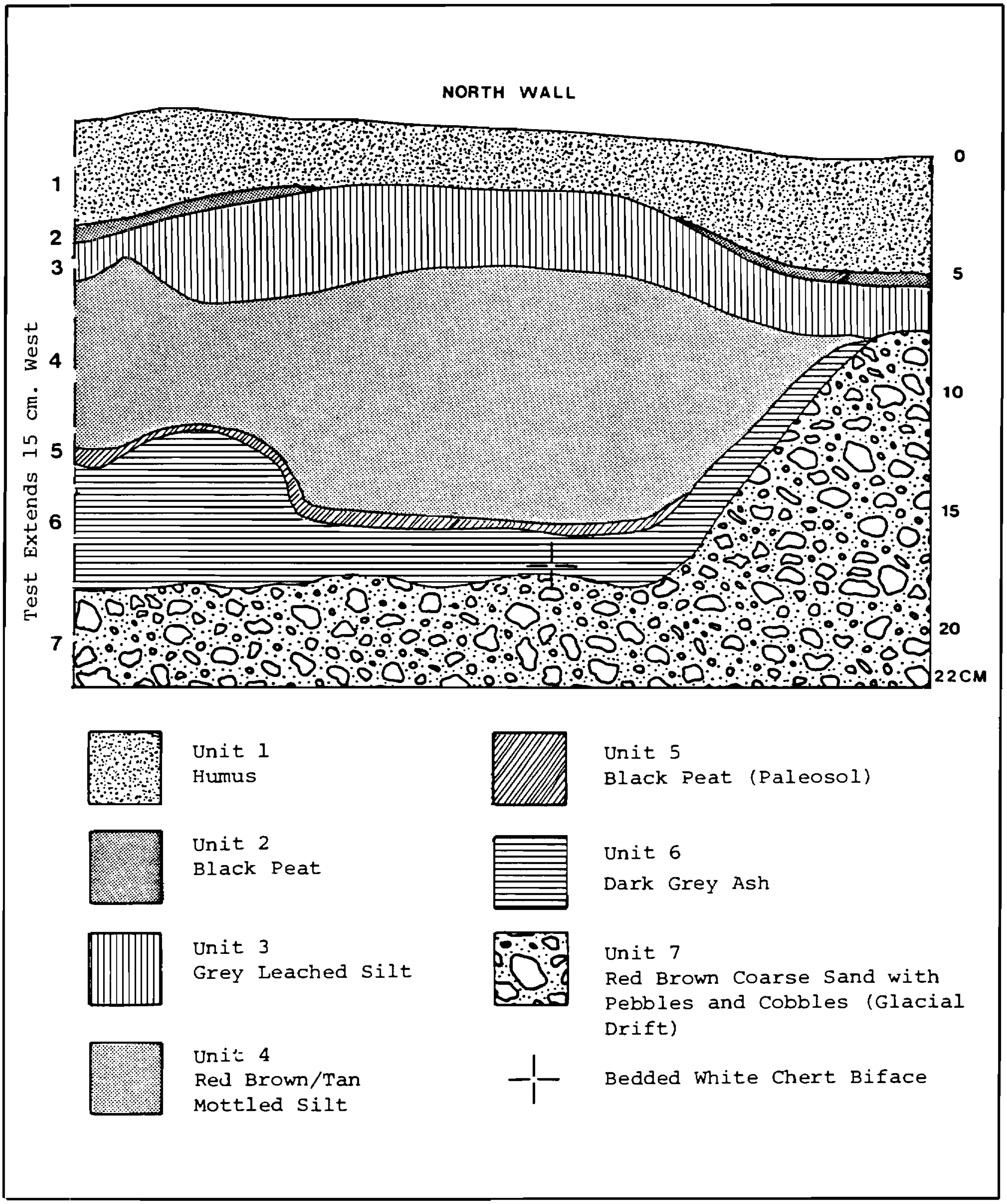


Figure 63.

Soil profile UA80-155 (TLM 048), test 1.

3.2.1.29 - Site UA80-156, State Number TLM 049

Area: Survey Locale 48
Area Map: Figure 104; Survey Locale Map: Figure 159
USGS Map: Talkeetna Mts. C-1, Scale 63,360

Site Location: UTM Zone 6 Easting 482025 Northing 6945250

Latitude 62°38'23" N., Longitude 147°21'00" W.

T. 29 N., R. 11 E., Seward Meridian
Sec. 2, NE¼NW¼NW¼

Site Map: Figure 64; Soil Profile: Figure 65

Setting: The site, situated approximately 732 m asl (2400 feet asl), is located south of the Susitna River and approximately 1.5 km east of the mouth of the Oshetna River (Figure 159). The site occupies the pointed summit of a discrete knoll located on a north-south trending continuous ridge. This knoll is a prominent feature on the crest of the ridge and is separated from the higher ridge crest to the south by a slightly lower saddle. In all other directions the knoll is higher than the surrounding terrain and affords a panoramic view. To the north of the site the knoll slopes gradually down to a small flat bench approximately 8 m below the summit and then drops off steeply to a northeast-southwest trending terrace approximately 30 m below the elevation of the site. The Susitna River, flowing in a serpentine course, is approximately 350 m northwest of the site at its closest point. The confluence of the Susitna River and the Oshetna River is not visible from the site, although sections of both rivers are in view. The site overlooks a broad alluvial terrace to the west, north, and east which is approximately 15 m above the Susitna and approximately

45 m to 60 m below the site. Much of this alluvial terrace is relatively flat and poorly drained. Two lakes are located on the terrace west of the site (Figure 159). The northernmost and smaller of the lakes, approximately 3 hectares in size, is approximately 600 m west of the site and in view. The southernmost lake, and equal distance southwest of the site, is not visible. These two lakes, the Susitna, and Oshetna are easily accessible from the site. Other large lakes lie 1 km to 2 km south of the site at a higher elevation and would also be accessible by ascending the ridge upon which the site is located. Much of the surface of the knoll in the vicinity of the site is deflated with numerous small blowouts occurring on the southwest slope. Vegetation at the summit consists of grass, fireweed, moss, and lichens with willow, alder, and dwarf birch occurring on the slopes below the site. Scattered white and black spruce are also present, increasing in density with a decrease in elevation.

Phase I Testing: Cultural material was observed on the surface and in subsurface tests at this site. A total of four tests were excavated on the knoll, two of which were placed at the highest elevation and two on the relatively level bench immediately to the north (Figure 64). Only one of these tests (test 1) produced cultural material. A single basalt flake was found in test 1 between the surface and 5 cmbs in the humus layer below which glacial drift was encountered (Figure 65). A small mammal mandible fragment discovered between the surface and 5 cmbs in the humus at test 2 (Figure 64). Two additional flakes were noted, but not collected, in a blowout on a narrow portion of the ridge top approximately .5 km south of the site datum.

Collected Artifact Inventory

Test 1, 0-5 cmbs:
1 Black basalt flake

Collected Faunal Material Inventory

Test 2, 0-5 cmbs:

1   Mandible, left fragment with teeth, small mammal

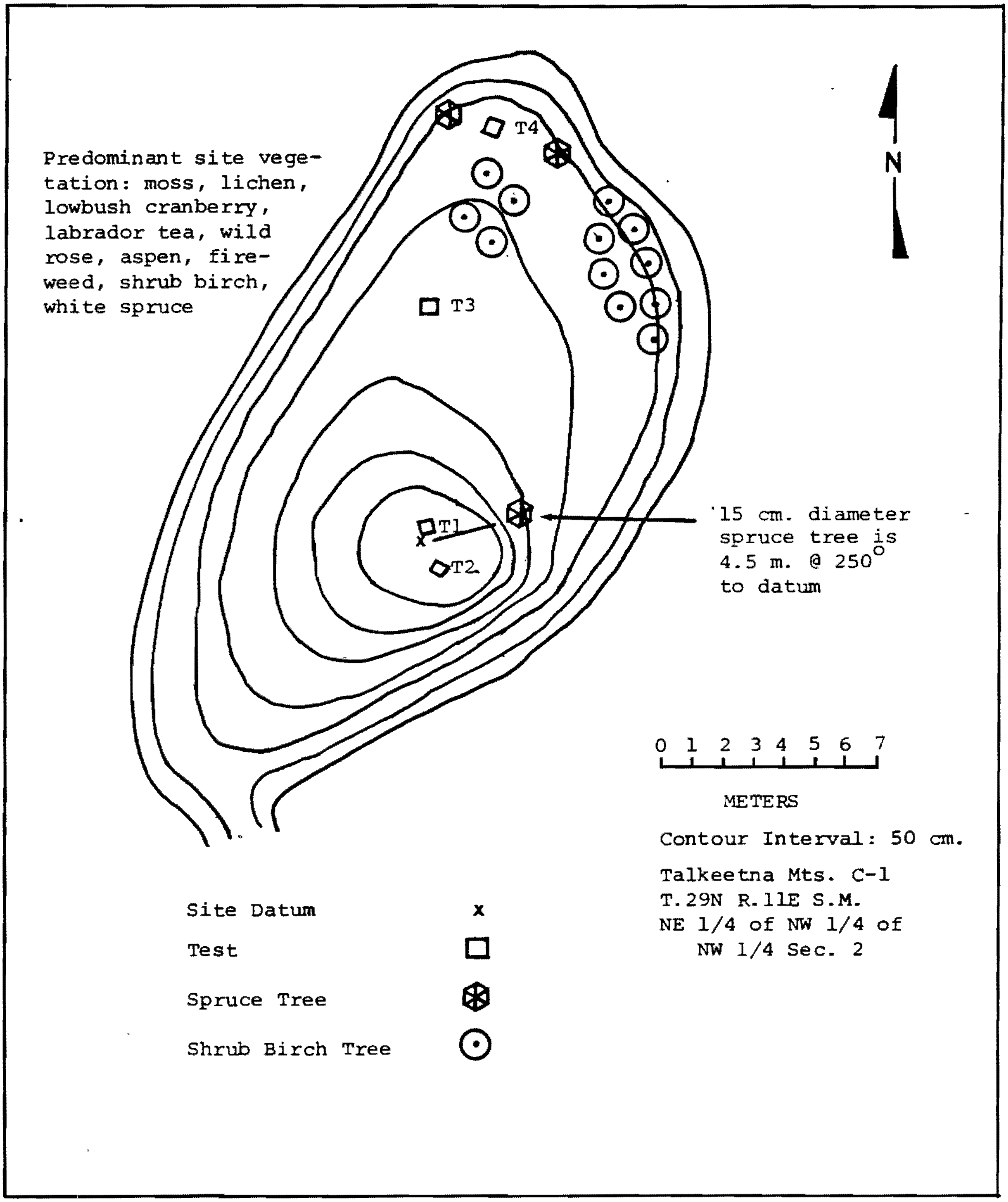


Figure 64.

Site map UA80-156 (TLM 049).

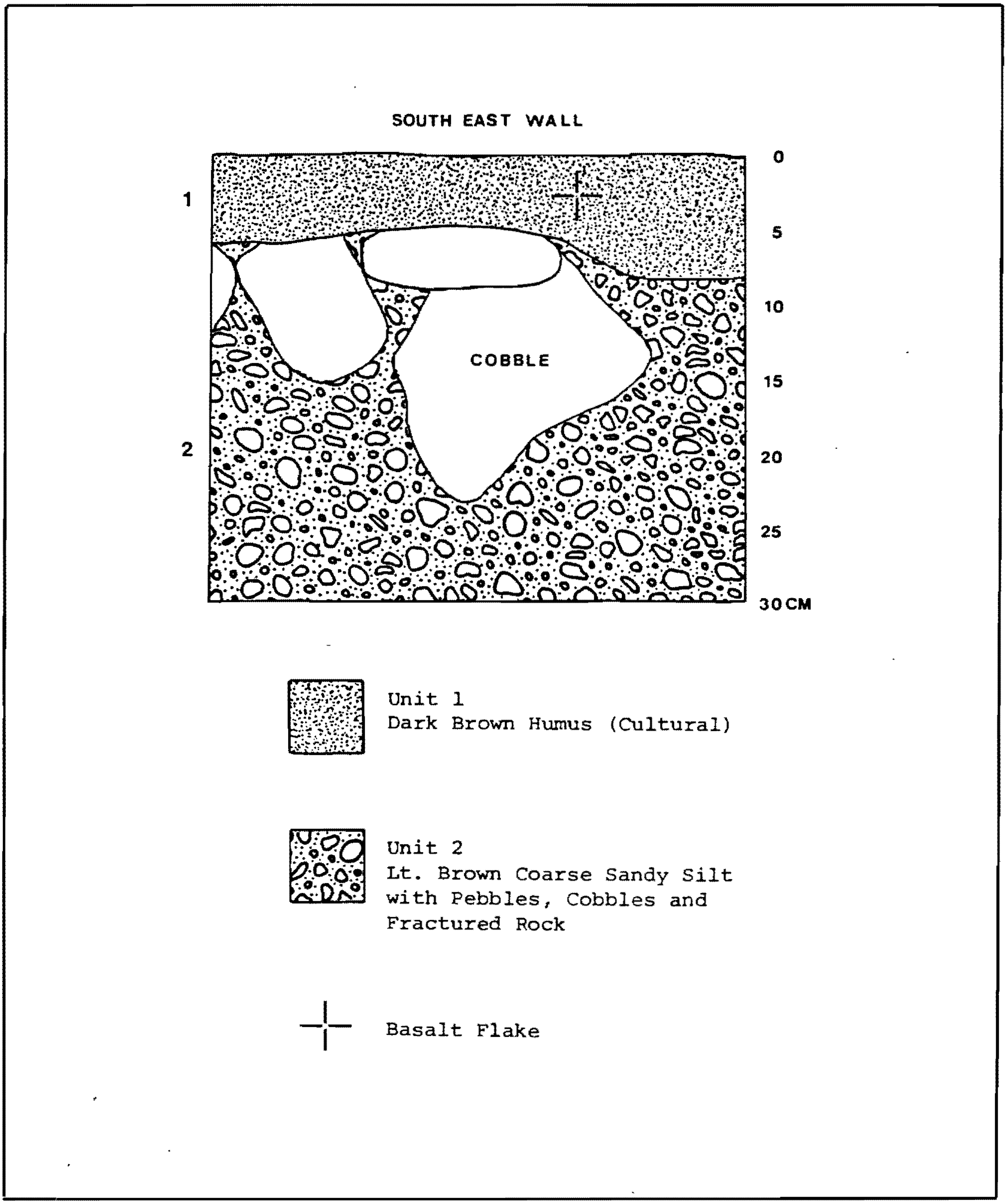


Figure 65.

Soil profile UA80-156 (TLM 049), test 1.

3.2.1.30 - Site UA80-157, State Number TLM 050

Area: Survey Locale 29a

Area Map: Figure 101; Survey Locale Map: Figure 135

USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 445200 Northing 6963700

Latitude 62°48'05" N., Longitude 148°04'20" W.

T. 31 N., R. 7 E., Seward Meridian

Sec. 1, NW¼SW¼SW¼

Site Map: Figure 66; Soil Profile: Figure 67

Setting: The site is located at 518 m asl (1700 feet asl) near the mouth of an unnamed creek which joins the Susitna River from the northeast, approximately 8 km upriver from the mouth of Watana Creek (Figure 135). Situated on a small alluvial bench on the east bank of the 4 meter wide creek, the site is approximately 40 m upstream from the mouth of the creek and 4 m east of the creek margin. This small bench, the only relatively flat area in an otherwise irregular ground surface, makes an excellent camping place overlooking the creek. The bench is approximately 2 m above the creek and 4 m above the Susitna. The site is in an area of low topographic relief in relation to the surrounding terrain which slopes steeply upward to the northeast towards a high plateau (Survey Locale 30) approximately 3 km distant, where a total of seven sites have been identified to date. A ridge crest ascends to the west-northwest from the immediate vicinity of the site, and appears to be the easiest access route between the river and the higher terrain to the northeast. The creek near the site is fast and shallow and emerges from a narrow bedrock canyon containing cascades and falls upstream from the site. The view is limited to the immediate vicinity of the site and encompasses the creek and the opposite bank for a distance of 30m to 40 m. Approximately 100 m of the north bank of the Susitna River is visible to the southwest, although the view is largely obstructed by trees.

Even with less dense vegetation the view would be restricted by topography to less than 100 m except to the southwest across the relatively shallow river which is approximately 200 m wide at this location and contained numerous forested islands. Vegetation is dense in the immediate vicinity of the site and consists of large white spruce, birch, and alder with low bush and high bush cranberry, wild rose, Labrador tea, blueberry, equisitum, and various grasses. Surrounding vegetation is similar but includes cottonwood and willow along the bank of the Susitna River and greater concentrations of white and black spruce to the southeast toward the river.

Phase I Testing: No cultural material was observed on the surface at this site, however, a shovel probe (probe 1) revealed thermally fractured rock approximately 10 cmbs associated with burned bone and charcoal. Probe 1 was expanded to test 1 (Figure 66) which revealed a concentration of charcoal, burned bone, and thermally fractured rock between 14 to 30 cmbs between the humus and a yellow sand (Figure 67, units 1 and 5). A lens of light brown silt (Figure 67, unit 3) also containing bone occurs approximately 15 cmbs within the charcoal concentration and it appears that more than one activity area may be present at the site. Hearth #1 which in the north wall soil profile (Figure 67, unit 2) occurs between 13 to 15 cmbs, is located between the humus and the light brown silt. A radiocarbon determination of 280 ± 110 years B.P.: 1670 A.D.

(DIC-1905) was obtained on a charcoal sample (UA80-157-3; Figure 67, b) from this hearth collected betweem 18 to 27 cmbs above the light brown silt. Hearth #2 (Figure 67, unit 4) at a depth of 16 to 30 cmbs is located between the light brown silt (Figure 67, unit 3) and a culturally sterile yellow sand (Figure 67, unit 5). A concentration of burned bone, charcoal, and thermally cracked rock are associated with this hearth. Another charcoal sample (UA80-157-1) collected from hearth #2 between 28 and 35 cmbs (Figure 67, c) was considered too small, after cleaning, to give a reliable date, but was run and produced a date of 280 ± 245 years B.P.: 1670 A.D. (DIC-1904). A third charcoal sample (UA80-157-2), a mix of charcoal from hearth #1 and hearth #2 (Figure 67, a) was not submitted for radiocarbon dating. The presence of two hearths was not recognized until the north wall of the test was prepared for a soil profile and consequently part of the faunal material from the two hearths was mixed. Test 1 was then extended 17 cm west and additional faunal material and charcoal was collected. In addition to 6 long bone fragments and 17 small bone fragments recovered from the initial shovel probe, test 1 produced 2 skull fragments, 2 rib fragments, 3 caribou (Rangifer tarandus) phalanges, 3 metatarsal fragments (1 bird, 2 caribou Rangifer tarandus), 1 tibia fragment (possibly caribou Rangifer tarandus), 54 long bone fragments, and about 227 small fragments. One of the bone fragments (Lot UA80-157-7) recovered between 17 to 30 cmbs exhibits a distinct cut mark. Other than 34 thermally fractured rock fragments, no lithic material of cultural origin was found in test 1. Two additional tests (tests 2 and 3) excavated to the northeast and southeast of test 1 (Figure 66) did not reveal additional cultural material. Only part of the hearths exposed by test 1 were excavated and additional testing at the site may clarify the relationship of the subsurface features at the site.

Inventory of Collected Faunal Material

Probe 1, 0-29 cmbs:

- 5 Long bone fragments, calcined, medium-large mammal
- 1 Long bone fragment, heavily burned, medium-large mammal
- 17 Small fragments, calcined, small-large mammal

Test 1, 14-30 cmbs:

- 1 Skull fragment, large mammal
- 1 Skull fragment, calcined, medium-large mammal
- 1 Rib fragment, medium-large mammal
- 1 Rib fragment, heavily burned, medium-large mammal
- 1 3rd phalanx, calcined, large mammal, caribou (*Rangifer tarandus*)
- 1 2nd phalanx, proximal 1/5, calcined, large mammal, caribou (*Rangifer tarandus*)
- 1 1st phalanx, proximal 1/3 , calcined, large mammal, caribou (*Rangifer tarandus*)
- 1 Metatarsal fragment, distal 1/10, calcined, bird
- 1 Long bone fragment, heavily burned and calcined, medium-large mammal
- 4 Long bone fragments, medium-large mammal
- 6 Long bone fragments, heavily burned, medium-large mammal
- 2 Long bone fragments, 1 rodent/canid gnawed, calcined, medium-large mammal
- 3 Long bone fragments, 1 rodent/canid gnawed, calcined, medium-large mammal
- ca. 100 Small fragments, calcined, small-large mammal

Test 1, West 17 cm of test, 18-27 cmbs:

- 7 Fragments, 1 calcined, small-large mammal

22-30 cmbs:

- 2 Metatarsal fragments, proximal 1/6, proximal 1/10, heavily burned, large mammal, caribou (*Rangifer tarandus*)
- 1 Tibia fragment, proximal 1/20, heavily burned, large mammal, possibly caribou (*Rangifer tarandus*)
- 5 Long bone fragments, heavily burned, medium-large mammal
- 1 Long bone fragment, calcined, medium-large mammal
- ca. 20 Small fragments, calcined, small-large mammal

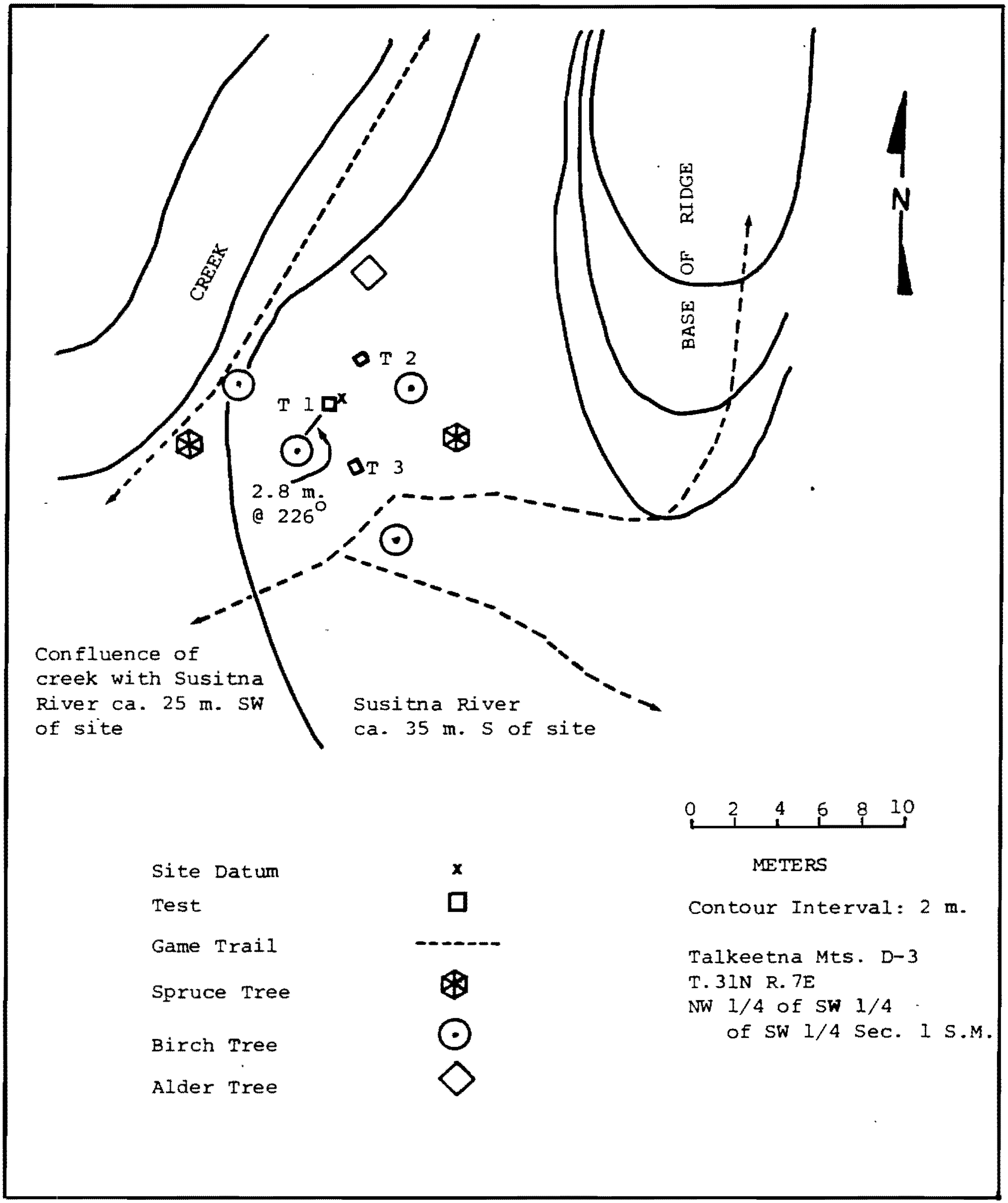


Figure 66.

Site map UA80-157 (TLM 050).

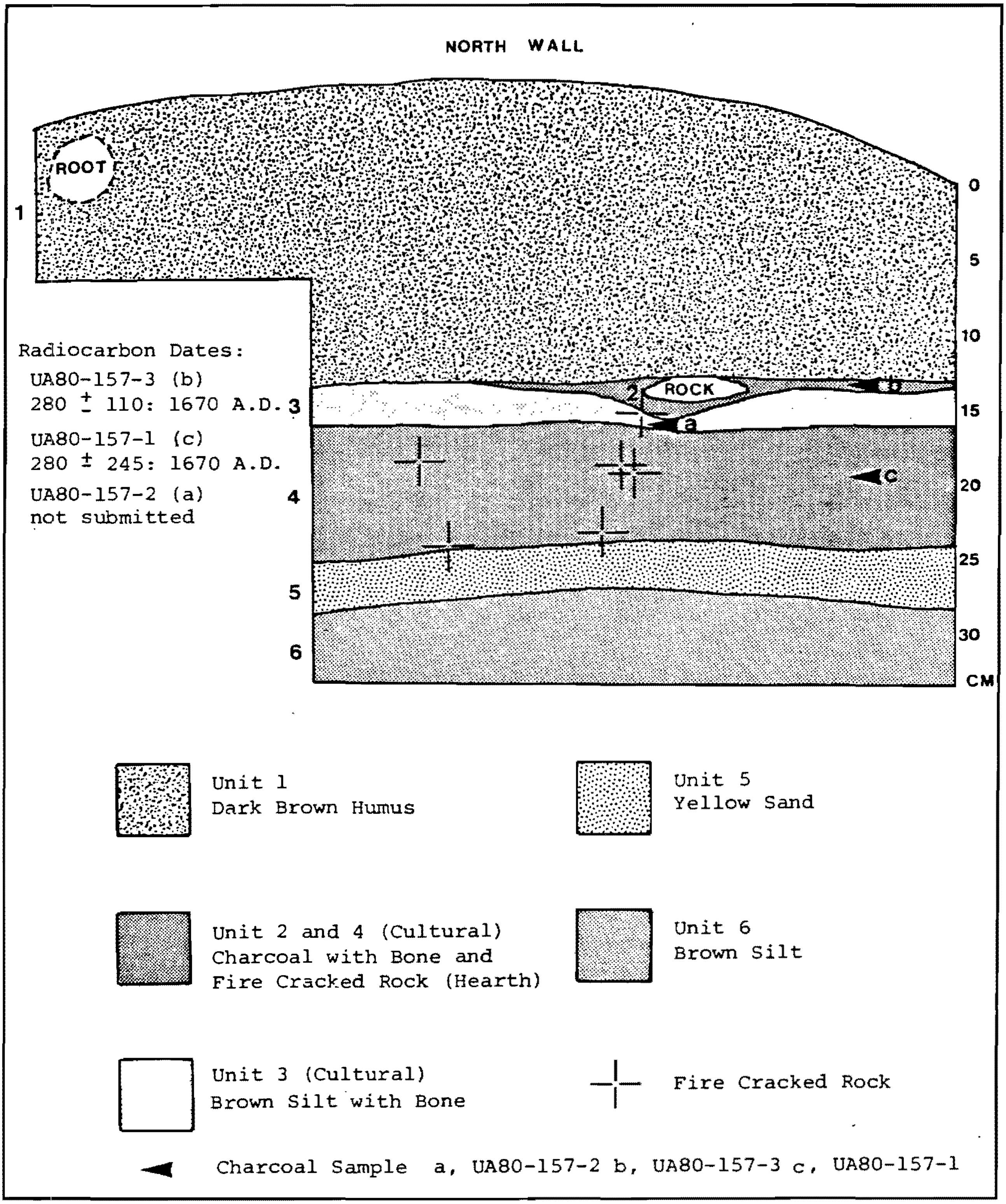


Figure 67.

Soil profile UA80-157 (TLM 050), test 1.

3.2.1.31 - Site UA80-158, State Number TLM 051

Area: Borrow F

Area Map: Figure 100; Location Map: Figure 174

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 422800 Northing 6970500

Latitude 62°51'36" N., Longitude 148°31'00" W.

T. 32 N., R. 5 E., Seward Meridian

Sec. 16, NW¼SE¼SE¼

Site Map: Figure 68; Soil Profile: Figure 69

Setting: The site is located near the southeastern boundary of Borrow Area F (Figure 100), approximately 700 m east of Tsusena Creek and approximately 6.2 km northeast of the confluence of Tsusena Creek and the Susitna River (Figure 174). Located at an elevation of 701 m asl (2300 feet asl) on a 50 m long by 15 meter wide bench which forms the northern extension of the summit of a knoll, the site lies at the northwest corner of the bench 2m to 3 m lower than the point of highest relief on the knoll. This knoll, one of the highest in the vicinity, is located in kettle and kame topography where numerous knolls and ridges and approximately 17 lakes and ponds are located within a 1 km radius of the site (Figure 174). The site location provides a view of many of the kettle lakes to the south, east, and north, however, the principal view is to the south overlooking a 7 hectare lake with a long finger of the lake extending to the northwest. The lake margin, located approximately 100 m south of the site and approximately 30 m lower in elevation at the closest point, is entirely in view and easily accessible from the site. Tsusena Creek, approximately 90 m lower in elevation, is not visible from the site. Much of the Tsusena Creek canyon to the west is deeply incised vertical bedrock with numerous cascades and a major waterfall. Access to the creek, while possible, would require descending greater than 30° slopes. The site appears to be oriented more towards the surrounding lakes which are easily accessible. One other site (UA78-65, TLM 015), identified in 1978 by Glenn Bacon, is located in the same topographic context, approximately 600 m to the south on a similar but slightly lower knoll. The ground surface at site UA80-158 is smooth and sloping with vegetation consisting primarily of dense shrub birch with open clearings where ground cover consists of lichen, moss, and low heath species. Scattered spruce are present on the knoll and increase in density in lower elevations where alder thickets are present.

Phase I Testing: No cultural material was observed on the surface at the site, however, a shovel probe (Figure 68, test 1) revealed four tuffacious rhyolite flakes approximately 20 cmbs, one of which (UA80-158-1) exhibits retouch along one margin. This probe was expanded into test 1 (Figure 68) which produced an additional tuffacious rhyolite flake 17 cmbs in a possible paleosol lens (Figure 69, unit 5c) contained within a matrix of yellow brown sand and gravel which was interpreted as glacial drift (Figure 69, unit 6). All of the flakes recovered from the initial probe and test 1 show a light to dark brown staining on one side. A possible volcanic ash layer (Figure 69, units 3a and 3b) is present in test 1 between 5 and 10 cmbs.

Four additional tests (Figure 68, tests 2, 3, 4, and 5) were excavated at the site but did not reveal additional cultural material.

Collected Artifact Inventory

1	Light brown tuffacious rhyolite retouched flake
4	Light brown tuffacious rhyolite flakes

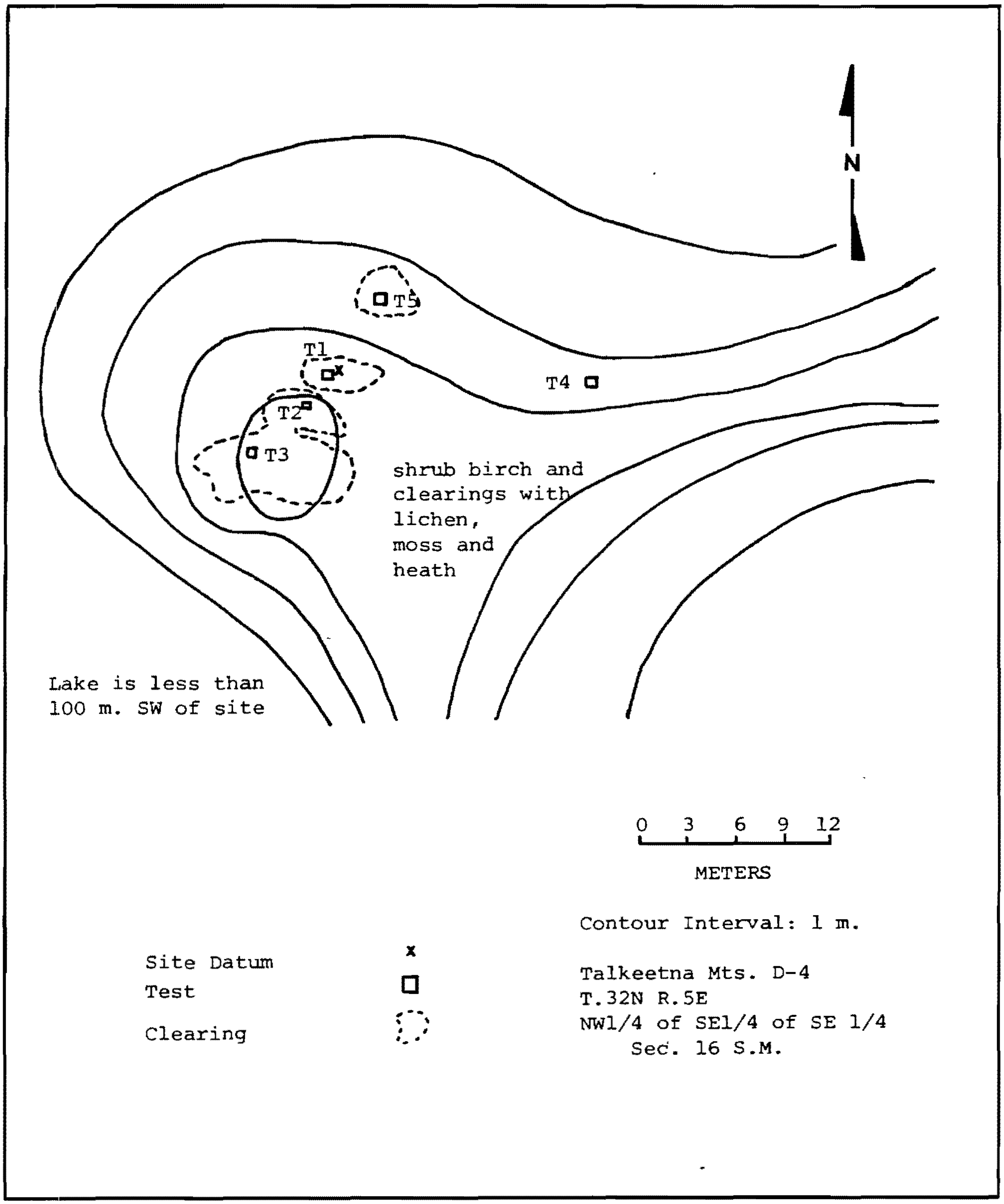


Figure 68.

Site map UA80-158 (TLM 051).

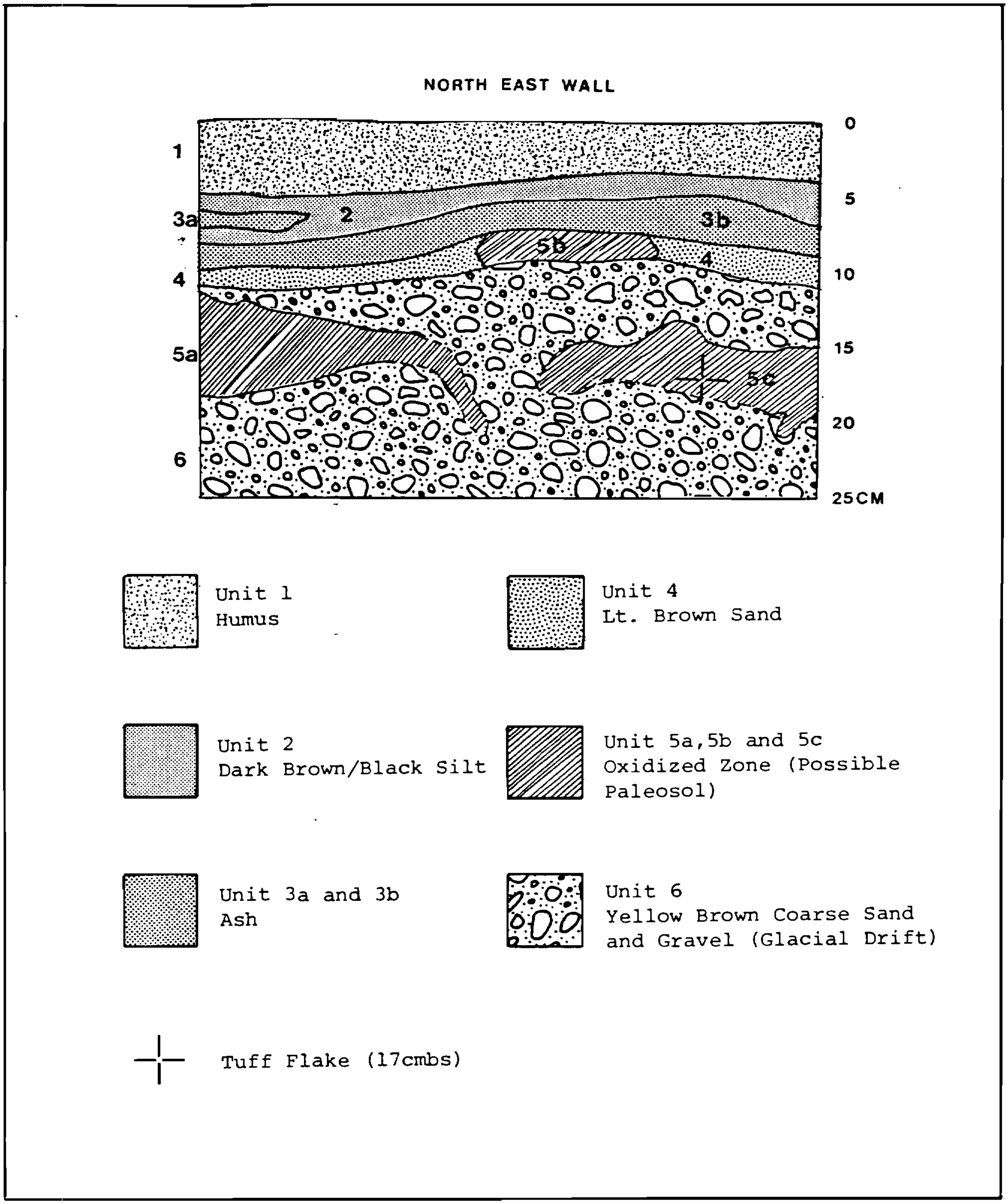


Figure 69.

Soil profile UA80-158 (TLM 051), test 1.

3.2.1.32 - Site UA80-159, State Number TLM 052

Area: Survey Local 51

Area Map: Figure 102; Survey Locale Map: Figure 162

USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 453500 Northing 6964100 (Locus A)

Easting 453550 Northing 6964200 (Locus B)

Latitude 62°48'24" N., Longitude 147°54'50" W. (Locus A)

Latitude 62°48'28" N., Longitude 147°54'42" W. (Locus B)

T. 31 N., R. 8 E., Seward Meridian

Sec. 2, SE¼SW¼NW¼ (Locus A and B)

Site Map: Figure 70; Soil Profile: Figure 71 (Locus A)

Setting: The site, consisting of two loci (A and B), is located on a southeast-northwest trending ridge at an elevation of 884 m asl (2900 feet asl) approximately 2.5 km north of the Susitna River and 3 km west of Jay Creek (Figure 102). This ridge is the highest of numerous deflated ridges and knolls characteristic of the glacially scoured ice stagnation terrain in this vicinity and affords an excellent vantage point overlooking lower areas of tundra. The ridge slopes gradually in all directions from the site location, except to the southwest along the ridge crest, where it is relatively level. The view from the ridge crest is panoramic ranging in distance from approximately 5 km to the south to less than 2 km to the north and west. Both site loci are located at the northeastern end of this discrete ridge (Figure 162) and overlook the largest kettle lake in the area, an 8 hectare lake (Laha Lake) approximately 600 m southeast of the site and 91 m (300 feet) lower in elevation. Also visible from the site is the lake's inlet stream, located approximately 500 m east of the site, which drains higher terrain to the north. A 3 hectare lake, not visible from the site, is located 1.6 km to the west. Both of these lakes and the stream drainage are easily accessible from the site, as is all of the surrounding terrain within 5 km. Locus A is situated at the edge of the deflated crest of the ridge on the southern slope and locus B is located 138 m to the northeast on the rounded crest of the ridge. Most of the crest of the ridge is deflated and consequently vegetation is sparse. What vegetation there is includes dwarf willow, low bush cranberry, moss, and lichen. A few scattered spruce grow on the ridge and increase in density in all directions as elevation decreases. The surrounding lower terrain is poorly drained and consists primarily of tundra and low brush with areas of marsh and grass in the vicinity of the lake margins.

Phase I Testing: Both surface and subsurface cultural material was found at the site including a surface lithic scatter (locus A) exposed on the south slope of the ridge crest at the edge of a large deflated area, and two isolated surface artifacts (locus B) observed approximately 130 to 150 m northeast of locus A on the rounded and largely deflated crest of the northeastern end of the ridge (Figure 70). Artifacts surface collected from the site include three projectile point bases, seven flakes, and a chalcedony pebble fragment possibly cultural in origin. Thirty-four flakes observed on the surface were left *in situ*.

Locus A: Surface artifacts were observed at the southern edge of the deflated ridge crest during surface reconnaissance. The exposed portion of the flake scatter measures approximately 5 by 15 m (Figure 70). Artifacts surface collected from this scatter include a straight, edge ground base portion of a black chert projectile point (UA80-159-1; Figure 85, h), and a similiar but smaller fragment of a grey chert projectile point exhibiting the same characteristics (UA80-159-4; Figure 85, i). In addition, four banded chert and three basalt flakes were surface collected. Approximately 30 black basalt and 3 banded chert flakes were left in situ. Test 1 (Figure 70), excavated immediately southwest of the largest concentration of flakes, produced a single black basalt flake 7 cmbs at the contact between the humus and a grey leached silt (Figure 71, unit 2). No other cultural material was revealed by test 1.

Locus B: Two isolated artifacts located on the surface outside of the immediate vicinity of locus A comprise the cultural material observed at locus B. The rounded edge ground base of a grey basalt projectile point (UA80-159-12; Figure 85, j) was surface collected 138.6 m northeast of the datum at locus A (Figure 70). A datum for locus B was established at this location. The only other cultural material observed on the surface at locus B was a single black basalt flake located 33.8 m southeast of the locus B datum (Figure 70). Time limitations did not permit subsurface testing at locus B.

Collected Artifact Inventory

Locus A:

1	Straight, edge ground black chert projectile point base
1	Straight, edge ground grey chert projectile point base
2	Whitish-grey banded chert flakes
2	Yellow-brown banded chert flakes
3	Black basalt flakes
1	White chalcedony pebble fragment

Test 1, 7 cm:

1	Black basalt flake

Locus B:

1	Rounded, edge ground grey basalt projectile base

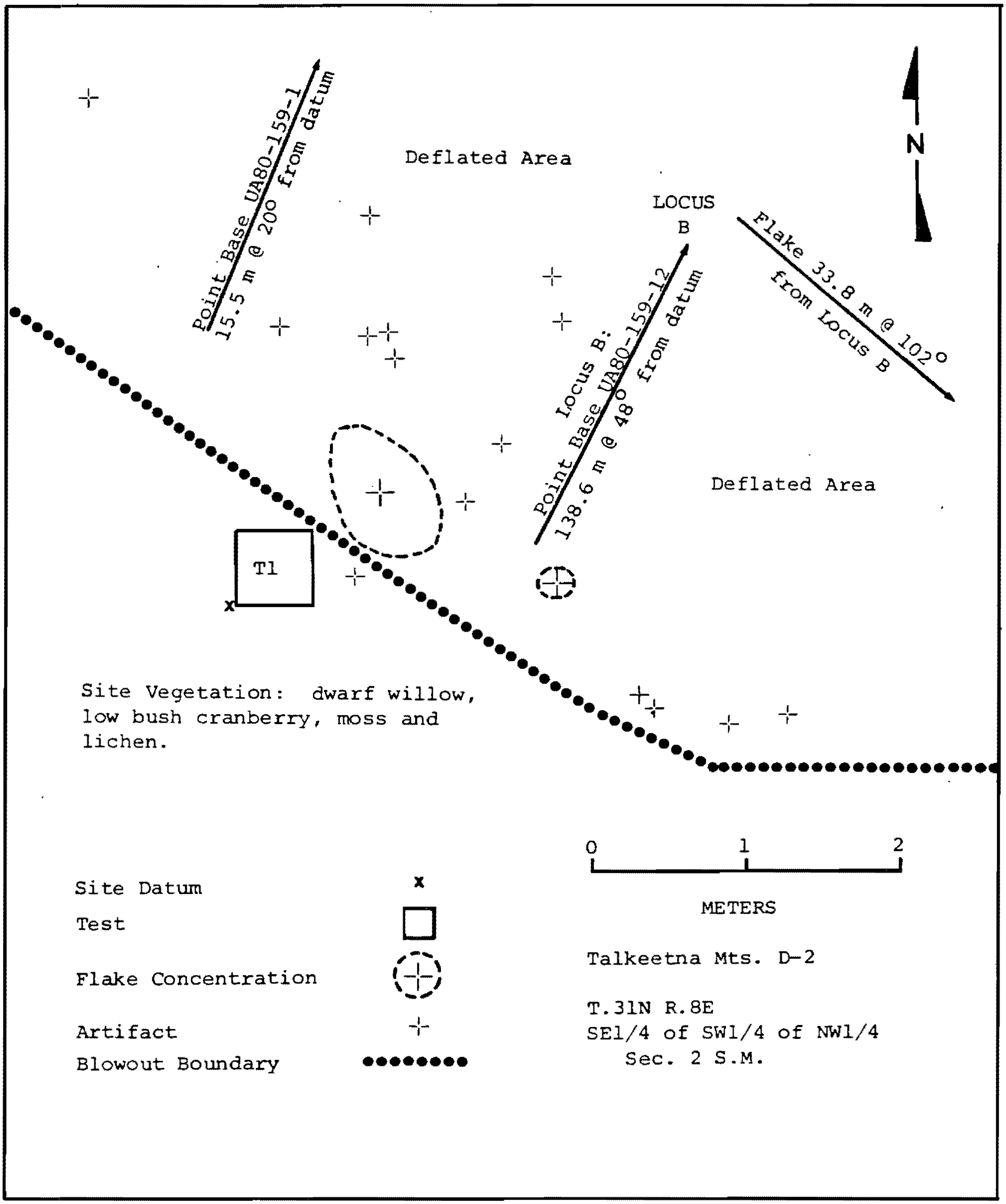


Figure 70.

Site map UA80-159 (TLM 052).

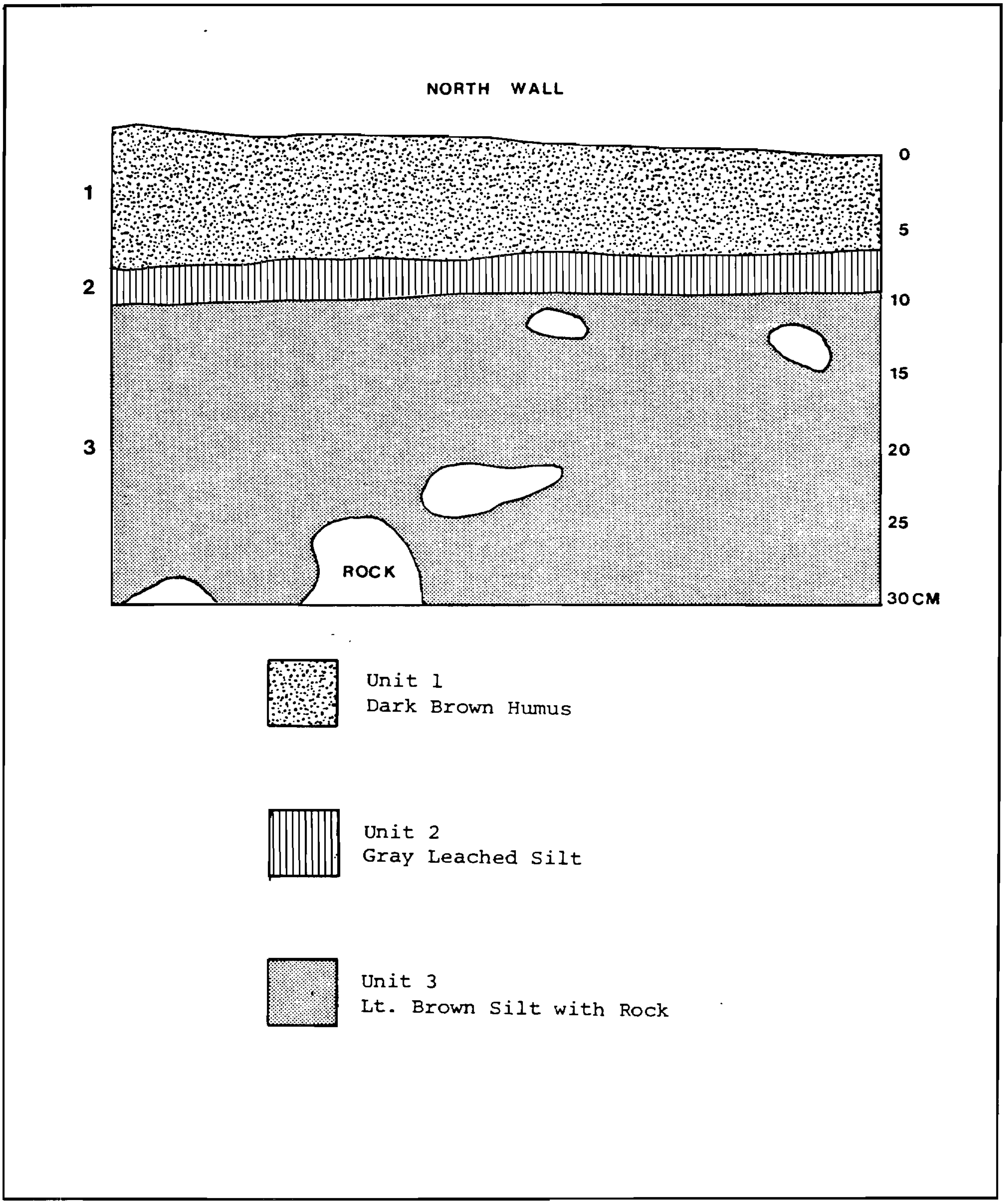


Figure 71.

Soil profile UA80-159 (TLM 052), locus A, test 1.

3.2.1.33 - Site UA80-160, State Number TLM 053

Area: Survey Locale 51

Area Map: Figure 102; Survey Locale Map: Figure 163

USGS Map: Talkeetna Mts. D-2, Scale 1:63,360

Site Location: UTM Zone 6 Easting 456000 Northing 6964700 (Locus A)

Easting 455850 Northing 6964650 (Locus B)

Latitude 62°48'45" N., Longitude 147°51'48" W. (Locus A)

Latitude 62°48'43" N., Longitude 147°51'59" W. (Locus B)

T. 31 N., R. 8 E., Seward Meridian

Sec. 1, NW¼NE¼NE¼ (Locus A)

Sec. 1, NE¼NW¼NE¼ (Locus B)

Site Map: Figure 72; Soil Profile: Figure 73 (Locus A)

Setting: The site, consisting of two loci (A and B), is located approximately 3 km northeast of the confluence of Jay Creek and the Susitna River and approximately 1.5 km west of Jay Creek (Figure 102). Situated on a 150 m to 200 m long discrete northeast-southwest trending ridge line at an elevation of 975 m asl (3200 feet asl), the site is located in glacially scoured terrain characterized by numerous deflated ridges and knolls which overlook poorly drained areas of tundra and high brush (Figure 163). The Susitna River valley is visible approximately 3 km to the south, although the river is out of view. The two site loci are situated approximately 240 m apart on the opposite ends of the ridge.

Locus A: Locus A, at the northeastern end of the ridge, is situated at the point of highest relief on the ridge which slopes gradually upward from the southwest to the northeast (Figure 163). The northeastern end of the ridge terminates abruptly and locus A is situated on a relatively flat 20 m by 25 m deflated area just before the ridge slopes steeply downward and continues to the northeast at a lower elevation. The principal view from the site is to the east encompassing the deeply incised canyon downcut by Jay Creek and portions of the creek itself to the south-southeast. Over half the ground surface is deflated in the vicinity of locus A and what vegetation there is consists primarily of dwarf and shrub birch, low bush cranberry, crowberry, ptarmigan berry, moss, and lichen. Scattered black spruce and alder are present on the slopes of the ridges and, along with dense shrub birch and tundra, form the principal vegetation at lower elevation.

Locus B: Locus B, situated at the southwestern end of the ridge, is on the slope slightly below the end of the relatively level crest of the ridge (Figure 163). Like locus A, this part of the ridge is deflated and consists almost entirely of exposed gravel and fractured rock. Locus B overlooks a broad expanse of tundra to the southwest and the view encompasses an eight hectare lake (Laha Lake) located approximately 2 km southwest of the site. The larger of two small lakes immediately east of Laha Lake is also visible from locus B. Vegetation in the vicinity of locus B is similar to that of locus A.

Phase I Testing: Surface and subsurface cultural material occur primarily at locus A (Figure 72). All observed surface artifacts were collected at both loci.

Locus A: Locus A consists of a surface lithic scatter covering an area of approximately 6 m by 8 m (Figure 72). Artifacts surface collected from locus A include a chert flake bifacially retouched on the right lateral margin with a graver spur at the distal end (UA80-160-4; Figure 86, b), a whitish-grey chert flake with retouch on the left and right margins and the distal end (UA80-160-6; Figure 86, c), a large tuffacious rhyolite flake (UA80-160-1; Figure 86, a), and two additional flakes, one of basalt and the other of chalcedony. Test 1 (Figure 72), excavated at the west edge of the blowout in which the artifacts are exposed, produced a single light brown tuffacious rhyolite flake 10 cmbs in a dark grey leached silt (Figure 73, unit 3). Glacial drift was encountered in test 1 between 10 and 19 cmbs (Figure 73, unit 4).

Locus B: A single grey chert flake retouched on the dorsal surface (or possibly scraper) was surface collected approximately 240 m southwest of locus A (Figure 72). Intensive surface reconnaissance in the vicinity of locus B and along the ridge crest between the two loci did not reveal any additional cultural material. Almost the entire area in the vicinity of locus B is deflated and no subsurface testing was initiated.

Collected Artifact Inventory

Locus A:

1	Whitish-dark grey chert flake, bifacially retouched on the right lateral margin, a graver spur at the distal end
1	Whitish-dark grey chert flake with continuous retouch on all margins
1	Light grey tuffacious rhyolite flake
1	Black basalt flake
1	Grey chalcedony flake

Test 1, 10 cmbs:

1	Light brown tuffacious rhyolite flake

Locus B:

1	Grey chert flake retouched dorsally (possible scraper)

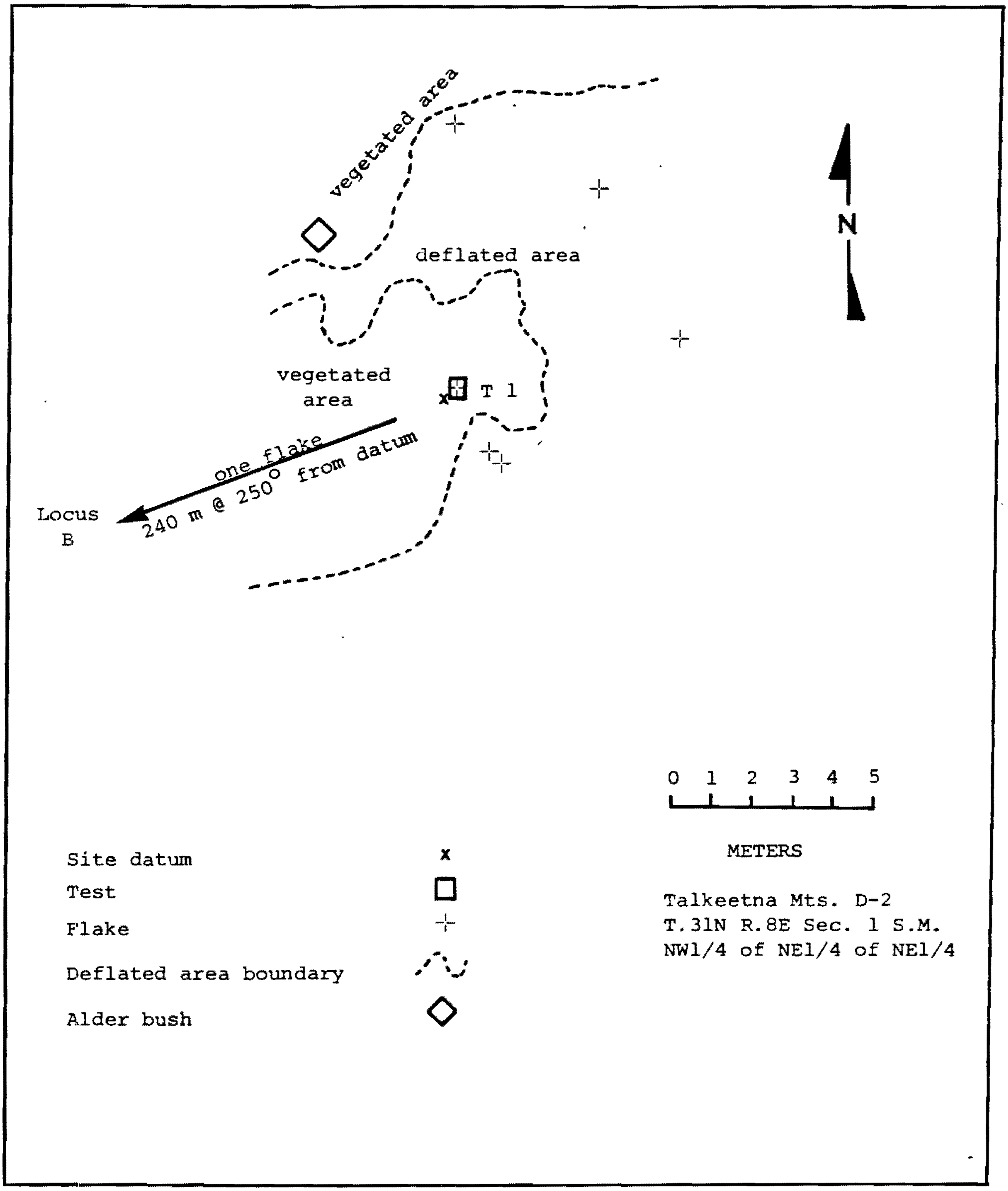


Figure 72.

Site map UA80-160 (TLM 053), locus A.

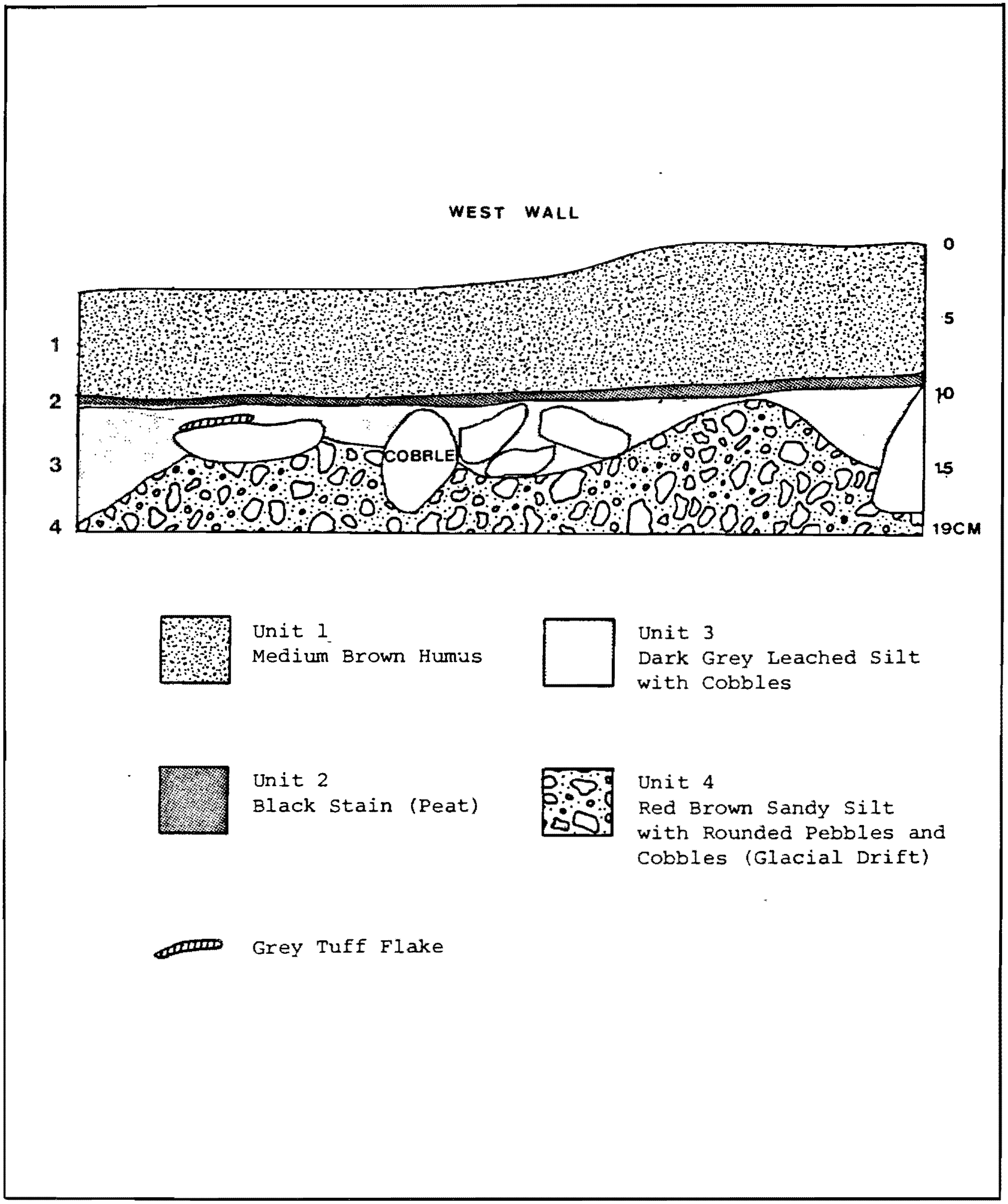


Figure 73.

Soil profile UA80-160 (TLM 053), locus A, test 1.

The following four sites were found during a brief (one day) aerial reconnaissance and survey conducted after the field season and cannot be discussed in depth in this report, because field time did not permit adequate survey, testing, or data recording procedures to be implemented.

3.2.1.34 - Site UA80-252, State Number ~~TLM 054~~

Area: North shore of Deadman Lake
Area Map: Figure 105
USGS Map: Healy A-3, Scale 1:63,360

Setting: The site is located on a low flat deflated area on the north shore of Deadman Lake.

Phase I Testing: No phase I testing was conducted at this site and only a few surface artifacts were collected.

Inventory of Collected Artifacts:

1 Sidescraper
1 Basalt blade-like flake

3.2.1.35 - Site UA80-253, State Number ~~TLM 055~~

Area: Southwest portion of Butte Lake
Area Map: Figure 105
USGS Map: Healy A-2, Scale 1:63,360

Setting: The site is located on a low but elevated ridge adjacent to Butte Lake. The site appears to extend along the lake shore for approximately 100 m.

Phase I Testing: No phase I testing was conducted at the site and only a few surface artifacts were collected.

Inventory of Collected Artifacts

1	Light green rhyolite microblade fragment
1	Basalt biface fragment
3	Basalt flakes
3	Grey rhyolite flakes
2	Rock fragments

3.2.1.36 - Site UA80-254, State Number ~~TLM 056~~

Area: Between Deadman Lake and Big Lake
Area Map: Figure 105
USGS Map: Healy A-3, Scale 1:63,360

Setting: The site is located on a low rise between Deadman Lake and Big Lake and is surrounded by low marshy terrain.

Phase I Testing: No phase I testing was conducted at this site and only a few surface artifacts were collected.

Inventory of Collected Artifacts:

1	Basalt flake
3	Chert flakes
1	Rhyolite flake

3.2.1.37 - UA80-255, State Number TLM 057

Area: East shore of Big Lake
Area Map: Figure 105
USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Setting: The site is located on a knoll at the mouth of a small stream that flows into Big Lake from the east.

Phase I Testing: No phase I testing was conducted at this site and only a few surface artifacts were collected.

Inventory of Collected Artifacts

1	Retouched flake
1	Rhyolite flake

3.2.1.38 - Site UA78-65, State Number TLM 015

Area: .6 km southeast of Borrow Area F
Area Map: Figure 100; Location Map: Figure 180
USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 423050 Northing 6970100

Latitude 62°51'21" N., Longitude 148°30'40" W.

T. 32 N., R. 5 E., Seward Meridian
Sec. 15, SW¼SW¼SW¼

Setting: The site, at an elevation of approximately 639 m asl (2275 feet asl), is located southeast of Borrow Area F (Figure 100) approximately 1.7 km east of Tsusena Creek and 2.7 km north of the Susitna River (Figure 100). Situated on ice stagnation terrain characterized by kettle and kame topography, the site is located at the top of a kame with large kettle lakes to the north, west, and south (Figure 180). A low ridge extends from this knoll approximately 200 m southwest terminating in a lower knoll. Numerous other knolls and ridges and over 20 kettle lakes lie within a 1 km radius of the site. The elevation of the knoll on which the site is located is the highest point of relief within approximately 800 m. The view from the site is unrestricted and encompasses a radius of 1.6 km of accessible terrain including portions of five kettle lakes to the north, northeast, west, and south. These lakes are between 10 m to 30 m lower than the site and are all easily accessible from it. Much of the area between the lakes is poorly drained muskeg and marsh and the numerous ridges and knolls in the vicinity provide natural travel routes and vantage points overlooking the lakes and ponds. The lakes in the vicinity of the site vary from 1 hectare to 18 hectares in size with the northern end of the largest lake located approximately 250 m southeast of the site. Many of the lakes are interconnected by their outlet and inlet streams and a lake approximately 200 m southwest of the site has an outlet to Tsusena Creek. Tsusena Creek, which lies approximately 1 km northwest of the site at the closest point, is approximately 90 m lower in elevation and is not in view. Vegetation at the site consists primarily of shrub birch, low bush cranberry, blueberry, Labrador tea, moss, and lichen. Dense stands of black spruce are present at lower elevations especially around the lake margins. A great deal of bear (Ursus spp.) and moose (Alces alces) sign was observed in the vicinity of the site and the area appears to be excellent wildlife habitat. Site UA80-158 (TLM 051), situated near the top of a slightly higher kame and located approximately 600 m to the north near the boundary of Borrow Area F, is in a similar topographic context.

Phase I Testing: This site was identified by Glenn Bacon during a preliminary reconnaissance conducted in 1978 prior to the establishment of Watana Camp (Bacon 1978b). It was revisited during the 1980 reconnaissance survey in order to check locational data and environmental information. No further testing was done at the site although three previously excavated test pits on the lower knoll approximately 200 m southwest of the site were reopened in an attempt to determine the provenience of the cultural material reported by Bacon. No cultural material was observed in these tests or in surface reconnaissance in the area. Initially it was assumed that the site location was on the lower knoll where the test pits were found and it was not until after the field season that it was learned that the site was located on the higher of the two knolls as indicated on the original site map (Bacon, personal communication). Intensive surface reconnaissance on the higher knoll failed to identify earlier testing at that location and more systematic and intensive subsurface testing is scheduled for 1981.

Bacon (1978b) reports that subsurface testing at the site produced two flakes from different soil units in a single test and suggests that the site is multicomponent. One flake was recovered at a depth of 34 cmbs associated with a dark brown/black loess unit and a second flake was recovered between 34 and 49 cmbs and associated with an orange sandy silt with pebble intrusion (Bacon 1978:22).

3.2.1.39 - Site UA78-66, State Number TLM 016

Area: 1.5 km north of Borrow Area D
Area Map: Figure 101; Location Map: Figure 181
USGS Map: Talkeetna Mts. D-3, Scale 1:63,360

Site Location: UTM Zone 6 Easting 424350 Northing 6970050

Latitude 62°51'18" N., Longitude 148°29'10" W.

T. 32 N., R. 5 E., Seward Meridian
Sec. 22, SW¼NE¼NE¼

Site Map: Figure 74

Setting: Located at an elevation of 732 m (2400 feet asl) approximately 1.5 km east of site UA78-65 (TLM 015), site UA78-66 is located in the area of kettle and kame topography bordered to the west and east by Tsusena and Deadman Creeks and to the south by the Susitna River (Figure 101). The site is situated at the top of a relatively low rounded kame which is the highest point of relief within a 600 m radius. A 1978 Corps of Engineers Survey Monument (WA 16) is located on the knoll at the site location (Figure 181). This knoll is fairly difficult to locate from the air as it slopes very gradually eastward, blending into the relatively flat terrain in that direction. The slope is steepest to the west where it approaches an angle of 15° to 20°. To the northwest the slope is more gradual and several relatively flat benches occur, possibly a result of solifluction. The view from the top of the knoll is panoramic but the principal view is to the west and north encompassing portions of four lakes. These lakes vary in distance from 150 m to 1.5 km from the site and in size from 1 hectare to 14 hectares. A marsh, which appears to formerly have been a small pond 30 m to

40 m in diameter, lies approximately 50 m to the southwest of the site. Deadman Creek, the closest creek to the site, lies approximately 2 km to the east but is not visible. Like Tsusena Creek, Deadman Creek is deeply incised in a bedrock canyon with at least one major waterfall prior to its confluence with the Susitna River approximately 2.8 km southeast of the site. Access to both of these creeks, the Susitna River, and the kettle lakes in the vicinity is across low, poorly drained tundra which is best traversed by staying on the knolls and low ridge systems that comprise the higher ground. Site vegetation consists primarily of tundra, shrub birch, and willow but includes dwarf birch, low bush cranberry, crowberry, blueberry, Labrador tea, and lichen. Shrub birch and willow are denser on the slopes of the knoll and lower elevations contain stands of black spruce and muskeg especially in the vicinity of the lakes.

Phase I Testing: Surface and subsurface cultural material at this site, was identified by Bacon (1978b). It was revisited during the 1980 reconnaissance survey in order to check locational data and environmental information but no further testing was done. The site was initially identified by the presence of flakes exposed in a blowout at the top of the knoll next to a Corps of Engineers Monument (WA 16). Six basalt and rhyolite flakes were collected by Bacon from this blowout in 1978 and one additional basalt flake was observed but not collected in 1980. Subsurface testing in 1978 revealed a 1 cm thick concentration of charcoal at 16.5 cmbs in test 1. Forty bone fragments were excavated in association with the charcoal and three charcoal samples were collected, one of which was submitted for radiometric dating. A radiocarbon determination of 3675 ± 160 years B.P.: 1725 B.C. (GX-5630) was obtained from the sample that was submitted (Bacon 1978:24). In addition to the bone, six flakes were excavated from test 1 between 7.5 and 17.5 cmbs and were associated both with the charcoal stained level and with an overlying grey/brown loess level (Bacon 1978:24). Two other tests in the site vicinity produced cultural material in 1978. Test 2 produced a unifacially retouched rhyolite pebble (UA78-66-3) and test 5 produced six flakes (Bacon 1978b: 26, 38). Two of the earlier tests (Figure 74, tests A and B) were relocated in 1980.

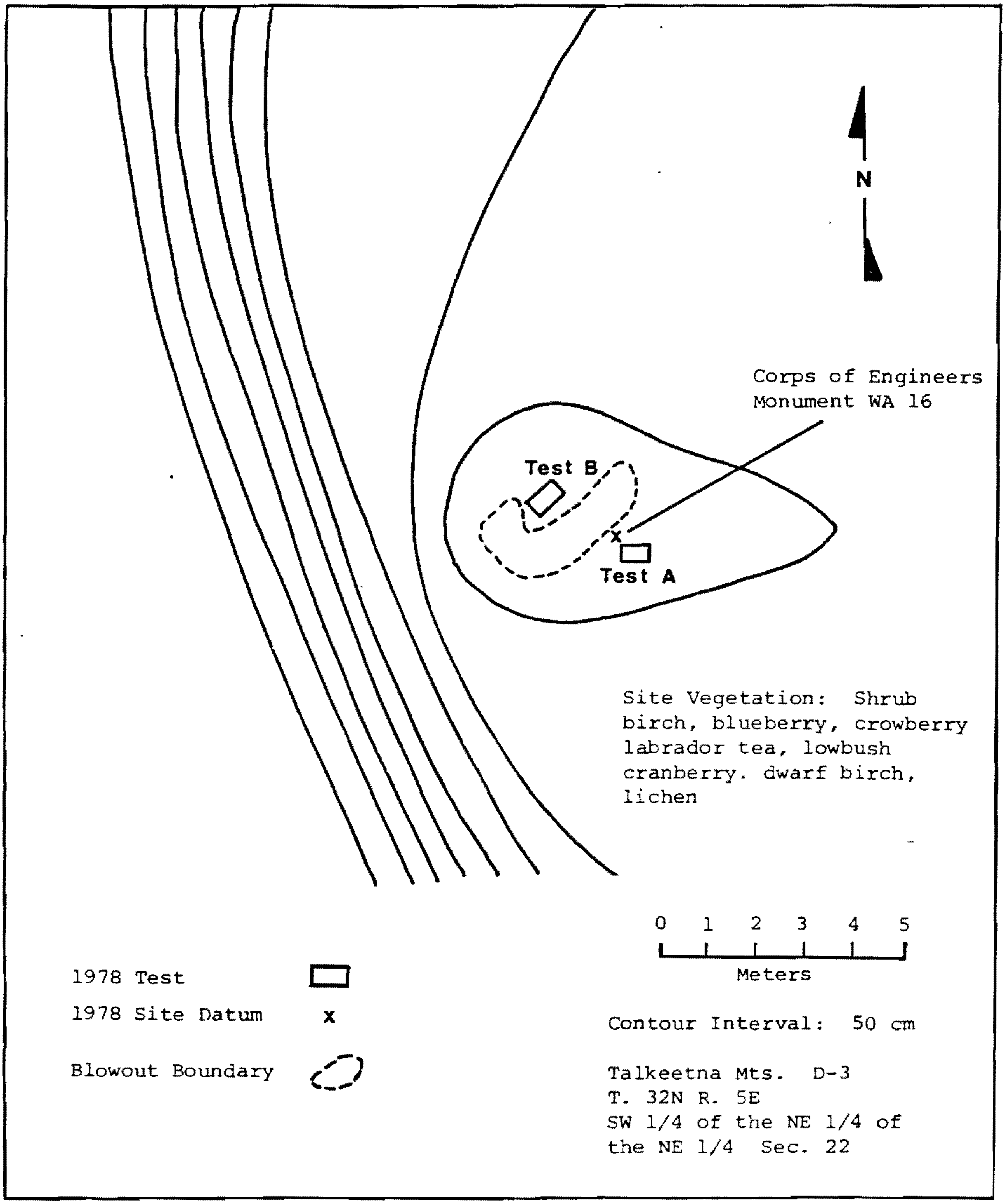


Figure 74.

Site map UA78-66 (TLM 016)

3.2.1.40 - Site UA78-67, State Number TLM 017

Area: 2.1 km northeast of confluence of Tsusena Creek and the Susitna River

Area Map: Figure 100; Location Map: Figure 182

USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 419600 Northing 6967500

Latitude 62°49'55" N., Longitude 148°34'35" W.

T. 32 N., R. 5 E., Seward Meridian

Sec. 29, SW¼NW¼SW¼

Site Map: Figure 75; Soil Profile: Figure 76

Setting: Located at an elevation of 610 m asl (2000 feet asl), the site is approximately 900 m north of the Susitna River and 1.2 km east of Tsusena Creek (Figure 182). The site is situated on a level bench near the top of a northwest facing slope which descends to Tsusena Creek which is approximately 122 m (400 feet) lower in elevation. The bench upon which the site is located is a discrete feature oriented northeast-southwest and is approximately 75 m long by 30 m wide. Several other similar benches are located at about the same elevation on the northwest slope in the vicinity of the site. To the east the terrain continues to rise for approximately 61 m (200 feet) after which it becomes a relatively flat undulating plain of glacial drift characterized by kettle and kame topography. The confluence of Tsusena Creek and the Susitna River is located approximately 2.1 km southwest of the site and approximately 152 m (500 feet) lower in elevation. A 180° field of view from the southwest to the northwest encompasses the Tsusena Creek drainage for a distance of several km although the creek itself is not visible. Portions of the Susitna River approximately 2 km to the southwest are in view and although access to the Susitna to the southwest is reasonably good, access to Tsusena Creek to the west and southwest is much better even though it is restricted in places by sheer bedrock walls. Terrain on the west side of Tsusena Creek is visible from the site but the difficulty of crossing the deeply incised canyon and the deep, fast-flowing creek makes accessibility to this area difficult. Vegetation at the site is relatively open with scattered black spruce, birch, and a ground mat of moss and lichen covering most of the bench. Other vegetation at the site includes Labrador tea, blueberry, low bush cranberry, crowberry, and willow. Several large boulders, apparently glacial erratics, are conspicuous in the vicinity of the site. The site is located at the transitional zone between dense black spruce, which begin thinning out approximately 150 m below the site to the west, and a more open tundra and brush environment which becomes the dominant vegetation at about the elevation of the site and extends eastward.

Phase I Testing: This site was identified by Bacon in 1978 during a preliminary reconnaissance survey prior to the establishment of Watana Camp (Bacon 1978b). No surface cultural material was observed by Bacon at the site but one of his tests next to a large boulder near the center of the bench (Figure 75, test 1) produced 372 basalt flakes, a large number of which were cortex flakes (Bacon 1978:43). The flakes excavated by Bacon were recovered from a dark brown/black loess/clay unit 1 cm thick located 23 to 24 cmbs and just above a 1 cm thick loess/clay unit which overlies the sandy silt and unsorted pebbles characteristic of glacial drift (Bacon 1978:27). Only a portion of this subsurface flake scatter was excavated by Bacon. This site was revisited in 1980 and the 1978 test which produced cultural material was relocated (Figure 75). No additional cultural material was revealed by the eight additional shovel probes dug in 1980 and the site appears to be limited to the immediate vicinity of Bacon's test 1. This test was reexcavated in 1980 to positively identify the provenience of the flakes recovered by Bacon and to draw a soil profile (Figure 76). During the removal of backdirt from test 1 and the preparation of the west wall of the test for a drawing of the soil profile an additional 285 basalt flakes were recovered from this test. The flakes excavated during the preparation of the west wall of the test were associated with what appears to be a dark grey paleosol varying in depth from 11 to 24 cmbs (Figure 76, unit 4). Flakes were concentrated at depths of 14 and 24 cmbs in association with this soil unit. A charcoal sample (UA80-164-1) was also collected during the preparation of the soil profile but was not submitted for radiometric dating. The subsurface flake scatter partly excavated by test 1 is a very dense concentration of flakes which appears to be limited spacially to the immediate vicinity of the large boulder which forms the southern wall of the test. The flakes are actually found concentrated at the base of this boulder (Figure 75). Additional systematic excavation is planned for this site and should help define the spacial extent of this scatter.

Collected Artifact Inventory

1	Charcoal sample
285	Black basalt flakes

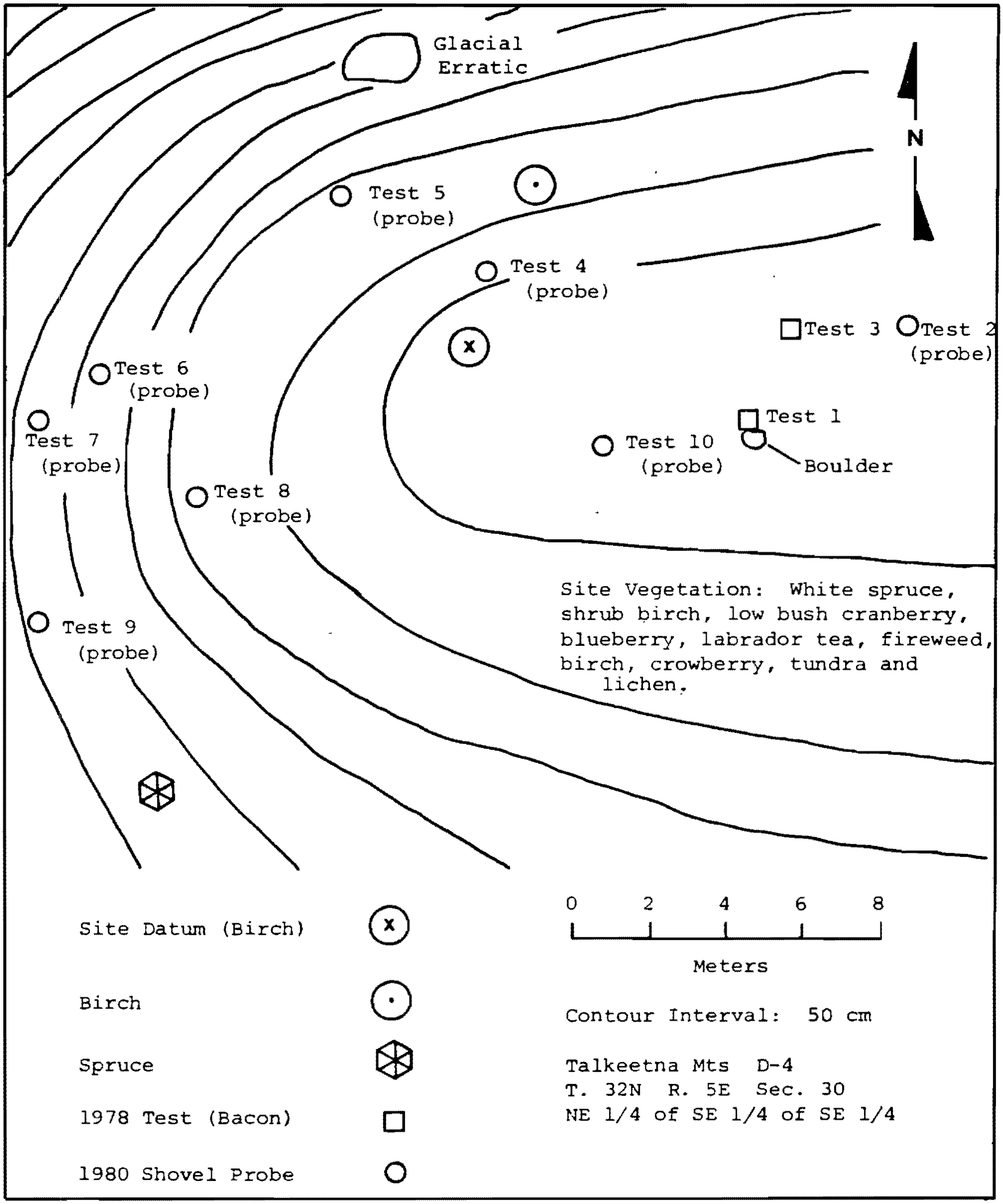


Figure 75.

Site map UA78-67 (TLM 017)

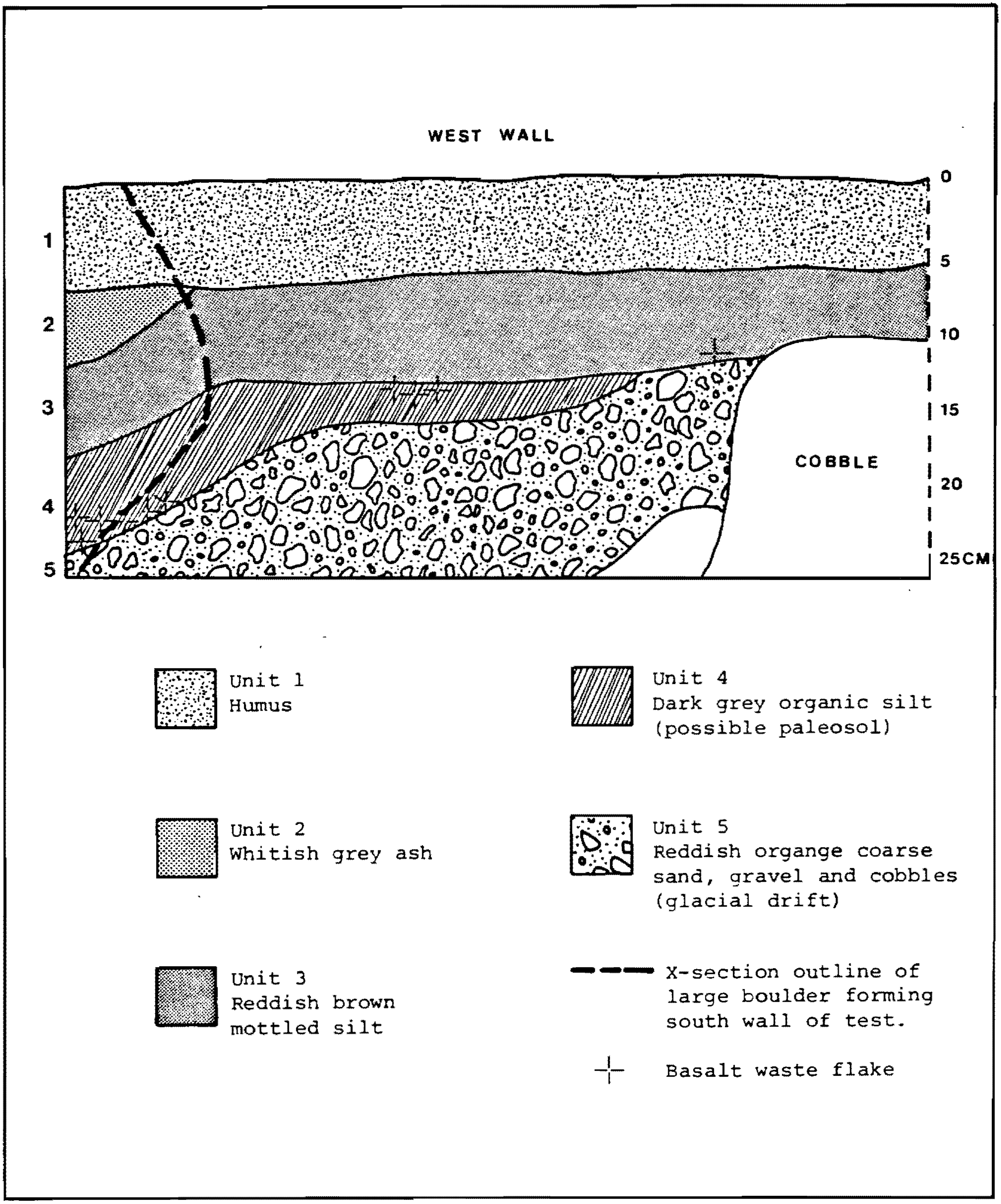


Figure 76.

Soil Profile UA78-67 (TLM 017), test 1.

3.2.1.41 - Site UA78-60, State Number TLM 018

Area: 1.6 km southwest of Watana Camp
Area Map: Figure 100; Location Map: Figure 183
USGS Map: Talkeetna Mts. D-4, Scale 1:63,360

Site Location: UTM Zone 6 Easting 421550 Northing 6967450

Latitude 62°49'50" N., Longitude 148°32'20" W.

T. 32 N., R. 5 E., Seward Meridian
Sec. 28, NW¼SW¼SW¼

Site Map: Figure 77

Setting: The site is located at an elevation of approximately 716 m asl (2350 feet asl) and is 3 km east of Tsusena Creek and 800 m north of the Susitna River (Figure 100). Situated on a discrete kame which is a part of a 1 km long east-west trending ridge, the site is located approximately 800 m east of a 1978 Corps of Engineers Camp on one of the highest points of relief along this ridge. The site is exposed in a blowout on the north and east slopes just below the top of the easternmost knoll. A terrace is located at the base of the slope to the north of the knoll approximately 15 m to 30 m lower than the elevation of the site. Beyond this terrace a glacially scoured plain capped by drift extends for several km to the northeast. West of the site the slope descends for approximately 50 m until it levels out and forms the portion of the main ridge extending westward. The highest elevation on this ridge is 729 m asl (2391 feet asl) which is located approximately 400 m west-southwest of the site (Figure 183). To the north and east the ground slopes continuously, affording an expansive view of the broad plain extending northeast of the site which is characterized by kettle and kame topography. A concentration of kettle lakes is situated approximately 2 km to 4 km to the northeast. The closest of these lakes, approximately 8 hectares in size and 1.5 km distant, is in view, as is a small .5 hectare pond located approximately 800 m to the northeast. To the southeast the ground is fairly flat for approximately 40 m to the edge of the Susitna Valley shoulder where it begins to slope steeply down towards the river located approximately 274 m (900 feet) below the site. Direct access to the Susitna River is difficult because the steep valley walls are sheer bedrock cliffs in places. Vegetation at the site consists of scattered black spruce, shrub and dwarf birch, and includes several varieties of low berry bushes, moss, and lichen. Large blowouts occur on the northern slope of the knoll where much of the ground surface is deflated. In the lower drainages and on the plain to the north, open white and black spruce forest occurs with muskeg, denser black spruce stands are in the poorly drained areas, and white spruce and shrub birch are located on the better drained ground. Much of the plain extending to the northeast is moist tundra and ice stagnation terrain.

Phase I Testing: This site was the last and the most extensive of the prehistoric sites identified by Bacon during his 1978 preliminary survey (Bacon 1978b:28). The site is partly exposed by blowouts covering an area of approximately 10 m by 20 m on the north and northeast slopes near the top of a low knoll (Figure 77). Bacon surface collected 29 flakes from these blowouts in 1978 and excavated an additional 138 flakes from a 20 by 20 cm test at the northern edge of one of the blowouts. The subsurface flakes were excavated from a depth of 20 cmbs and appeared to be associated with a buried paleosol (Bacon 1978:28). A single tool was surface collected at the site in 1978. This is a complete bifacially flaked triangular basalt projectile point exhibiting a ground concave base (UA78-60-1). Two distinct lithologies are represented by the artifacts from the site: a fine grained black basalt and a low-grade blue-grey chert (Bacon 1978b:28).

The site was revisited in 1980. No additional subsurface testing was conducted in 1980, however, three additional artifacts were surface collected at the site. These include the medial portion of a black basalt biface (UA80-165-1), a blue-grey chert flake with what appears to be a facet resulting from removal of a blade or blade-like flake (UA80-165-2), and a blue-grey chert burin spall (UA80-165-3). A high density of flakes was observed in blowouts at the site. Basalt flakes are concentrated on the southwest side of the knoll and chert flakes on the northwest side with a lower concentration of flakes between the two main scatters (Figure 77). Some flakes were observed downslope to the northeast of the main blowout, but whether the site extends further in that direction or the flakes were transported downslope in that direction by soil movement is not known.

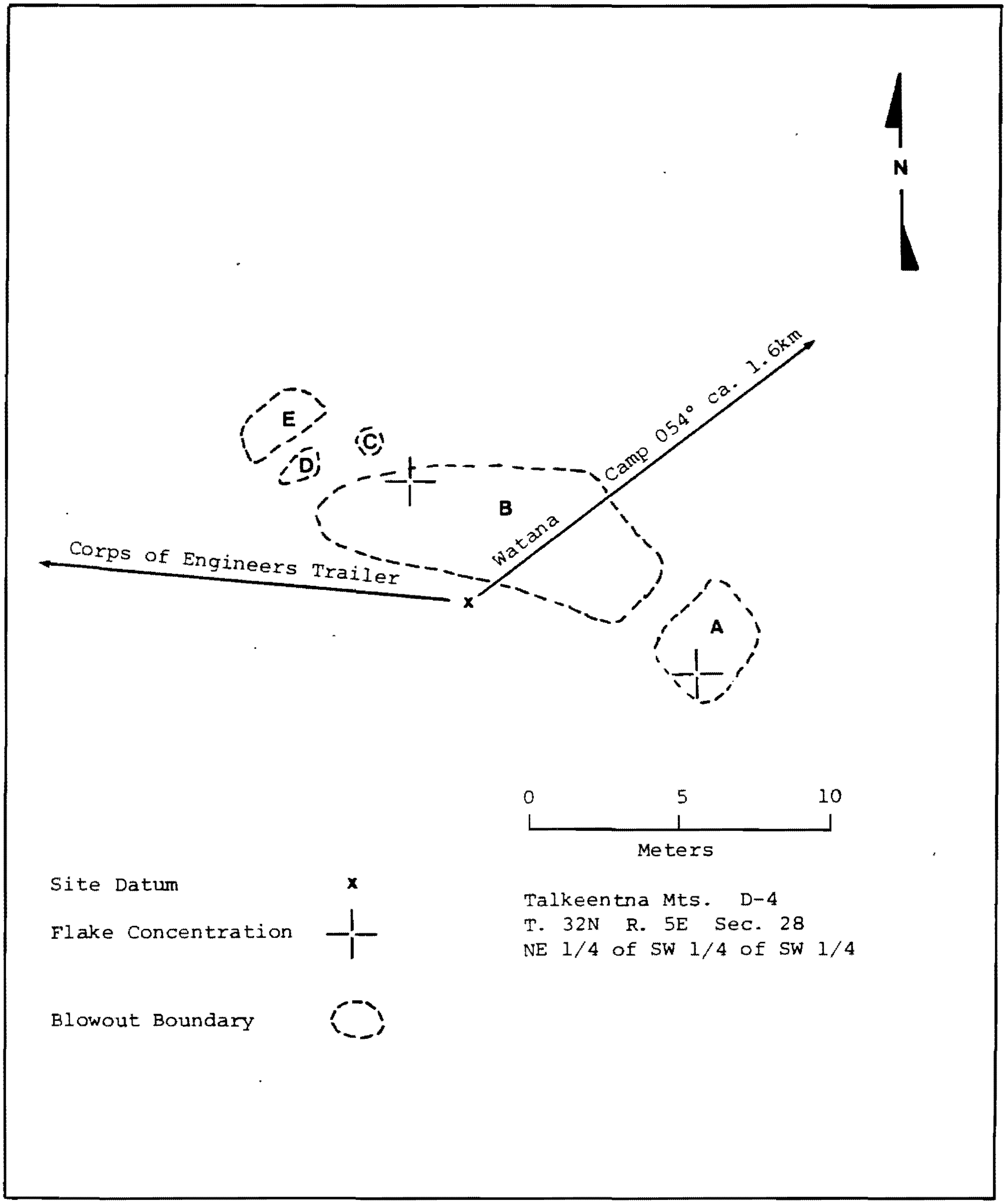


Figure 77.

Site Map UA78-60 (TLM 018)

KEY TO FIGURES 78-87

Figure 78	a	UA80-74-6, large flake
	b	UA80-74-3, large flake
	c	UA80-74-1, large flake
	d	UA80-74-8, large flake
	e	UA80-74-4, large flake
	f	UA80-74-2, large flake
	g	UA80-74-9, large flake
	h	UA80-74-10, possible flake core
	i	UA80-74-5, large flake
	j	UA80-74-7, large flake
Figure 79	a	UA80-73-1, endscraper
	b	UA80-68-144, locus A, scraper
	c	UA80-68-238, locus A, retouched flake
	d	UA80-68-239, locus A, scraper
	e	UA80-68-147, locus B, scraper
	f	UA80-68-190, locus B, projectile point, medial section
	g	UA80-68-194, locus B, biface
	h	UA80-72-10, core tablet
Figure 80	a	UA80-77-89, side-notched projectile point base
	b	UA80-77-327, complete side-notched biface
	c	UA80-77-427, blade fragment
	d	UA80-77-429, blade fragment
	e	UA80-77-430, blade core fragment
	f	UA80-77-437, blade-like flake
	g	UA80-77-517, retouched flake
	h	UA80-77-520, side-notched projectile point
Figure 81	a	UA80-78-1, endscraper
	b	UA80-79-1, endscraper
	c	UA80-79-2, retouched flake
	d	UA80-79-8, endscraper
	e	UA80-80-1, biface fragment
	f	UA80-143-1, unifacially worked scraper
Figure 82	a	UA80-79-16, notched cobble with battering
Figure 83	a	UA80-146-1, primary burin spall
	b	UA80-147-1, blade-like flake with retouch
	c	UA80-149-2, locus A, biface fragment
	d	UA80-149-3, locus A, blade-like flake fragment, medial section
	e	UA80-149-4, locus A, blade-like flake fragment, medial section

f UA80-149-30, locus B, retouched flake
g UA80-149-31, locus B, side-notched projectile point base
h UA80-149-34, endscraper fragment

Figure 84 a UA80-151-1, lanceolate projectile point
b UA80-151-40, retouched flake
c UA80-151-42, biface fragment
d UA80-151-43, uniface fragment
e UA80-152-3, microblade fragment, distal end
f UA80-152-5, microblade
g UA80-152-37, projectile point

Figure 85 a UA80-153-50, projectile point base
b UA80-153-53, projectile point base fragment
c UA80-153-55, unifacial endscraper fragment
d UA80-154-4, biface fragment
e UA80-154-5, microblade fragment, distal end
f UA80-154-14, retouched flake
g UA80-155-1, biface
h UA80-159-1, projectile point base
i UA80-159-4, projectile point base
j UA80-159-12, projectile point base

Figure 86 a UA80-160-1, large flake
b UA80-160-4, bifacially retouched flake with graver spur
c UA80-160-6, retouched flake

Figure 87 Mammoth (?) bone

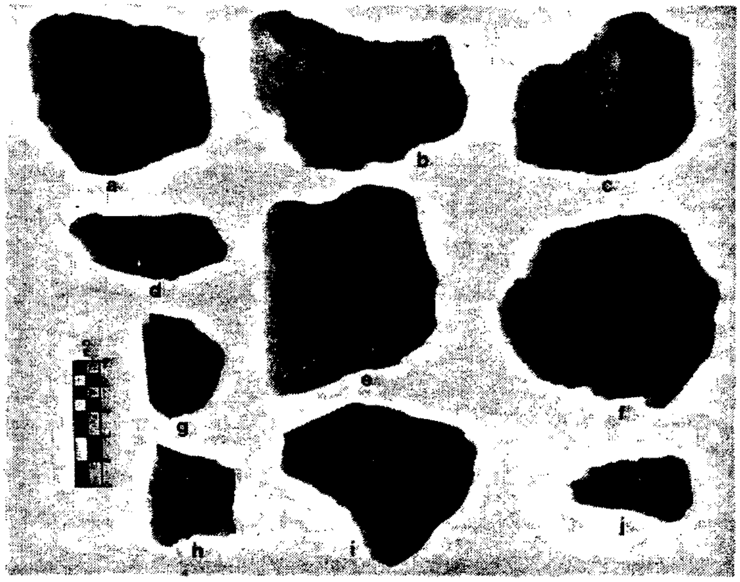


Figure 78.

Artifacts from site UA80-74 (TLM 027).

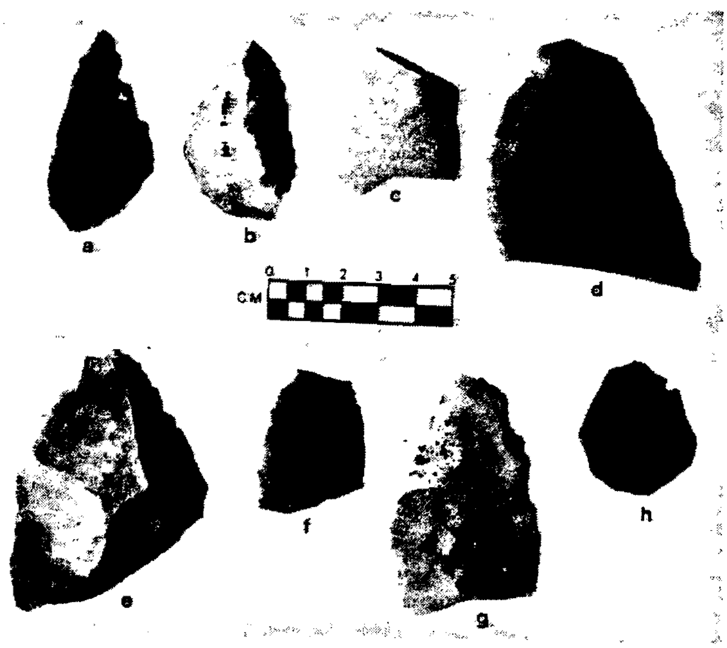


Figure 79.

Artifacts from sites UA80-73 (TLM 026) a, UA80-68 (TLM 021) b-g, UA80-72 (TLM 025) h.

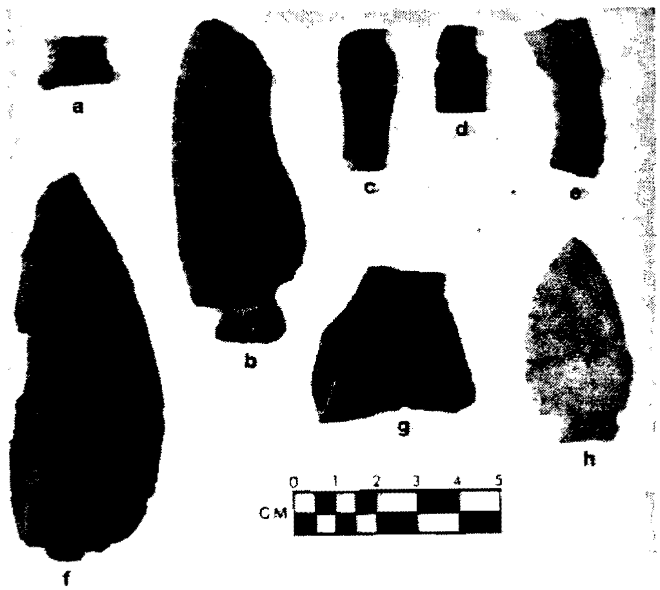


Figure 80.

Artifacts from site UA80-77 (TLM 030).

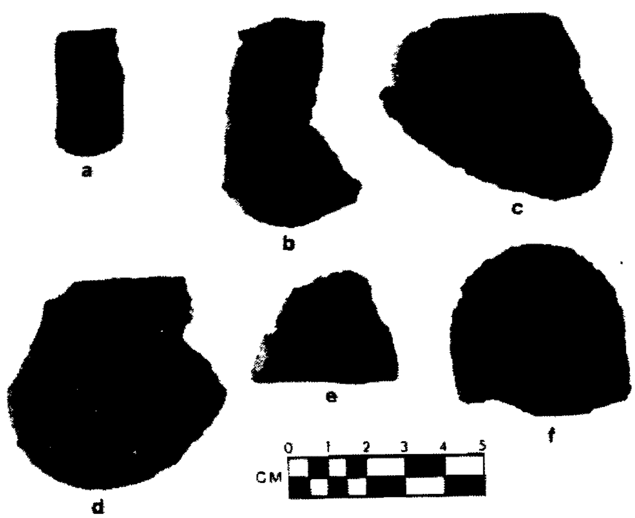


Figure 81.

Artifacts from sites UA80-78 (TLM 031) a, UA80-79 (TLM 032) b-d, UA80-80 (TLM 033) e, UA80-143 (TLM 036) f.

Figure 82.

Artifact from site UA80-79 (TLM 032).

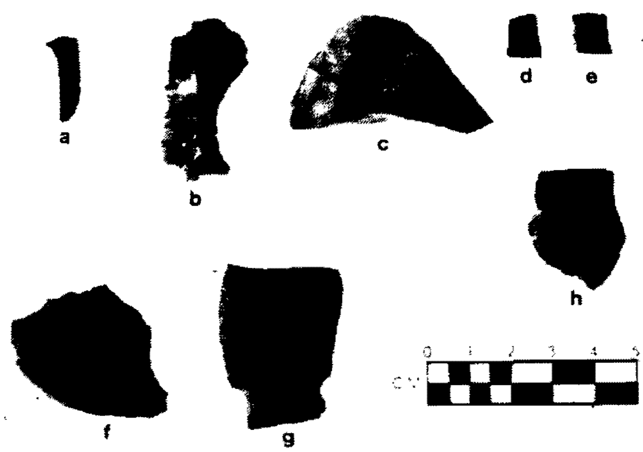


Figure 83.

Artifacts from sites UA80-146 (TLM 039) a, UA80-147 (TLM 040) b, UA80-149 (TLM 042) c-h.

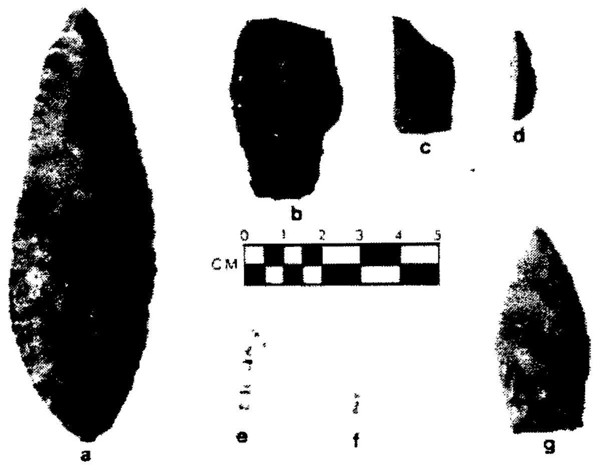


Figure 84.

Artifacts from sites UA80-151 (TLM 044) a-d, UA80-152 (TLM 045) e-g.

Figure 85.

Artifacts from sites UA80-153 (TLM 046) a-c, UA80-154 (TLM 047) d-f, UA80-155 (TLM 048) g, UA80-159 (TLM 052) h-j.

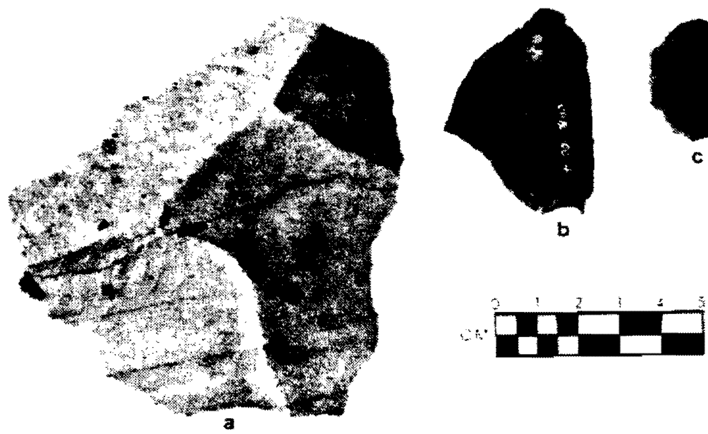


Figure 86.

Artifacts from site UA80-160 (TLM 053).

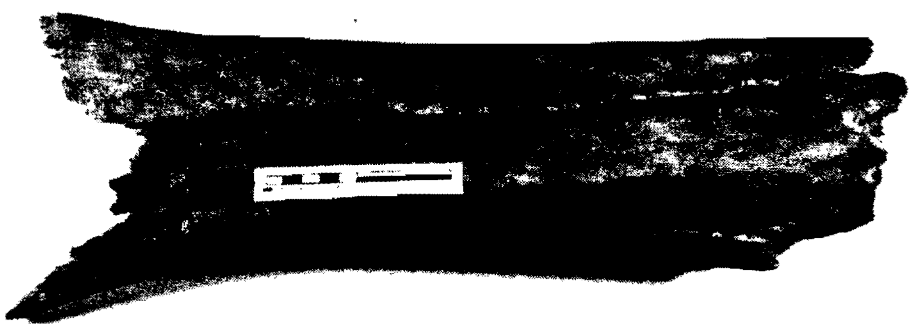


Figure 87.

Mammoth (?) bone from near mouth of Tyone River.

3.2.2 - Airstrip Survey--Watana Base Camp

Proposed borrow areas, parking apron, and runway for the Watana airstrip were surveyed during the 1980 field season. Surface reconnaissance and subsurface testing were conducted along the entire length (6000 feet) and width (500 feet) of the airstrip. Five transects, one directly on the centerline and two on each side and paralleling the centerline, were examined (Figure 88). Subsurface tests were placed every 200 feet along each transect. Prior to archeological investigation survey markers were placed along the centerline as well as along the outer perimeter clearly delineating the airstrip. A total of 155 subsurface tests were excavated to a depth of 50 cm where possible. However, in most cases water or gravel was encountered before reaching 50 cm. In addition to the transect tests, 11 tests were placed in areas that provided some topographic relief from the surrounding low marshy terrain. Five other tests were made on the proposed runway in connection with transect testing in Borrow Area D (see Figures 170 and 171, Appendix E), which crosses the airstrip.

No cultural material was observed on the surface or in any of the subsurface tests. Therefore, archeological clearance is recommended. However, in the event that cultural resources, missed by the above sampling method, are uncovered during construction or use of the airstrip, TES and the project archeologist should be contacted so that the necessary action can be taken in a timely manner and unnecessary delays avoided.

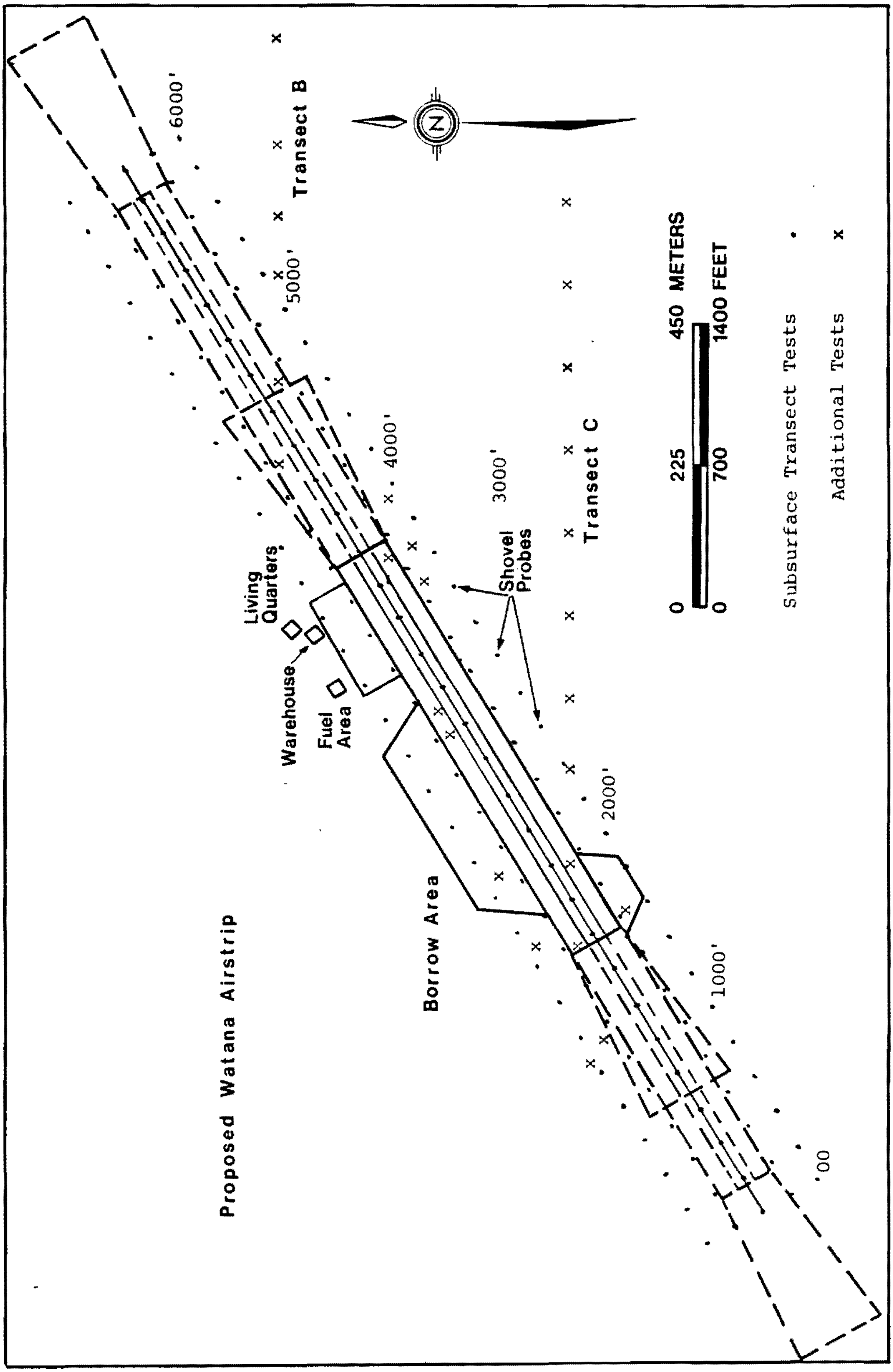


Figure 88.

Surface reconnaissance and subsurface testing at the proposed Watana airstrip.

3.3 - Geology

3.3.1 - Geo-Archeologic Terrain Unit Mapping

After regional reconnaissance mapping, which was partly illustrated in the August 5 semi-annual report (Subtask 7.06), the geo-archeologic units were revised and remapped. Although the revised maps are not complete at this time the unit descriptions are included as Appendix C. Units were crudely divided by age (Glacial and Holocene) into two first order categories. Second order categories include rock surfaces (R), drift (D), ice contact terrain (I), outwash (O), lacustrine (L), valley wall features (V), alluvium (A), slope deposits (S), and marshy bog areas (M).

Units mapped as glacial (G) in age include all erosional or depositional surfaces modified by ice during glaciation. The highest peaks in the study area, many of which stood above the limit, are also included as glacial units because their surfaces were intensely effected by frost shattering and mass movement at that time. Units mapped as Holocene (H), include all those of non-glacial origin that clearly post-date final ice wastage in the valley bottoms.

Rock surfaces (R) include all those modified by glacier erosion. Surfaces are commonly rounded, but include some open flat areas, and some very steep slopes. Drainage is usually excellent, and soil cover minimal. Tundra vegetation is usually thin and patchy. Unit R is divided into four subunits: hills (h), surfaces (s), valley walls (b), and drift covered (d). Subunit h indicates that the rock unit described occurs as part of an isolated hill or complex of hills. Subunit s indicates where horizontal or sloping bedrock exists in varying relief from S_1 (low local relief) to S_3 (high local relief). Subunit b is used where rock occurs as part of a broadly sloping valley wall, most commonly that of an abandoned glacial trough. Subunit d indicates where patchy drift occurs on rock surfaces, but where the bedrock structure still controls the local relief.

Drift surfaces (D) are those areas of low local relief thickly mantled with glacial till. Because the till is commonly dense, silt rich, and impermeable slopes are typically poorly drained and tussock covered. Subunit t indicates where the drift is thick, obscuring all bedrock structures. Local relief is very low, but gullying is common. Subunit p refers to patchy drift. Poorly drained areas dominate, but they are interspersed with well drained, usually high relief bedrock areas. Subunit u refers to undifferentiated drift. Surfaces generally are nearly flat and poorly drained, but commonly contain irregular zones of hummocky ice contact stratified drift (icsd) that are locally well drained.

Unit (I) indicates concentrations of ice contact stratified drift, which formed over broad areas by deposition associated with stagnant ice. Surfaces are generally gravelly, windswept, free of dense vegetation, and very well drained. Ridges and mounds of irregular pattern are the most common, but elongate features such as individual glacial moraines and eskers are also included within this group because all features grade one into another. Subunit o refers to open hummocky areas where the icsd has subdued local relief. Broad swales and mounds form the dominant pattern. Surfaces are only moderately well drained and generally brush-covered. Subunit t indicates areas of tightly nested ridges and swales in a dense well-drained chaotic pattern. Subunit p refers to patchy areas of well drained gravelly icsd overlying bedrock. Relief is generally low, but sharp.

Glacial outwash (O) mantles areas of low gradient with little surface relief. Surfaces are generally well-drained and forest- or brush-covered. Subunit p indicates broad areas of continuous outwash plains. Subunit v indicates valley train deposits consisting of low flat valley-bottom outwash. Subunit f indicates fans of outwash, commonly at the mouths of tributaries that carried glacial meltwater.

Lacustrine (L) surfaces are generally low, very poorly drained areas mantled with fine grained lake deposits. Earthflows typically occur where slopes are greater than several degrees, but generally the surfaces are stable, and tussock-covered. The subunit m is used where lacustrine deposits mantle the underlying land forms, but not obscure them. Subunit s is used where the deposits are thick enough to obscure the underlying land forms completely.

Areas mapped as (V) indicate those steep slopes which resulted from either Holocene downcutting or from Holocene modification of existing steep slopes by colluviation. These areas are typically cut into bedrock, but thick deposits of drift form the upper parts of the valley walls in many areas. Subunit g is used where the valley walls along the Susitna River or in tributaries are densely dissected by gullies. Terrain is very steep and irregular. Subunit s indicates where steep valley walls are not greatly dissected. These areas often contain a thick mantle of colluvium at the bases of slopes.

Alluvium (A) indicates coarse gravel surfaces of low relief that formed from fluvial deposition. Surfaces are generally well drained, thickly sloping, and exhibit gentle gradients. Subunit s refers to alluvial terraces along the Susitna River. These terraces commonly exhibit well defined overflow drainage channels. Recent alluvium that forms the forested gravel bars of the Susitna River was not mapped separately. Subunit t refers to tributary floor and fan alluvium. These terraces discontinuously mantle the floors of many tributaries.

Slope deposits (S) indicate those large areas thickly mantled by or modified by slope deposits or processes, respectively. These areas are invariably poorly drained, and are mantled by non-sorted mixed deposits. Subunit c indicates colluvial slopes, commonly near the base of steep valley walls. Subunit s indicates areas overlain by solifluction deposits.

Areas mantled by organic accumulations which occur in expansive bogs are indicated by Unit (M). These areas are still essentially undrained, and contain numerous small ponds.

3.3.2 - Stratigraphic Framework

River bluff exposures provided an excellent opportunity to partially interpret the evolution of the Susitna Valley. A brief description of the sediments exposed in the region is followed by a more detailed discussion of those exposures that have been radiocarbon-dated.

Portage Creek was the farthest west tributary studied. The creek exposes little sediment more than 20 km upstream, but sediments were common between 5 and 15 km upstream. They consisted of dense silty till, clay-rich lacustrine sediments, and coarse outwash, and suggest that Portage Creek was at one time covered by a proglacial lake.

Between Portage and Devil Creeks the valley walls are composed almost entirely of bedrock, but significant thicknesses of glacial sediment mantle the valley bottom and are exposed at river level. Just downstream from Devil Creek 5-20 m of coarse bouldery gravel overlies glacial till and oxidized fluvial sediments. Eskers are common at the surface. Just upstream from the proposed Devil Canyon damsite 30-40 m of silty icsd and possibly till occur to river level. These sediments collectively indicate that Devil Canyon was carved some time before glaciers left the area, and that much of the valley may have been carved prior to glaciation. The valley here carried glacial meltwater westward during subsequent ice stagnation.

Between Devil Creek and Fog Creek morainal deposits and till mantle the broadened valley floor. Eskers and ice contact drift are common, but exposures are generally poor. Between Fog and Tsusena Creeks exposures are better, but generally exhibit only lacustrine and morainal icsd over a dense till and bedrock substrate. Good exposures of glacial sediment become even more rare between Tsusena and Watana Creeks, as the valley walls steepen and bedrock occurs at the surface.

Near and upstream in Watana Creek significant thick masses of surficial sediment are present and excellently exposed. Lacustrine deposits typically occur above till throughout this area but large masses of icsd are also present. Between Watana Creek and the drainage of Clarence Lake, the valley is very broad, hence exposures are generally low. They exhibit lacustrine and morainal icsd, till, and outwash, and become better exposed to the east. Between the Clarence Lake drainage and the steep V-shaped canyon (Vee-Canyon) exposures of deltaic and ice contact sediments extend nearly the full height of the valley in some areas. Clearly the receding glaciers deposited much material here, much of it in proglacially ponded lakes.

Between Vee-Canyon and Goose Creek sediments are exposed only near the base of the valley walls. There they exhibit interlayered till, lacustrine, and gravel units that suggest a complicated glacial history for this area. In the area of intense meandering of the Susitna River near the Oshetna River a number of excellent exposures are present. They contain lacustrine deposits, outwash, icsd, and till and indicate a prolonged glacial history in which outwash deposition was dominant. Deposition has been the rule here, rather than glacial erosion. East of the meander zone the valley opens up into a broad basin floored with glacial moraines and lacustrine deposits. Sandy deltaic and silty glaciolacustrine deposits are widely exposed.

Four exposures contained organic horizons that have been radiocarbon-dated (Table 1). These dated sediments provide a chronologic framework to which undated sediments and inferred events can be correlated.

Tyone Bluff is a 200 m long river bluff that exposes 53 m of deposits of variable origin (Figure 89). The oldest layer (Unit 1) is layered with rhythmically bedded silt and fine sand which is interpreted to be glaciolacustrine. Unit 2 is 13 m of ripple marked, cross bedded, and interbedded fine sand and silt that gradationally overlies Unit 1 and is interpreted as basin-margin lacustrine sediment.

TABLE 1.
RADIOCARBON DATES PERTAINING TO REGIONAL STRATIGRAPHY - SUSITNA VALLEY

^{14}C yr BP	MATERIAL	LOCATION	SIGNIFICANCE
2210 ± 70 (DIC-1858)	Compressed Wood	Earthflow Bluff (2 km South Fog Creek)	Minimum age for valley-floor drift.
3200 ± 195 (DIC-1860)	Woody Peat	Tyone Bluff (1 km up Tyone River)	Close minimum age for tephra.
11,535 ± 140 (BETA-1821)	Peaty Silt	Thaw Bluff (2 km upstream from Tyone River)	Close minimum age for last glaciation.
21,730 ± 390 (DIC-1861)	Woody Peat	Tyone Bluff	Maximum age for last glaciation.
24,900 ± 325 (BETA-1822)	Large Wood Fragment	Oshetna Mouth (0.5 km west Oshetna River)	Recessional ice contact stratified drift.
29,450 ± 610 (BETA-1819)	Collagen from Mammoth(?) bone	Tyone Bluff	Interstadial gravel deposition.

TABLE 1. continued

30,700 $^{+260}_{-1230}$ (DIC-1859)	Large Wood Fragments	Earthflow Bluff	Maximum age for last glaciation.
31,070 $^{+860}_{-960}$ (DIC-1862)	Detrital Wood Fragments	Tyone Bluff	Fluvial reworking of basin-margin glaciolacustrine sediments.
32,000 ± 2735 (BETA-1820)	Detrital Wood Fragments	Thaw Bluff	Fluvial reworking of basin-margin glaciolacustrine sediments.

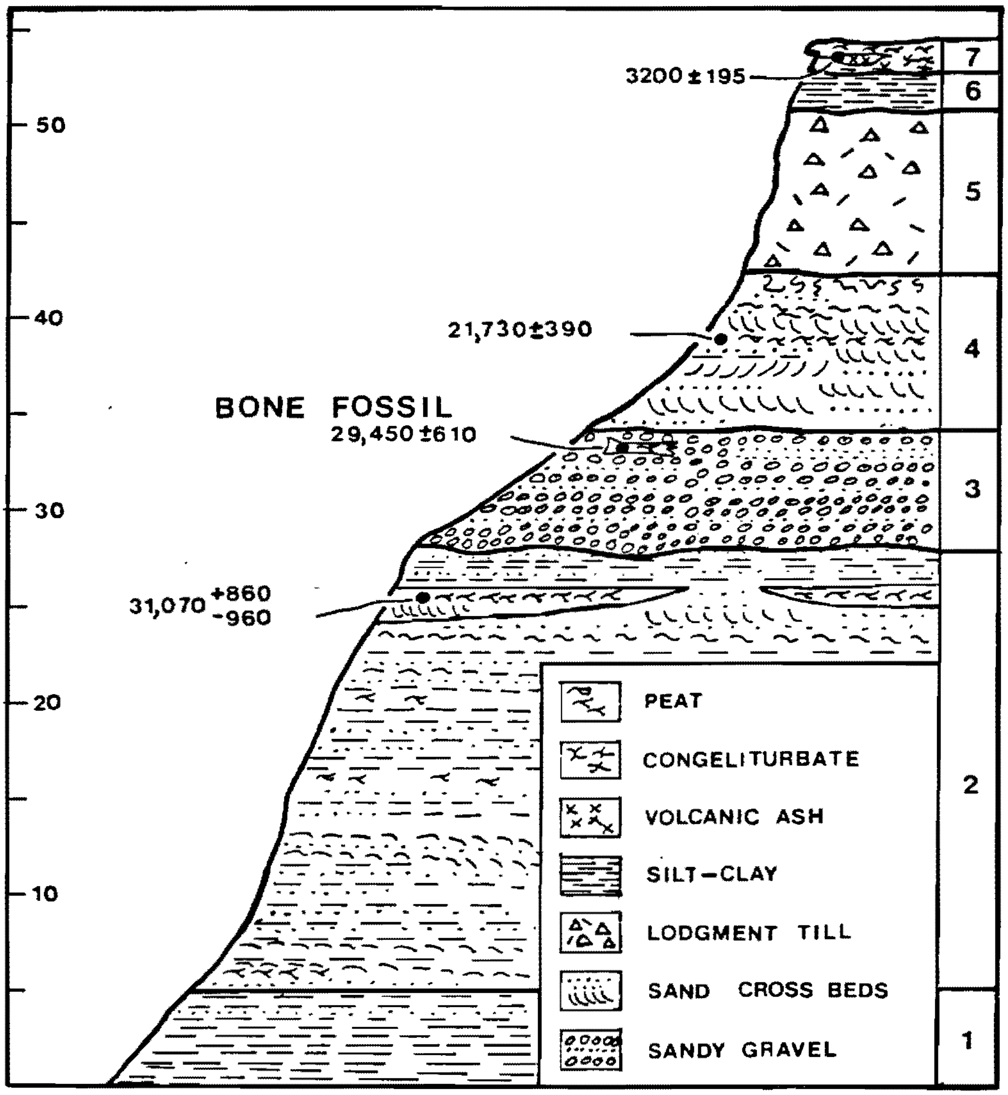


Figure 89.

Generalized stratigraphic section of Tyone Bluff.

Detrital wood fragments from an allochthonous peat horizon in a fluvial lens near its top yielded a date of 31,070 $^{+860}_{-960}$ ^{14}C yr BP. Fine gravels of Unit 3 may represent continued fluvial deposition in the basin after it filled or possibly after it drained. The collagen fraction from a mammoth (?) limb bone from near the top of Unit 3 yielded a radiocarbon date of 29,450 ± 610 ^{14}C yr BP. Unit 3 grades upward into the cross-bedded sand of Unit 4. The upper 2 m of Unit 4 is silty possibly reflecting glaciolacustrine deposition. A date of 21,730 ± 390 ^{14}C yr BP was obtained from a peat horizon in Unit 4. Unit 5 is a 9 m-thick massive dense lodgment till. Unit 6 is laminated silt and clay with dropstones, indicating a glaciolacustrine origin. Unit 7 consists of silty organic colluvium that contains a white vitric volcanic ash layer near its top. The ash is overlain by a dense surface peat which yielded a basal radiocarbon date of 3200 ± 195 ^{14}C yr BP.

These deposits are interpreted to indicate the progressive filling or draining of a large proglacial lake followed by fluvial deposition and overriding of the area by glacial ice. During deglaciation the area was submerged below a vast proglacial lake. Reworking of the older sediments and ash deposition characterized Holocene time. The four radiocarbon dates indicate that glaciation may have been initiated sometime before about 31,000 yr BP but that the Tyone lowland was not ice covered until sometime after about 21,700 yr BP. Glaciers probably occupied the area for a long time, but clearly retreated prior to 3200 yr BP.

Thaw Bluff lies along the Susitna River about 1 km north of Tyone Bluff (Figure 90). It exposes a lower massive unit of varved glaciolacustrine sediments (Unit 1), the top of which was slightly reworked and contained small wood fragments that yielded a date of 32,000 ± 2735 ^{14}C yr BP. The cross-bedded fluvial sand of Unit 2 overlies the lacustrine deposits in sharp angular unconformity. The upper unit (3) is interpreted to be thaw lake sediments or organic fluvial silt that was deposited after glaciation of the region. It yielded a date of 11,535 ± 140 ^{14}C yr BP.

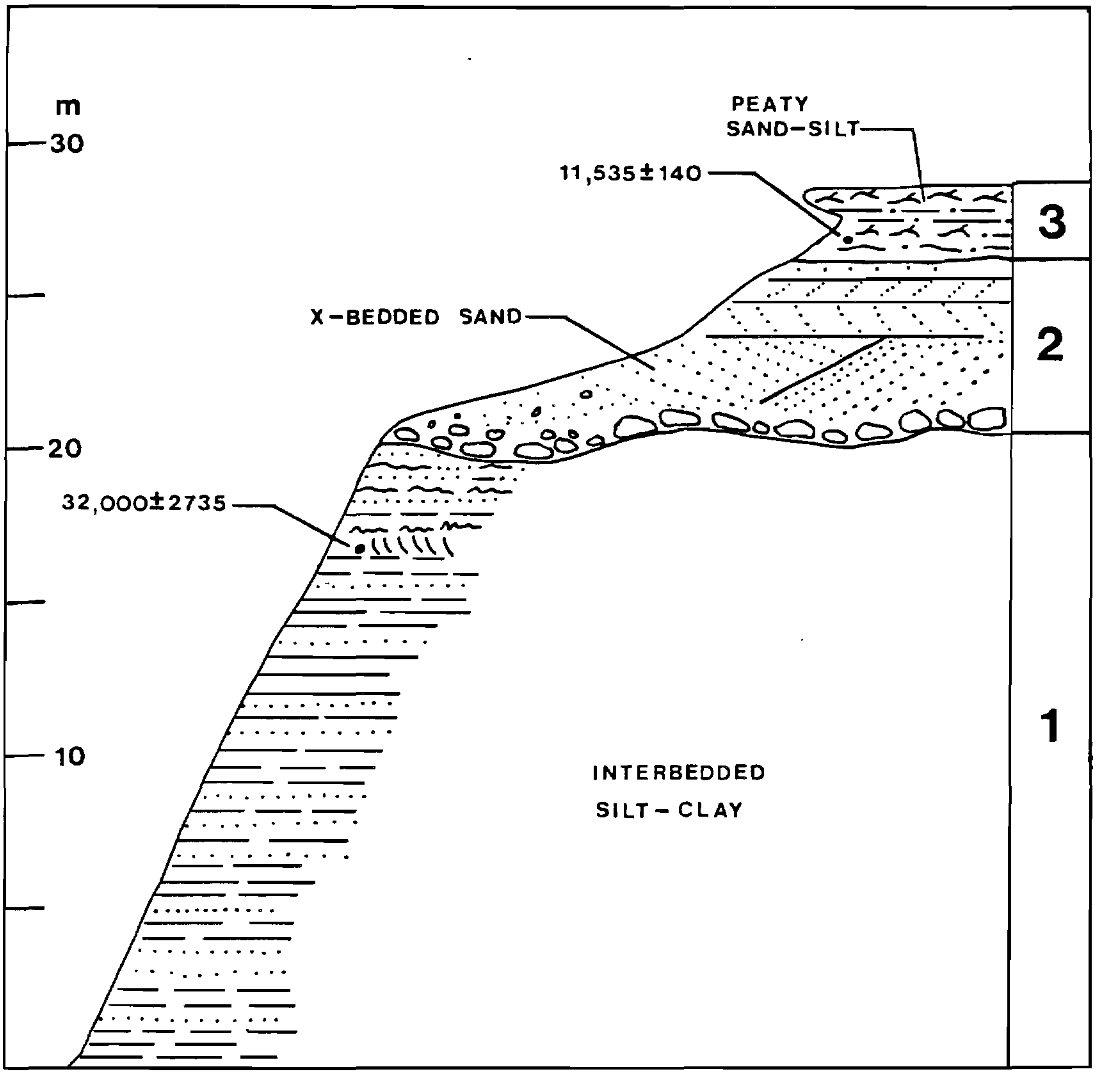


Figure 90.

Generalized stratigraphic section of Thaw Bluff.

The lower lacustrine sediments of Thaw Bluff are clearly correlative to similar deposits in Tyone Bluff, and indicate glaciolacustrine conditions as early as 32,000 yr BP. The fluvial sand unit probably represents reworking of the bluff area during deglaciation. The date of about 11,500 yr BP indicates that this broad area, which was covered by at least several hundred meters of ice was completely deglaciated prior to Holocene time.

Oshetna-mouth Bluff, which lies along the southern Susitna Valley wall just downstream from the Oshetna River, is an enigmatic exposure (Figure 91). The bulk of the sediments to the upstream side are poorly sorted and bouldery, and are interpreted as ice contact drift deposited in a northerly direction from an active glacier. Discrete organic layers in the drift contained several large wood fragments which yielded a date of 24,900 ± 325 ^{14}C yr BP. These deposits grade downslope into sandy well washed, faulted deposits interpreted as ice-contact deltaic in origin. These sediments are underlain by a till layer interpreted as lodgment in origin, which in turn overlies clearly varved deformed glaciolacustrine deposits. A thin and poorly defined till layer occurs near the top of the bluff, but it cannot be determined whether this is a lodgment till or flow till layer. A large cut-and-fill wedge of coarse bouldery gravel to the north end of the exposure is interpreted as outwash that was deposited during deglaciation.

The drift containing the dated wood sample is interpreted as recessional in origin, yet it indicates active glaciation at a time in which nonglacial conditions were present at Tyone Bluff. It is possible that the Oshetna Valley glacier acted as a separate and out of phase glacier system with respect to glaciation of the lowland to the east. The till at the top of the exposure may be all that remains of a once more extensive till layer that may have formed when glacier ice inundated the entire area some time after 21,000 yr BP.

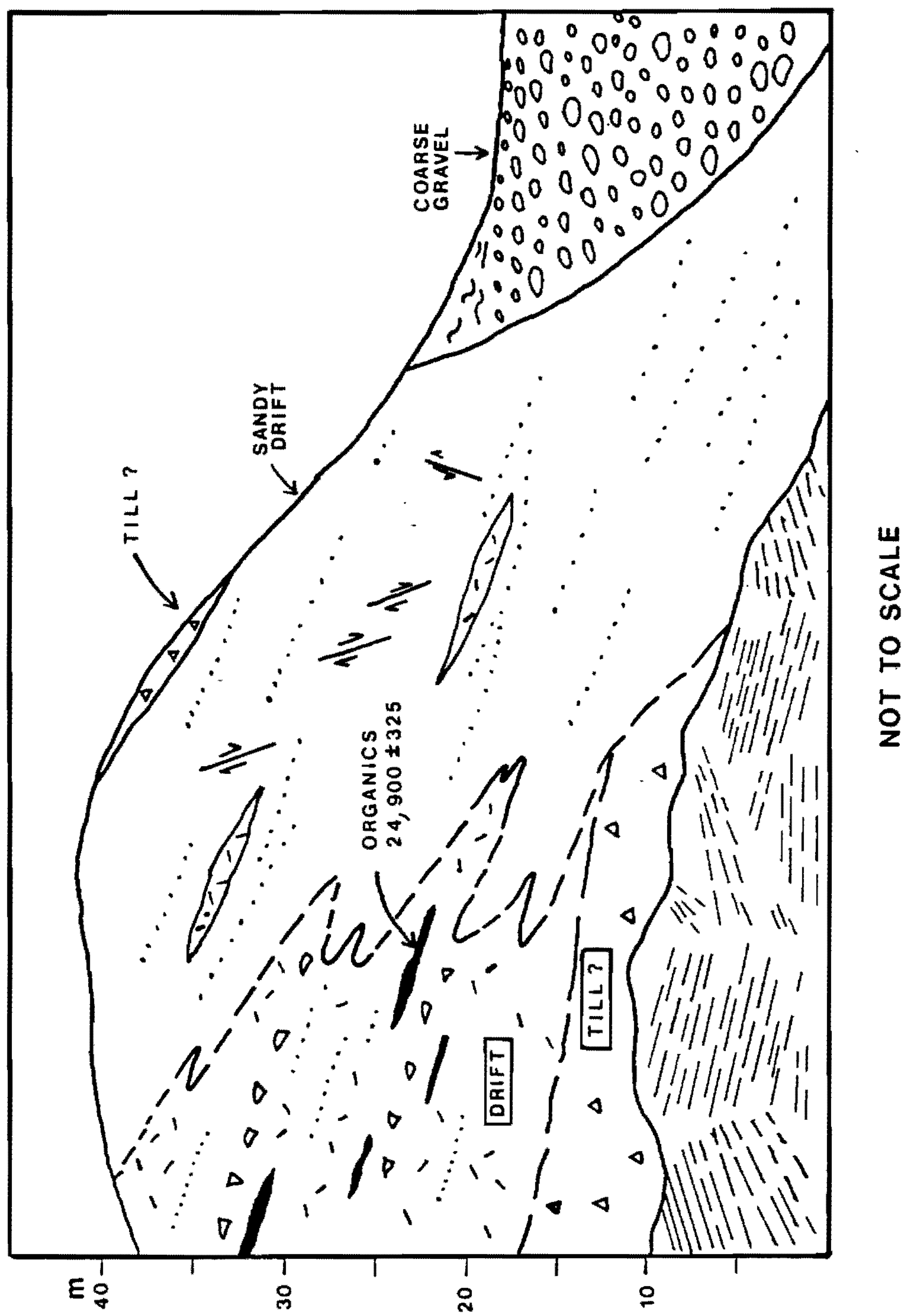


Figure 91.

Generalized stratigraphic section of Oshetna-mouth Bluff.

Earthflow Bluff is located 2 km south of the mouth of Fog Creek, about 70 km west of the other dated exposures (Figure 92). Oxidized sandy fine fluvial gravel near the base of the exposure contains abundant pieces of large wood, and is interpreted as interstadial in character. A date of 30,700 $^{+260}_{-1230}$ ^{14}C yr BP was obtained from near the base of this unit. The interstadial sediments are overlain by thin horizons of well washed medium sand and laminated clay which are interpreted as separate recessional ice contact facies. The bulk of the sediments at Earthflow Bluff are poorly sorted, bouldery and poorly washed sediments with a slight westerly dip. They are interpreted as a massive accumulation of ice contact drift deposited in the valley bottom during eastward glacier recession. Cut into and overlying the massive drift is an outwash terrace composed of bouldery gravel, which is interpreted to have been deposited during the final phases of glacial retreat from the valley. Overlying the gravel is a lens of organic-rich silty sand which is interpreted as pond sediments. A radiocarbon date of 2210 ± 70 ^{14}C yr BP from this horizon indicates that these sediments are late Holocene in age.

The oldest date from Earthflow Bluff indicates that nonglacial conditions there continued more recently than in the areas near the Tyone and Oshetna Rivers. Glacial conditions were not evident there until some time well after 30,700 yr BP. Glaciers advanced from the east, covering much of the valley free of interstadial sediments and depositing till on the higher slopes. Eastward glacial retreat which occurred some time prior to 2200 yr BP was probably slow, as suggested by the large volume of morainal material in the valley bottom.

3.3.3 - Preliminary Glacial-Geomorphologic Mapping

The location, orientation, altitude, and state of development of glacial moraines, ice marginal meltwater channels, lake shorelines, kame-deltas, eskers, and ice flow indicators can all be used to reconstruct the glacial history of the region. These features are now being mapped on the U-2 images and transferred to a 1:250,000

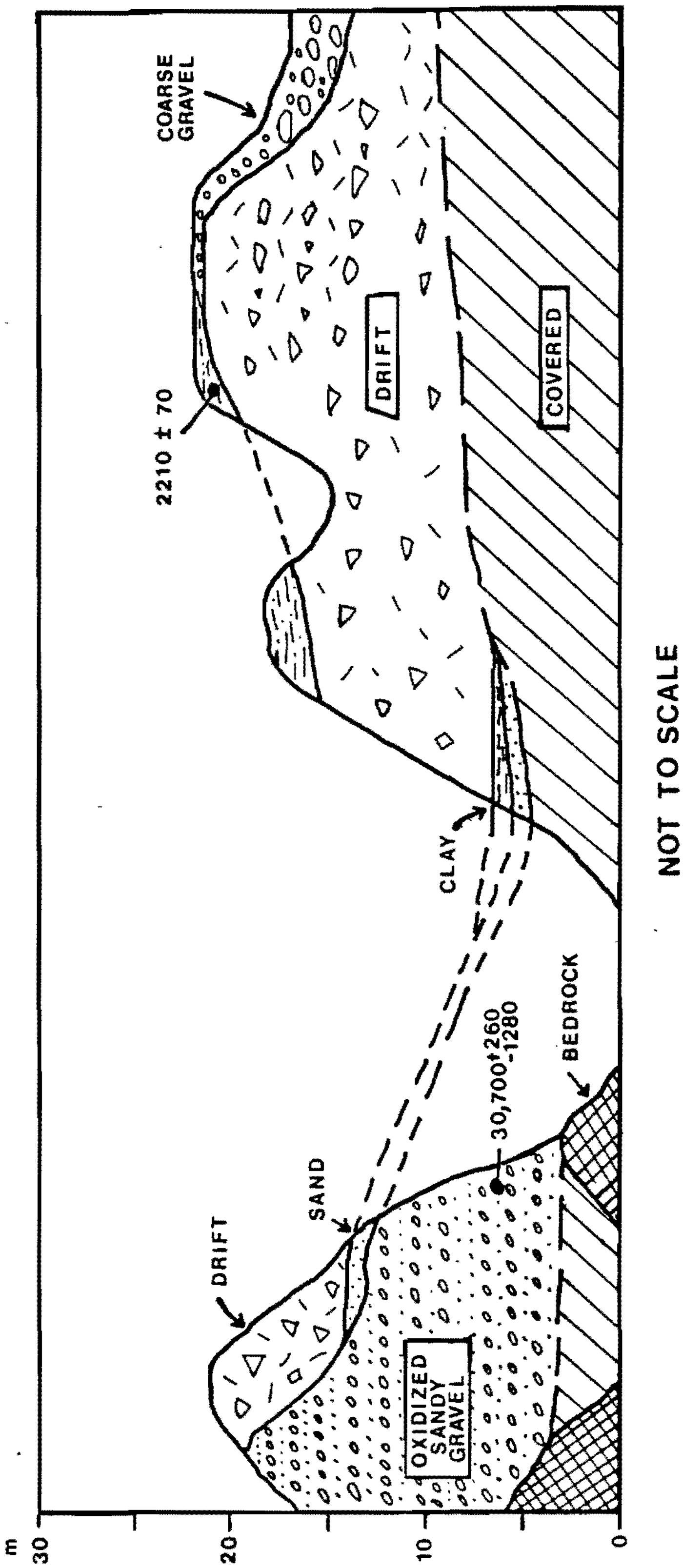


Figure 92.

Generalized stratigraphic section of Earthflow Bluff.

scale base, but the map is not yet ready to be included in this report. A complete description of all glacial-morphologic features studied is beyond the scope of this report but a brief summary of them will be presented.

Deposits of at least two and possibly four major ice advances are recorded on hills which projected above all glacial limits. In areas where slopes are not too steep, such as near the headwaters of Jay Creek, these features are particularly well preserved.

Valley floor gradients, moraines, meltwater channels, and directional indicators resulting from the last major glaciation indicate that the pattern of glacial flow was very complex. Each major valley contained its own glacier system, and these merged to form large coalesced lobes in the broad floor of the Susitna Valley between Stephan Lake and Watana Creek. A major lobe of ice which advanced southward and eastward from the headwaters of the Susitna and MacLaren Rivers, respectively, inundated the lowland near the Tyone and Oshetna Rivers. This lobe of ice built upward until it spilled westward as a tongue of ice through the narrow canyon east of Kosina Creek. This tongue of ice may have been joined by an ice tongue which occupied Jay Creek.

Another major ice source was the southeast drainage valleys of Watana, Tsusena, and Deadman Creeks, which carried local valley glaciers as well as overflow ice drainage from the north. The Talkeetna River-Fog Creek area was another major ice source. Glaciers which descended these valleys merged to build a large northeast flowing ice lobe that may have extended across much of the broad valley bottom in this area. A portion of this lobe spilled westward through the Devil Canyon area where it merged with a large southeast-flowing glacier in the valley of Portage Creek. Glaciers in the valleys of the Oshetna River and Kosina-Tsisi Creeks may not have advanced to join the main ice stream, but ice drainage from these valleys spilled over low divides to join other systems.

The pattern of deglaciation was different for each separate system and very complicated. Several readvances have been recognized for some valley glacier systems. The great bulk of recessional ice contact drift and the large number of recessional moraines indicates that retreat in many areas was progressive and systematic. In other valleys, particularly in the smaller systems, retreat must have been relatively rapid.

The widespread occurrence of eskers and other ice stagnation features over broad areas indicates that the ice may have stagnated over large areas during retreat. The gradient of eskers is commonly reverse relative to modern drainage, indicating that glaciers controlled drainage during retreat. Widespread lake deposits, particularly in the Fog Lakes-Watana Creek and Tyone-Oshetna River areas, indicate that these areas were covered by large proglacial lakes during deglaciation.

Examination of moraines fronting cirques in the Kosina Creek-Black River areas indicate that Neoglacial advances were very small, not extending more than several km beyond the present glacier margins.

3.3.4 - Mammoth/Mastodon Fossil Discovery

One of the most exciting finds of the 1980 field season was the discovery of a mammoth/mastodon fossil found *in situ* in fluvial gravels at Tyone Bluff (Figure 87). The fossil, representing the shaft portion of a right femur, was identified by R.D. Guthrie and George S. Smith of the University of Alaska, and is the first reported occurrence for any Pleistocene mammals in southern Alaska. It yielded a radiocarbon date of 29,450 ± 610 ^{14}C yr BP, and clearly implies nonglacial conditions at that time. This discovery indicates that the range of mammoth should be extended about 200 km south of its present limit. It also suggests that mountain passes in the Alaska Range may have been deglaciated during mid-Wisconsinan time.

3.3.5 - Holocene Volcanic Tephra

During reconnaissance study of terrain units and stratigraphic exposures, one or more white volcanic ash units were found to be widespread between Fog Creek and the Tyone River. The ash commonly occurred as a thin discontinuous mantle overlying gravelly prominences and immediately underlying the surface soil horizons. It was also found in many archeologic test pits between 2 and 40 cmbs. The ash also occurs widely in thin (2-5 cm) discontinuous lenses near the top of many river bluffs, where it usually immediately underlies the surface peat horizon.

In only one instance, at archeologic site UA80-74 near Fog Creek, two ash horizons were present, the lower one of which was poorly preserved. The singular common ash horizon found through much of the area from Fog Creek to the Tyone River is probably correlative to the upper ash at site UA80-74. The date of 3200 ± 195 ^{14}C yr BP from Tyone Bluff was obtained from peat interfingered with the upper part of the ash lens, and therefore probably represents a close minimum age. The date of 4720 ± 130 ^{14}C yr BP from site UA80-77 was obtained from a hearth 15 cm below the well developed single ash at this site, and probably represents a distant maximum age for this horizon.

These dates bracket the widespread ash layer closely between 3200 and 4720 yr BP, making it a very useful stratigraphic marker for late Holocene sediments. This horizon is already being actively used by the archeologists, and has great potential for other geologic studies, particularly the earthquake hazards program.

3.3.6 - Summary of Geologic History

(a) The Susitna Valley has been repeatedly inundated with extensive valley glacier systems that coalesced to form a minor mountain ice sheet. One or more pre-Wisconsinan glaciations have been recognized.

(b) Much of the present valley was carved to the present river level prior to middle Wisconsinan time (31,000 yr BP). The direction of drainage at that time is presently unknown.

(c) The valley bottom was extensively modified during the last glaciation which began some time after about 31,000 yr BP in the Fog Creek area, and some time after about 22,000 yr BP in the Tyone River region.

(d) During deglaciation large areas were covered with stagnant ice, and meltwater drained freely below the surface, forming complex esker systems. The direction of meltwater flow, and the presence of till at river level suggests that Devil Canyon was carved prior to Holocene time. Glaciers retreated systematically over many areas leaving a number of periodically spaced massive ,ecessional moraines.

(e) Deglaciation of the Tyone River region was complete by at least 11,500 yr BP. Because this area was covered by a large piedmont ice lobe, other areas may have been ice free even earlier. Thus, much of the Susitna Valley may have been deglaciated prior to about 12,000 yr BP.

(f) During Holocene time the Susitna River has not greatly deepened its valley in most areas; rather it has widened the valley bottom slightly by lateral planation. Low-level alluvial terraces and tributary mouth alluvial fans have formed in widened portions of the valley. Many small streams tributary to the Susitna have greatly incised their channels during Holocene time, resulting in steep irregular profiles characterized by waterfalls and rapids.

3.4 - Paleontology

3.4.1 - Section and Unit Descriptions

The Watana Creek exposures are approximately 515 feet (157 m) thick. The Tertiary deposits unconformably overlie Triassic age extrusive rock previously mapped as metavolcanics (Csejtey, et al. 1978). Pleistocene(?) deposits composed of very fine to fine-grained fluviatile sands overlie the Tertiary deposits with angular unconformity. The outcrops occur in a basin of approximately 10 square miles and extend up Watana Creek for a distance of 7 miles.

The section is composed of sandstones, siltstones, conglomerates, and coals. The outcrops are very poorly indurated, with a few calcareous units showing some degree of lithification. No faulting in the section has been observed. Dips obtained from bedding planes in the section were recorded from 5° to 35°.

Sandstone units within the section are predominantly massive without discernable bedding. Planar and trough crossbedding are observable in a few of the units and many units exhibit a fining upward grain size distribution. Color ranges from greenish-brown to reddish-brown. The grains comprising these units are commonly subangular to angular. Fossil material is commonly found in the units composed of finer-grained sands, but is rarely preserved due to the poor lithification of the units. The sandstone units show a variety of contact relationships with adjacent units: sharp, erosional, and gradational contacts are seen in the section.

Siltstone units in the section commonly show well-defined horizontal bedding planes. They are extremely variable in thickness, ranging from inches to tens of feet and vary from brown to gray in color. The siltstones are commonly gradational over sandstones but are also found in gradational or sharp contact with coals and conglomerates. Plant material is typically found in these units but is only well preserved in the well cemented calcareous siltstones.

Conglomerate units are characteristically prominent, structureless exposures, commonly tens of feet thick. The upper portion of the section has a greater number of conglomerate units with many occurring as laterally discontinuous lenses and rarely exceeding a thickness of 10 feet. Units of the lower portion will commonly be 30 to 50 feet thick. Clasts range in size from approximately 0.5 inches to 6.0 inches. The clasts are subrounded and rounded, commonly reddish brown in color, and consist of volcanic rock fragments. Conglomerate units typically exhibit either an erosional or sharp contact with both underlying and overlying units.

Coals in the section are thin, discontinuous, and of subbituminous rank. They range from a few inches to three feet in thickness, are of a platy nature, and are brown to black in color. At two areas, one at the southern end and one at the northern end of the basin, the coal beds have been burned, with the result that the adjacent sandstones and siltstones have been "baked". Fossil plant specimens were collected from these baked beds. The coal units are found within fining upwards trends or in sharp contact with any of the other lithologic units of the section.

3.4.2 - Present and Future Studies

Selected sandstone units have been sieved and prepared for thin section analysis. When analyzed, the results of the sieving procedure will further subfacies delineation. Ongoing petrographic analysis of the thin sections has revealed that these deposits are compositionally quite immature; volcanic and metamorphic rock fragments and feldspars predominate, and quartz (chert included) does not appear to exceed 10%. When completed, petrographic studies of the thin sections will allow suggestion of a source terrain from which these deposits were derived. Extraction of heavy minerals from selected sand samples will also be undertaken to support the results of petrographic analysis.

Samples of conglomerate clasts have been examined megascopically and are virtually all derived from volcanic rocks. No chert clasts have been observed. Representative clasts will be thin-sectioned to determine the parent volcanic rock types.

Coal samples prepared for pollen and spore analysis are available for future investigations at the Mineral Industries Research Laboratory, University of Alaska, Fairbanks.

Systematic identification of the fossil plants collected from the deposits of the Watana Creek area is currently being conducted at the University of Alaska Museum, Fairbanks. Plant localities are indicated in unit description of Figures 93 to 97. Poor lithification of most units resulted in collection of the Watana Creek assemblage mainly from indurated calcareous units. Taxa thus far identified include: Metasequoia cf. M. glytostroboides, Alnus cappsi, Alnus barnesi, Carpinus cappensis, Carpinus seldoviana, Salix sp. (?) Crataegus chamissoni, and Monocoylophyllum sp. Based on the identifications, the Watana Creek assemblage appears to be correlative with Seldovian Stage assemblages of the Cook Inlet Region (Wolfe 1966; Wolfe et al. 1966; Wolfe and Tanai 1980; Wahrhaftig et al. 1969). The Seldovian Stage is early to middle Miocene (Figure 98). Placement of a more precise limit on the age of the Watana Creek deposits does not appear warranted until more extensive collection and interpretation is accomplished. Further study will enable floristic and ecologic interpretations to be suggested.

3.4.3 - Interpretations

Based on lithologies and stratigraphic relationships, the deposits exposed along Watana Creek are interpreted to represent an alluvial system. Observed facies relationships, lateral discontinuity, wide range in particle size, and the nature of unit contacts are all consistent with alluvial sedimentation. A braided stream is envisaged as having transported the clastic material from a nearby source. The energy of the system was subject to vast fluctuations, as is evident

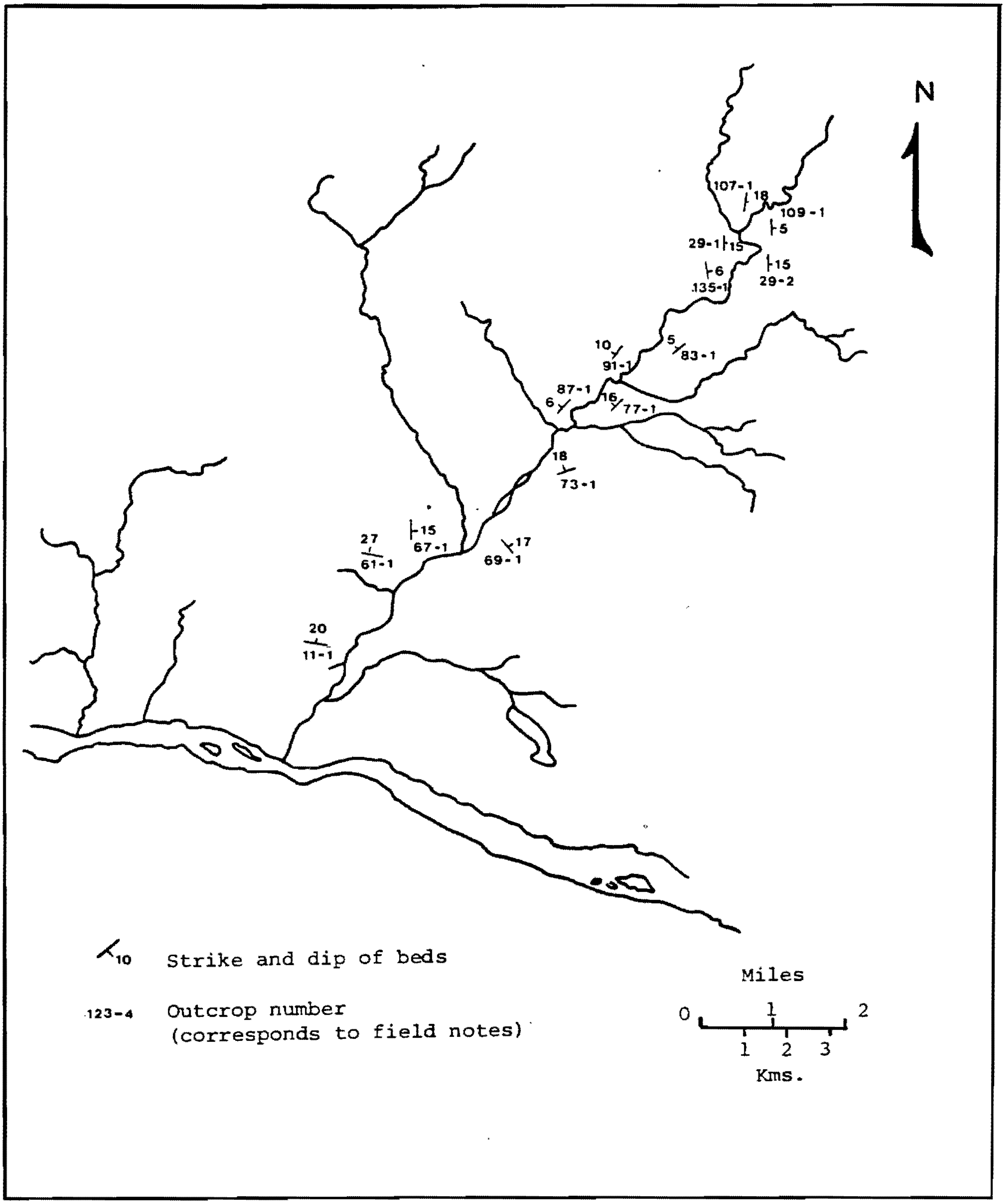
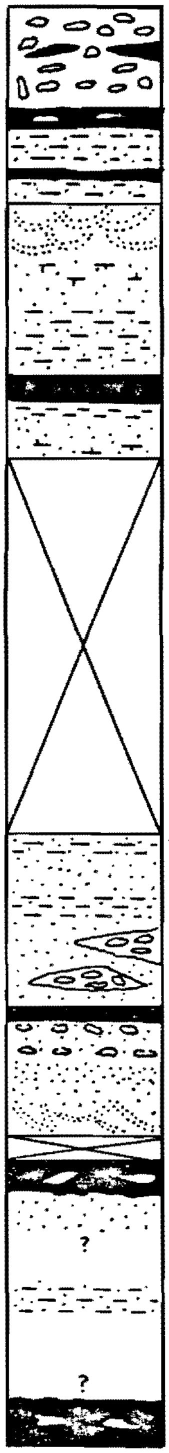


Figure 93.

Location of outcrops.



Unit	Description and Sample
57-2	Congl
21-2	Coal - POL
19-4	Sltst,ss - SV
19-3	Coal - POL
19-2	Sltst - PLF
17-3	Ss - PLM
17-2	Calc ss - PLF
15-3	Sltst coarsen ss - PLM,SV
15-2	Coal - POL
13-1	Sltst,ss - SV,PLM,PLF
55-3	Ss fining sltst - SV,PLM
55-2	Ss,Congl lens - PLM
55-1A	Coal - POL
55-1	Congl
53-1	Ss - SV,PLM
51-1	Bkd coal,sltst,ss - PLF

KEY

PLM - paleomagnetic
PLF - plant fossils
POL - pollen,spores
SV - sieved
Ss - sandstone
Sltst - siltstone
Congl - conglomerate
Calc - calcareous
Bkd - baked

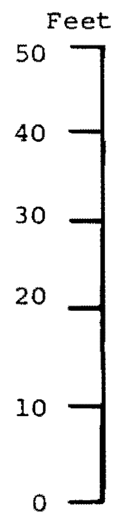


Figure 94.

Outcrop 11-1.

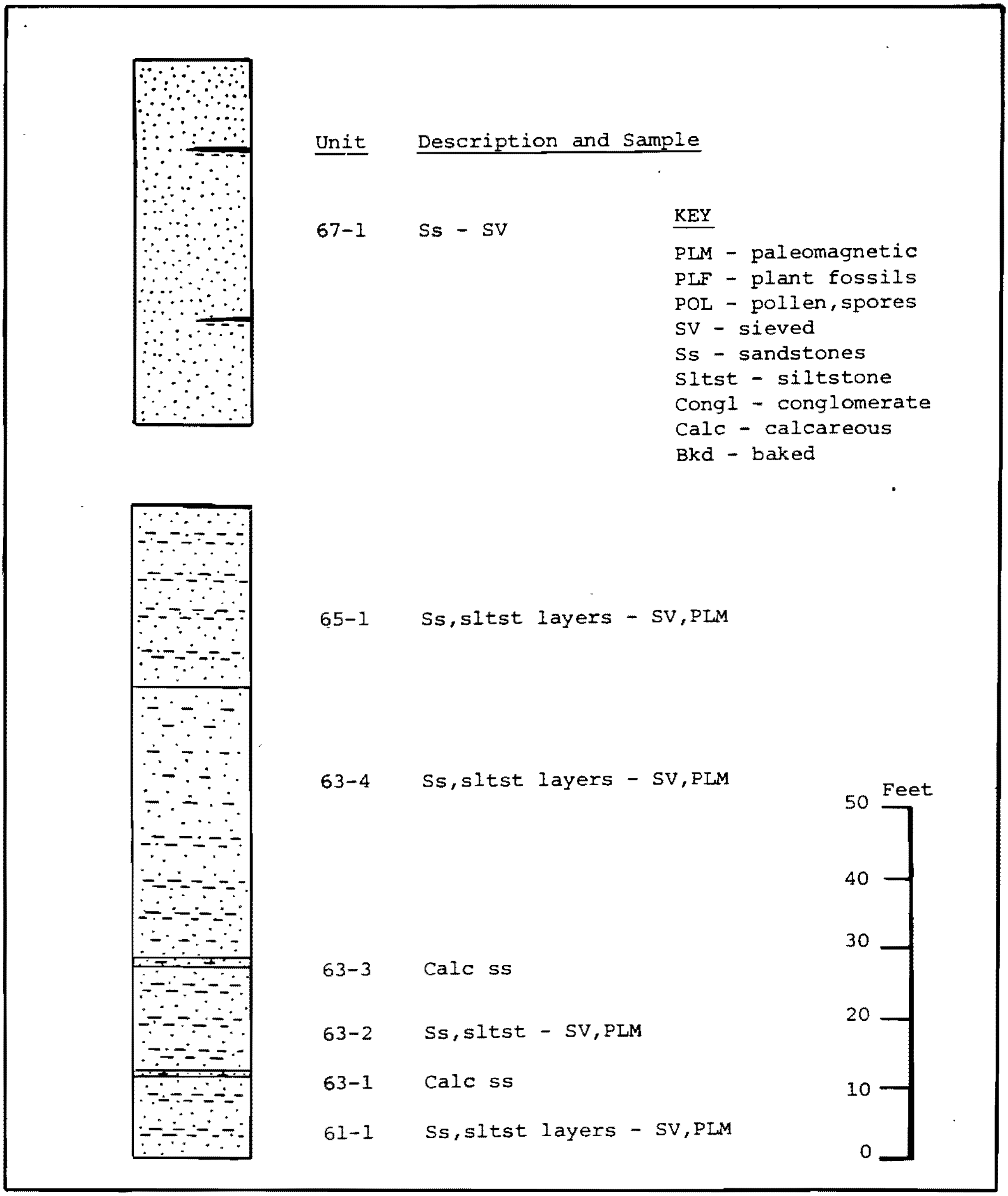


Figure 95.

Outcrop 61-1, 67-1.

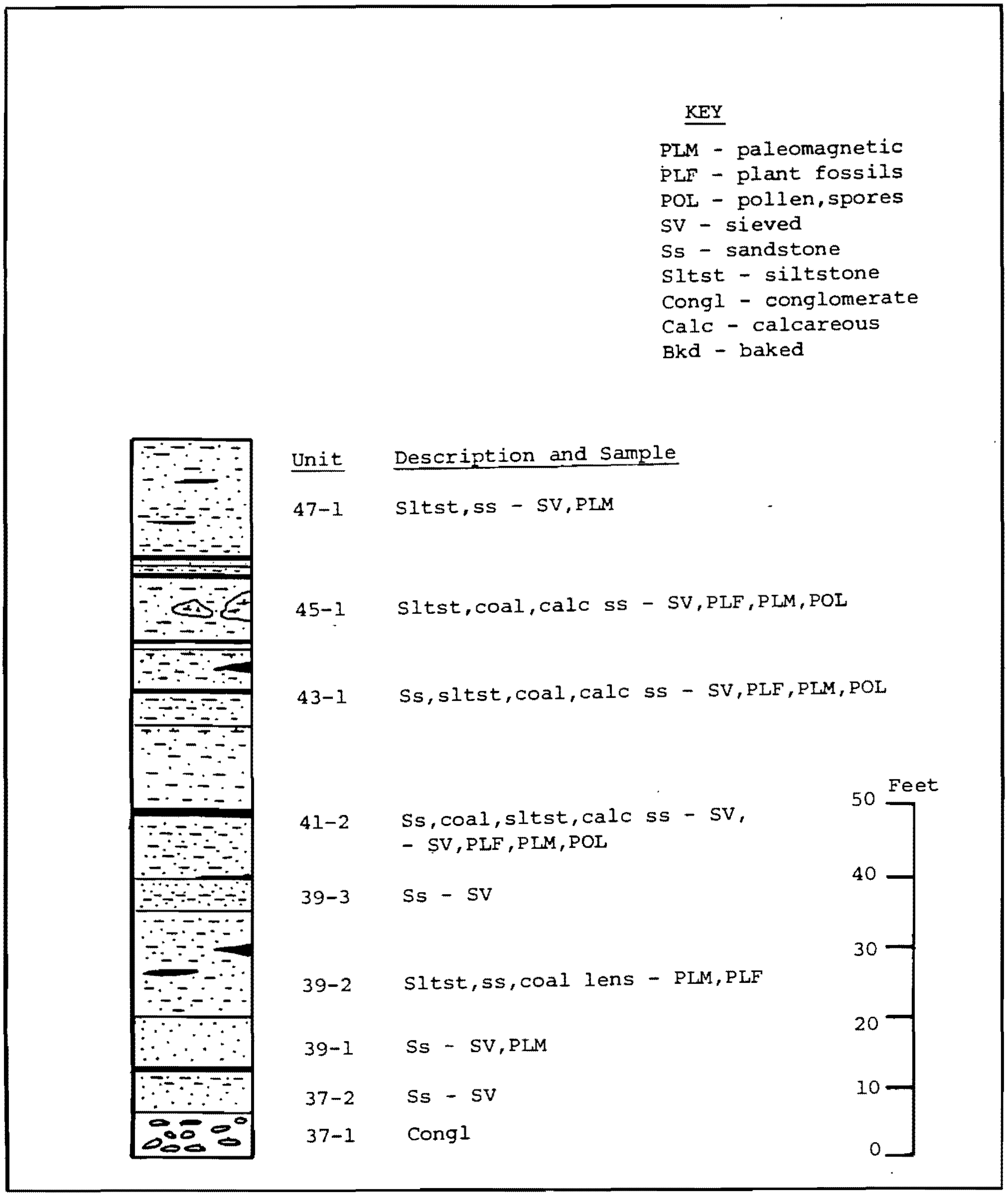
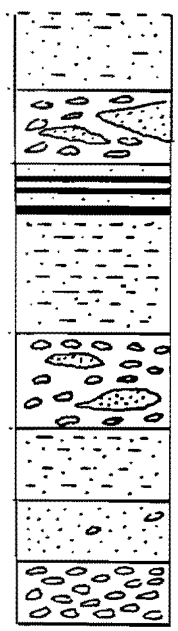


Figure 96.

Outcrop 29-2.

KEY

PLM - paleomagnetc
PLF - plant fossils
POL - pollen,spores
SV - sieved
Ss - sandstone
Sltst - siltstone
Congl - conglomerate
Calc - calcareous
Bkd - baked



Unit	Description and Sample
125-2	Bkd ss,sltst - PLF
125-1	Congl,ss lens - PLM
33-2,33-4,33-3	Coals - POL
123-1	Sltst - PLM
121-4	Congl - PLF
121-3	Sltst coarsen ss
105-3	Ss,congl lens - SV,PLM
105-2	Congl - PLM

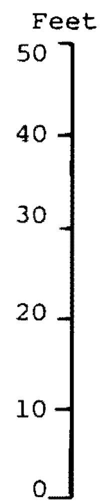


Figure 97.

Outcrop 29-1.

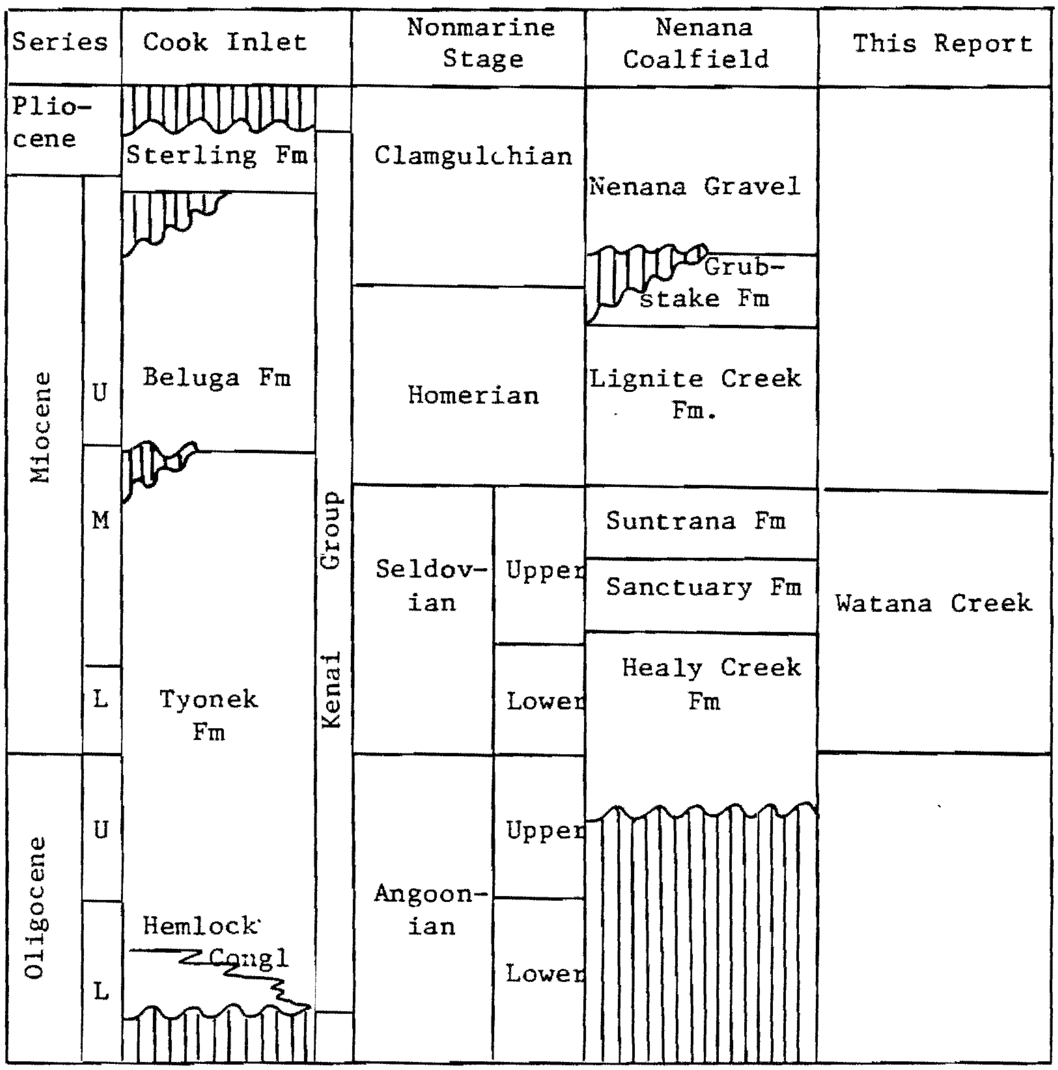


Figure 98.

Suggested correlations with Cook Inlet region and Nenana coalfield (after Wolfe and Tanai, 1980, Figure 6, page 9).

from recurrent deposition of both conglomerates and coals. This can be attributed to tectonism in the source area. Pulses of high energy are evidenced by conglomerate units. Extensive floodplains probably existed that supported local accumulation of plant debris with deposition of conglomerates and sands within channels. Further analysis of stratigraphic relationships within the section will perhaps allow discrete channel, floodplain, bar, and other braided stream facies to be delineated.

4 - IMPACT ASSESSMENT

4.1 - Introduction

The degree and type of impact expected to occur on cultural resources within direct and indirect impact areas are considered in this section. Only those sites previously documented and those discovered during the 1980 field season are considered, however, additional sites will surely be discovered in 1981, and further evaluation of sites already documented will continue. Because the exact construction parameters have not been fully delineated the impact assessment for cultural resources has been tailored to the best project construction scheme as outlined by the U.S. Army Corps of Engineers. Until the location of dams, borrow areas, access routes, etc., are finalized, cultural resource studies can only deal with the areas expected to be impacted based on the two dam proposal and current engineering data. Should major engineering changes be made late in the 1981 field season it will be very difficult to assess the impact on cultural resources for the areas affected.

For the purposes of this discussion, direct impact is defined as the immediate and demonstrable modification of the land resulting from construction and pre-construction activities. Indirect impact is an adverse effect to cultural resources resulting from the project that are secondary, but clearly brought about by the land modification project, such as subsequent changes in hydrology of tributaries, recreational activities, etc.

4.2 - Construction Impact

4.2.1 - Dam Construction

4.2.1.1 - Direct Impact Areas

4.2.1.1.1 - Devil Canyon Dam

No archeological or historical sites were located in the immediate area of the proposed Devil Canyon Dam during the reconnaissance level survey conducted during the 1980 field season. However, further testing is scheduled for 1981.

4.2.1.1.2 - Watana Dam

Archeological reconnaissance in the area of the proposed Watana Dam located and documented six sites that are in direct impact areas and would be adversely affected by dam construction. Three sites are located in borrow area E (UA80-69, UA80-70, and UA80-71), one in borrow area F (UA80-151), and two additional sites are located on the north side of the canyon in the proposed area of the Watana Dam (UA78-60 and UA78-67). Additional reconnaissance survey and intensive testing are planned for all six sites.

4.2.1.2 - Indirect Impact Areas

There are a number of sites located in areas of indirect impact. These sites (UA80-66, UA80-65, and UA80-142) will likely be affected by ancillary activities in and around construction areas. Indirect impact may also occur to other sites due to increased use of the study area by construction personnel. It is anticipated that additional sites will be discovered in areas of indirect impact during 1981.

4.2.2 - Access Routes

No detailed survey has been conducted along any of the proposed access routes, however, the route which proceeds north from the Watana Dam camp up Deadman Creek to the Denali Highway was subject to a brief aerial reconnaissance during the late fall of 1980. This reconnaissance located four sites, three of which (UA80-252, UA80-253, and UA80-254) may be directly impacted, should this route be selected.

The fourth site (UA80-255) may be indirectly impacted. Reconnaissance and phase II testing have only been budgeted for a single access corridor, and impact assessment cannot be undertaken in depth until a final selection of the access route has been made.

4.2.3 - Transmission Facilities

Cultural resource investigations of the proposed transmission routes are not presently part of phase I cultural resource studies. When the exact location and nature of these facilities are known, it will be necessary to develop a program to locate, document, and mitigate adverse effects to cultural resources located along the transmission routes from the dams to Fairbanks and Anchorage. However, the general literature review included a preliminary review of the proposed transmission routes.

4.3 - Operation Impact

4.3.1 - Reservoirs

4.3.1.1 - Direct Impact Areas

4.3.1.1.1 - Devil Canyon Dam

Filling of the reservoir behind the Devil Canyon Dam will inundate approximately 7,550 acres, and increase the water level to about the 1500 foot contour interval. During 1980 seven sites (UA80-141, UA80-74, UA80-76, UA80-70, UA80-71, and UA80-69) were documented that will suffer direct impact from inundation. Three of these sites are located in borrow area E and have previously been discussed. It is anticipated that additional sites will be discovered in this impoundment area in 1981.

4.3.1.1.2 - Watana Dam

Filling of the reservoir behind the proposed Watana Dam will flood approximately 43,000 acres increasing the water level to about the 2200 foot contour interval and inundate eight sites (UA80-150, UA80-155, UA80-146, UA80-157, UA80-147, UA80-80, UA80-73, and UA80-149) which will suffer direct adverse impact as a result of submergence. It is anticipated that additional sites will be discovered in this impoundment area in 1981.

4.3.1.2 - Indirect Impact Areas

Sites located outside the impoundment area but in close proximity to tributaries of the Susitna River may be subject to indirect impact resulting from changes in local hydrology due to the higher level of the Susitna and its tributaries (UA80-145 and UA80-68). Indirect adverse impact to the following cultural resources will also likely occur due to the increased use of the area by project personnel during construction and operations of the dams (UA80-142, UA78-67, UA80-158, UA78-65, UA78-60, UA78-66, UA80-144, UA80-78, UA80-79, UA80-151, UA80-152, UA80-153, UA80-143, UA80-159, UA80-160, UA80-154, and UA80-75).

4.3.2 - Recreation Impact

The recreation plan for the Upper Susitna Valley is not complete at this time. Therefore, it is not known what areas have been suggested for what types of recreational activities. Although not enough data are available, it is possible to suggest that sites outside the impoundment area but within access of newly formed lakes and areas adjacent to access routes would be impacted by increased use of the area for recreational activities. In addition, construction associated with building, maintaining, and operating recreational facilities could also impact cultural resources. When recreation areas have been identified and defined, it will be necessary to conduct cultural resource studies to locate, document, and propose mitigation measures for avoiding or reducing adverse effects.

4.3.3 - Downriver and Upriver Impact

Information is not presently available on the anticipated effects that changes in waterflow, siltation, etc., may have on the banks of the Susitna River and its tributaries downriver and upriver from the proposed dams. When these data are available, it will be necessary to locate and investigate cultural resources in those areas that may be subject to adverse effect.

4.3.4 - Impact on Paleontological Resources

Further study and collecting in the Watana Creek area are necessary to evaluate the significance of the deposits in this area and determine the probable adverse effect of the project on them. However, given the present construction plan, the only area (Watana Creek) within the study area suitable for paleontological studies would be flooded by filling the Watana Dam reservoir.

5 - MITIGATION

Alaska State law specifies that before any public construction is undertaken by the State, or by a governmental agency of the State or by a private person under contract with or licensed by the State, cultural resources in the area must be identified. If cultural resources including "fossils", are located that will be adversely impacted by the project, construction cannot proceed until the necessary investigations and recording have been conducted and mitigation measures to avoid or lessen impact developed and implemented. Federal cultural resource laws and regulations follow a similar policy.

With respect to Federal legislation for all cultural resources on or eligible for inclusion in the National Register of Historic Places that will be adversely effected by federally funded or licensed projects, such as the Susitna Hydropower project, it is necessary to develop mitigation measures to avoid or lessen the impact of the project on these resources.

Before it can be determined if a site is eligible for inclusion in the National Register, the significance of the site must be determined. It is mandatory, however, that sufficient data be available before the criteria of significance can be applied. The criteria of significance, as stated in 36 CFR 800.10, refer to the quality of significance in American history, architecture, archeology, and culture present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

(a) That are associated with events that have made significant contributions to the broad patterns of history; or

(b) That are associated with the lives of persons significant in our past;

(c) They embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded and may be likely to yield information important in prehistory and history.

Intensive testing procedures, which will be implemented during the 1981 field season, are designed to gather the necessary data to evaluate significance. Once significance has been established it is necessary to determine if the project will effect cultural resources.

Any project shall be considered to effect a site whenever any condition of the project causes or may cause any change, beneficial or adverse, in the quality of historical, architectural, archeological, or cultural characteristics for cultural resources that are on or are eligible for inclusion in, the National Register of Historic Places. As outlined in 36 CFR 800.10, an effect occurs when a project changes the integrity of location, design, setting, materials, workmanship, feeling or association of the site. Generally adverse effect (impact) occurs under conditions which include but are not limited to:

(a) Destruction or alteration of all or part of a property (site);

(b) Isolation from or alteration of its surrounding environment;

(c) Introduction of visual, audible, or atmospheric elements that are out of character with the property (site) or alter its setting;

(d) Transfer or sale of federally owned property without adequate conditions or restrictions regarding preservation, maintenance or use; and

(e) Neglect of property resulting in its deterioration or destruction.

Although it is too early to develop mitigation measures to lessen the impact of the Susitna Hydroelectric Project on cultural resources, it is possible to suggest interim measures. For those sites located in direct and indirect impact areas for this project intensive testing is recommended to generate the necessary data on which to base mitigation. In addition, non-archeological personnel and preconstruction activities should avoid these areas until evaluations are complete.

Based on further studies to be conducted during the 1981 field season, mitigation measures to avoid or lessen the impact on paleontological resources will also be developed.

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Addendum

Cook, J. S. 1785. A voyage to the Pacific Ocean. Undertaken, by the command of His Majesty, for making discoveries in the Northern Hemisphere. Performed under the direction of Captains Cook, Clerke, and Gore, in His Majesty's Ship the Resolution & Discovery; In the years of 1776, 1777, 1778, 1779, and 1780. Order of the Lord's Commissioners of the Admiralty, London.

7 - AUTHORITIES CONTACTED

State Agencies

Division of Parks, Anchorage, Alaska

Mr. Doug Reger, State Archeologist
-Letter from E. James Dixon, January 10, 1980, requesting State Antiquities Permit.

Federal Agencies

Heritage Conservation and Recreation Service

Mr. Charles McKinney, Departmental Consulting Archeologist
-Letter from E. James Dixon, December 28, 1979, requesting a Federal Antiquities Permit.

Bureau of Land Management

Dr. Ray Leicht, Archeologist
-Discussion with E. James Dixon and George S. Smith, March 26, 1980, concerning the process necessary to conduct archeological excavations on BLM lands should it become necessary to do so during the 1980 or 1981 field season.

Other

Mr. Glenn Bacon, Consultant Archeologist
-Discussion with George S. Smith, 1980, concerning exact location of Site UA78-65, TLM 015.

APPENDICES

APPENDIX A

1 - LITERATURE REVIEW--ARCHEOLOGY

1.1 - Previous Archeological Research

Scientific archeological investigation of the upper Susitna River Valley began over 27 years ago; however, research during the intervening years has been sporadic. In 1953, Ivar Skarland conducted an aerial reconnaissance of the region in preparation for a survey conducted by William Irving in that same year. This work was done under contract to the National Park Service. Irving's survey was designed to investigate impoundment areas of dams proposed for the Susitna River (Irving 1957:37). His efforts were focused on the proposed Devil Canyon Dam, and near Lakes Susitna, Louise, and Tyone. The lakes were investigated because the proposed Vee and Denali dams were to be located above the present Watana dam site and expected to inundate these areas (Irving 1957).

Eleven sites were found on the lakes and a twelfth site was discovered approximately three miles above the confluence of Tyone Creek and the Tyone River (Irving 1957). Five of the sites contained remains of semi-subterranean houses which Irving thought resembled houses that Rainey (1939) found along tributaries of the upper Copper River. Both post-contact and early pre-contact sites were reported by Irving. A multicomponent site, site 9, was found north of the outlet of Lake Susitna and was reported to contain late prehistoric Athapaskan, Arctic Small Tool Tradition, Northern Archaic Tradition, and Denali Complex components (Irving 1957).

Frederick Hadleigh-West conducted a brief survey in the study area during the summer of 1971 and located five sites adjacent to Stephan Lake (West 1971). Survey for the proposed Denali State Park was the reason for this survey and consequently the report contains little data on the Stephan Lake sites. The files of the Alaska State Archeologist contain information which indicate that one site (TLM-007) is multicomponent and has been radiocarbon dated to 4,000 B.C.

A recent study, Bacon (1975a), utilized an aerial reconnaissance of the study area to delineate several locales of high archeological potential along the upper Susitna utilizing an ecotone model to predict probable site locations. Most recently, Bacon (1978a; 1978b) conducted surveys near the Devil Canyon and the Watana Dam sites. No sites were found at the proposed Devil Canyon Dam site but in the vicinity of the Watana Dam site prehistoric sites were discovered. Site TLM-016 was radiocarbon dated to 3,675 ± 160 B.P.: ca. 1,725 B.C. Bacon (1978a:23) suggests occupation as early as 8,000 to 10,000 years ago at site TLM-015 and a possible Norton influence at site TLM-018. A brief aerial reconnaissance of the entire impoundment area from Devil Canyon to the Tyone River and Stephan Lake was conducted in the spring of 1980 by E. James Dixon, Jr. and George S. Smith of the University of Alaska Museum. The purpose of the fly-over was to familiarize research personnel with the terrain and character of the study area.

Fifteen historic and prehistoric archeological sites are known from surveys in the study area conducted prior to the present study. It is reasonable to assume that more concentrated effort will discover many more sites. During the 1980 field season 37 archeological sites were located. Preliminary geologic analysis of the study area suggests that it has been ice free for approximately the last 13,000-11,000 years. Archeological sites dating from late Pleistocene to historic times have been found within the project area. The earliest C14 dates from the immediate project area document human occupation as early as 4,000 B.C.

1.2 - Regional Prehistory

Data available from the study area are inadequate to accurately define the cultural historical sequence. Consequently, it is necessary to draw on data from adjacent areas to construct a speculative prehistory for the upper Susitna River. Past studies of this type have proven to be fairly reliable indicators of cultural periods within a given area (Dixon, Smith, and Plaskett 1980a). The following regions adjacent to the study area will be considered: the Tanana Valley, Nenana River, the areas near Lakes Susitna, Louise, Tyone, and Tangle Lakes, the upper Copper River Valley, and the upper Cook Inlet region.

It is not necessary to discuss all sites within each area to project a probable cultural chronology for the upper Susitna because many sites within each area represent similar temporal and cultural periods and others lack diagnostic artifacts or have not been subject to absolute or relative dating techniques.

1.2.1 - Central Alaska Range

1.2.1.1 - Dry Creek

The Dry Creek site is located 10 miles north of Mt. McKinley National Park. It is a multicomponent site representing exploitation of a shrub tundra environment prior to 9,000 B.C. (Powers and Hamilton 1978:72). The latest component dates between 2,400 and 1,400 B.C. and may provide the best known temporal documentation for a notched projectile point horizon in Interior Alaska (Dixon, Smith and Plaskett 1980b). The projectile points together with end scraper forms, and time of occupation are suggestive of the Northern Archaic Tradition. This and other notched point sites in the Interior support Workman's (1978) hypothesis that Northern Archaic groups spread through the Yukon Territory and northward along the Brooks Range to the Onion Portage site by 4,000 B.C. and later spread into southern Interior Alaska. These data suggest that notched points and Northern Archaic Tradition artifact material could be found within the Susitna study area. Several sites representing this period were located during the first half of the 1980 field season.

An older component at Dry Creek dates to ca. 8,600 B.C. and contains a microblade core and microblade industry which is comparable to the Denali Complex of Interior Alaska (West 1967) and the Akmak level at Onion Portage on the Kobuk River (Anderson 1968a). The similarity of these assemblages with the late Pleistocene Diuktai culture of northeastern Siberia has been noted by Powers and Hamilton (1978:76).

1.2.1.2 - Carlo Creek

The Carlo Creek site is just east of Mt. McKinley National Park, and dates to ca. 8,500 years ago (Bowers 1978a:14). The oldest of two components produced percussion-flaked elongate bifaces, biface fragments, retouched flakes, several thousand waste flakes and a possible bone awl (Bowers 1978a:1). Component II consists of a few rhyolite waste flakes and is older than ca. 3,700 B.C.

Granulometric analysis of Component I sediment "indicates that human occupation occurred on a former sandbar/levee of the Nenana River, during a period of early postglacial downcutting and terrace formation" (Bowers 1978a:16). Analysis of Component I faunal remains suggests that this site may have been a fall/winter hunting camp. Component I may contain evidence of heat-treatment of lithic material to improve flaking (Bowers 1978a:6).

Although Component I tools are nondiagnostic and the sample size small, Bowers (1978a) compared this material with assemblages from other sites. He suggests that Component I at Carlo Creek may have some affinity with Component II at the Dry Creek site (ca. 8,600 B.C.) (Powers and Hamilton 1978:74), and the McKinley Park Teklanika River sites (West 1965) on the basis of similar morphology of bifacial industries (Bowers 1978a:14). General similarities were also noted with the "early horizon" at Healy Lake (Cook 1969), various Denali Complex sites (West 1965, 1967) and possibly with the Akmak assemblage from Onion Portage (Anderson 1970; Bowers 1978a:14).

1.2.1.3 - Teklanika Sites

Sites, Teklanika 1 and 2, were excavated by Frederick Hadleigh-West in Mt. McKinley National Park in 1961, and are located within a half mile of each other. Teklanika 1 occupies a knob overlooking the

Teklanika River and is west-northwest of Teklanika 2, which is on a nearby ridge. They produced sufficient cultural material to support the supposition that these were habitation sites (West 1965:5). It appears that they functioned as game lookouts and flaking stations, a point confirmed by Traganza (1964). Teklanika 1 and 2 contain projectile points (mainly tips), leaf-shaped knives, end scrapers, side scrapers, tabular blade cores, microblade cores (similar to Campus cores), microblades (prismatic blades), burins, scrapers or end blade tools, one polished adze blade (Teklanika 2) and a pebble hammer (Teklanika 2).

West interprets this material as coeval with Anangula (ca. 8,500 B.C.) or slightly earlier than the Campus site (West 1971:73). He suggests that they date between 8,000 and 10,000 B.C. In light of recent work and the cultural chronology suggested by this report, it would appear that these dates are not unreasonable, although, the oldest known site in Alaska, Moose Creek, is 9,700 years B.C. (Hoeffecker 1979). The dating of the Moose Creek site is based on a single C14 determination and may be subject to reinterpretation as additional dates become available. Moose Creek appears to lack microblade and blade or microblade core technology and these are associated with both Teklanika sites. These forms indicate affiliation with the Denali Complex which dates as early as 8,600 B.C. at Dry Creek. The Teklanika sites may be closer in age to West's 8,000 B.C. projection than 10,000 B.C. However, microblade sites may extend into the Christian era from 500 A.D. to 1,000 A.D. (Cook 1969; Holmes 1976) and the Teklanika sites could be quite recent in age, as may possibly be suggested by the polished adze blade.

1.2.1.4 - Nenana River Gorge Site

The Nenana River Gorge Site is located at the northwest boundary of Mt. McKinley National Park. The prehistoric component at the site represents a seasonal hunting campsite of Athapaskan Indians and has been radiocarbon dated to approximately 1,600 A.D. (Plaskett 1977). It is not certain which Athapaskan subgroup occupied the site.

Prehistoric archeological material found includes obsidian and pottery thought to have originated north of the Alaska Range and copper and chalcedony from south of the Alaska Range; suggesting that trade and communication among different Athapaskan groups occurred prehistorically.

1.2.2 - Tanana Valley

1.2.2.1 - Lake Minchumina

Several sites on the shores of Lake Minchumina in the western Tanana Valley document human occupation spanning approximately the past 2,500 years (Holmes 1976, Hosley 1967, West 1978). The oldest site known is MMK-004 where a lower level was dated to ca. 500 B.C. and an upper level dated to ca. 1,000 A.D. (Holmes 1976:2). The site is thought to represent a continuous sequence between these dates (Holmes 1976:2). Noteworthy is an apparent late persistence of microblade core and burin technology which dates to between 800 A.D. to 1,000 A.D. Notched points were recovered in addition to microblades in Holmes' level one, but the exact association of these artifacts is not clear and late persistence of microcore technology and affiliations with the earlier Denali Complex of Interior Alaska are unresolved questions. Until further research is conducted it may be prudent to consider that two traditions, i.e., Northern Archaic and Late Denali, may have coexisted during this time.

Holmes (1978) presents some comparative data on the assemblage from MMK-004. Point/knives from the lowest level resemble Choris points, and have been equated with the Norton period (Holmes 1976:5). A relationship between MMK-004 and forest adapted Ipiutak/Norton cultures similar to those from Onion Portage and Hahanudan Lake has also been suggested (Holmes 1976:8; Dumond 1978:14).

The majority of obsidian from MMK-004 is from the Batza Tena source near the Koyukuk River to the north and indicates trade over considerable distance in Interior Alaska. The obsidian is also present at Gulkana in the Copper River Valley and suggests widespread trade in that direction as well. Several other sites, the Birches site with a date of ca. 520 A.D. (West 1978), and MMK-012 dating to ca. 50 A.D. (Holmes 1976:8), demonstrate more recent occupations at Lake Minchumina.

1.2.2.2 - Campus Site

The Campus site on the Fairbanks campus of the University of Alaska appears to contain a Denali Complex component of microblades, microblade cores and burins. Also present are notched points and other materials characteristic of the Northern Archaic Tradition. Stratigraphic control at the site is poor and dating has not been established.

1.2.2.3 - Healy Lake

The Village site at Healy Lake has yielded evidence for human occupation of Interior Alaska by ca. 9,000 B.C. (Cook 1969). Five components have been identified at the site. The upper level, just below the sod, contained stemmed and notched points, and microblades, a situation similar to the Minchumina site MMK-004 and suggestive of both the Northern Archaic and Denali peoples. Below this level are two components similar to the Denali Complex defined by West (1967). The lowest level named the Chindadn complex was characterized by triangular projectile points, tear-dropped shaped knives, and possibly an absence of microblades.

1.2.2.4 - Dixthada

The Dixthada site on Mansfield Lake consists of nine housepits, an associated midden, several storage pits, and 11 tent rings. The site was originally excavated by Rainey (1939:364-371) who interpreted the site as an Athapaskan settlement of the last few hundred years, although, based on presence of a microblade industry, he suggested a relationship with the Campus Site. In 1953 Rainey amended his original evaluation of site age by assigning the microcores and microblades to an earlier component based on comparison with sites of known age (Rainey 1953). Additional excavations by Cook and McKennan in 1970 indicate that a yellow silt horizon located under the middens at Dixthada contained the core and microblade industry (Shinkwin 1975:149-150). These excavations supported the conclusion that the site was multicomponent, as suspected by Rainey.

Shinkwin (1975) studied materials from both components at Dixthada. The upper component, although mixed, contains an array of copper implements, bone and antler artifacts, bifacial knives, scrapers, whetstones, hammerstones, grinding stones, an adze and two axes (Shinkwin 1975:151-152) and represents a late prehistoric/early historic Athapaskan group as suggested by Rainey (Shinkwin 1974:153). Shinkwin notes similarity of the upper level lithic and bone industries to the Klo-kut site in the Yukon Territory. The lower component contains a microcore and microblade industry dating 470 ± 60 B.C.

1.2.2.5 - Donnelly Ridge

The Donnelly Ridge site is located over 2,600 feet above sea level in the northern foothills of the Alaska Range. The site is situated on one of the highest points in the area and provides an excellent view of the myriad of lakes and ponds which surround it (West 1967:15). A total of 1,512 stone artifacts were recovered, of which 533 show various degrees of use (West 1967:15). Stone artifacts recovered include bifacial biconvex knives, end scrapers, large blades and blade-like flakes, prepared cores, core tablets, microblades, burins, burin spalls, and worked flakes (West 1967: 17-25)

West interprets the site as a seasonal hunting camp used for a short period of time, possibly only one season (West 1967:27). The age of the site is uncertain although two radiocarbon dates (1,830 ± 200 B.P. (120 A.D. ± 200) (B-649) and 1,790 ± 300 B.P. (160 A.D. ± 300) (B-650) have been recorded. However, West feels that these actually date a later tundra fire and not the cultural material (1967:32). Based on comparison of the Donnelly Ridge material with other Denali Complex sites, West suggests an age of at least 10,000 B.C. The Minchumina site, the Village site at Healy Lake, and Dixthada have produced Denali Complex components with dates much more recent than West's projections.

1.2.2.6 - Ft. Wainwright

A 1979 archeological survey of Ft. Wainwright Reservation in the Tanana Valley led to the discovery of 48 prehistoric and four historic sites (Dixon, Smith, and Plaskett 1980a). Sampling areas for this project, delineated by the research design, corresponded to most of the major elevations within the military reservation. Site locations included: lake shores (Blair Lakes), outlets of streams draining lakes, knolls near streams and rivers, and high bluffs and buttes. Several of the sites were more than 300 m above the Tanana flats and provided excellent views of the surrounding area.

Three sites on the north shore of Blair Lake South were systematically tested: FAI-044, FAI-045, and FAI-048. Site FAI-044 contained historic, late prehistoric Athapaskan, Northern Archaic and possible Denali components. Site FAI-045 contained the same recent historic component documented at FAI-044, and possible Denali component. Samples of radiometric dating were not recovered but the Denali component was inferred from the recovery of microblades and microcores. Only one of four squares tested produced Denali material and two occupations are suggested. In addition to these sites, 10 Denali, 10 Northern Archaic, and 3 historic period sites were documented on the military reservation (Dixon, Smith, and Plaskett 1980a).

1.2.3 - Denali Highway Area

1.2.3.1 - Tangle Lakes

The Tangle Lakes are 80 km northeast of the study area and accessible from the Susitna via the McLaren River. Over 220 sites spanning the past 12,000 years have been documented in this area (West 1973). The sites represent several periods including late Athapaskan belonging to the last 3,000 years and an early period which West divides into groups. Denali Complex sites are located on or near old lake shorelines which are about 100 feet above present lake levels (West 1975:79). The Denali occupation at Tangle Lakes may have occurred as early as 10,000 B.C. but radiocarbon dates suggest a more recent date of 8,200 B.C. with the occupation ending about ca. 6,200 B.C. Denali hunters appear to have abandoned the area after that time. There is a hiatus in the Tangle Lakes archeological record until the appearance of the Northern Archaic Tradition (West 1973). The Northern Archaic Tradition was originally defined as a boreal forest adapted culture (Anderson 1968a); however, it may have thrived along the forest edge or even within the tundra forest ecotone (Hickey 1976). Appearance of the Northern Archaic peoples may be associated with a warming trend ca. 5,000 years ago (Anderson 1968b) and raised tree line elevation (Hopkins 1967). The most recent cultural period represented at Tangle Lakes was that of protohistoric Athapaskans (West 1975:20).

1.2.3.2 - Ratekin Site

The Ratekin site, near the Denali Highway, is located about 75 miles west of Paxson Lake. Although few artifacts have been recovered in situ, several surface collections have been made. Based on the collections by Skarland and Keim (1958), it is difficult to assess the significance of the site. Notched points suggestive of the Northern Archaic Tradition are present. Based on the type of notching and comparison with the notched point sequence developed by Anderson (1968a), an age of ca. 2,900 to 2,600 B.C. seems a reasonable inference since side notched, stemmed, and lanceolate forms are present.

The site appears to consist of a number of flaking stations and Skarland and Keim (1958:80) suggest that it functioned as a kill site rather than a camp because of the large number of unbroken arrowheads which they think were lost during the hunt. They also suggest that caribou were funnelled through a narrow corridor near the site created by muskeg to the south and steep hills to the north. Photographs on file at the University of Alaska Museum show a low rock wall at or near the site which may have functioned as a hunting blind. Age of this structure and its association with the Ratekin site have not been determined.

1.2.4 - Talkeetna Mountains - Long Lake

The Long Lake site is in the Southern Talkeetna Mountains and contains a microblade and microcore industry which is similar to that of the Denali Complex. Bacon suggests that the site represents "a displacement of the Denali technology to the southern highlands of southern Interior Alaska", a region which "represented a sort of tundra refugium that was pushed southward (but higher in elevation) by invading Taiga Forests" (1975b:4).

1.2.5 - Copper River Valley

Archeological investigations in the Copper River Valley began with Rainey's survey of the region in 1936. Most recently a number of historic and prehistoric sites have been located and several excavated (VanStone 1955; Shinkwin 1974; Workman 1976; Clark 1974; Arndt 1977; and others). Workman (1976:8) has synthesized the available data into a four period sequence for the area: historic (1850-present), protohistoric (1770-1850), late prehistoric (1000 A.D.-1770 A.D.), and early prehistoric (? to 1000 A.D.).

The following sites, some which were previously discussed in this report, can be placed within Workman's (1977:9-30) categories, Historic Period: Taral (VanStone 1955), site on Taral Creek (VanStone 1955:121), Susitna site 3A and 6C (Irving 1957:40), village near Batzulnetas (Rainey 1939:362). Protohistoric Period: Dakah D'nin's Village (Shinkwin 1974), VAL 146 (State of Alaska, Division of Parks), feature 77-3-4 at the BUL 077 site (Workman 1976:26-28), Paxson Lake site (Workman 1976:14), Gakona Airstrip Site (Rainey 1939:350), Slana Site (Rainey 1939:361). Late Prehistoric Period: GUL 077 (Workman 1976), MS 23-0 (Clark 1974, 1976), Gulkana River site (Rainey 1939:360), Susitna 3A (Irving 1957:41), Susitna 3B and 3C (Irving 1957:41), Susitna 3D (Irving 1957:41-42), Susitna 6A (Irving 1957:42), Susitna 6B (Irving 1957:42), caches near Batzulnetas (Rainey 1939:361-362), Tangle Lakes caches (Workman 1976:28), Portage site upper component (Workman 1976:28). Early Prehistoric Period: no sites representing this time period have been positively documented in the Copper River Valley, although the Copper River Basin would have been free of ice dammed lakes and available for human occupation by ca. 9,000 years ago (Workman 1976:31). Workman suggests that, when documented, the prehistory of the Coppr River Basin will probably span most of the Holocene times (1976:31). At present, however, there are only traces of occupations predating 1,000 A.D. (Workman 1976:31).

1.2.6 - Cook Inlet

1.2.6.1 - Beluga Point

Beluga Point is a multicomponent site composed of two localities on the northern shore of Turnagain Arm in upper Cook Inlet. Beluga Point North contains three components. Component I includes a microblade and core industry associated with the Denali Complex. Comparative data from Denali sites in Interior Alaska and the Alaska Peninsula suggest a tentative date between 4,500 and 7,000 years B.C. for this component (Reger 1977). Component II contains stemmed points and points with tapering bases (Reger 1977). An estimated age is 1,000 to 2,000 years B.C. based on typological comparisons (Reger 1977:9). Components IIIa and IIIb from Beluga Point North are similar to the third period of the Kachemak Bay Sequence as evidenced by ground slate points and stone ringed hearths filled with gravel (Reger 1977). A radiocarbon date for IIIa indicates an age of 790 ± 120 B.P. (960 ± 120 A.D.) while IIIb is estimated to be 1,000 years older (Reger 1977).

Beluga Point South, Component I, includes a few nondiagnostic specimens and dates to 4,155 ± 160 B.P. (2,205 ± 160 B.C.). Reger notes similarities between Beluga Point South Component II and Norton collections from the Iyatayet site. Similarities include steeply retouched end-scrapers, end blades, burin-like scrapers and ground slate points (Reger 1977).

1.2.6.2 - Kachemak Bay Sequence

Little is known about prehistory of Cook Inlet during the late Pleistocene, ca. 10,000 years ago. The Kachemak Bay Sequence provides an organized data base which can be applied to this study.

The Kachemak Bay tradition first appears in the second millenium B.C. and continues until just before historic contact. Kachemak settlements were usually along rugged coasts with deep water offshore and mountains inland (Reger 1977). Houses were semi-subterranean and made of whalebone, stone, or wood. Economic exploitation concentrated on sea resources, although inland resources were also utilized.

Kachemak I is a poorly defind phase (Workman 1977:35) and absence of reliable dates makes it difficult to place it in a specific time frame. However, relationships with Alaskan Peninsula material and the Takli Beach Phase places it in the second millenium B.C. (Workman 1977:35). Manifestations are known only on Yukon Island and are characterized by a predominance of flaked stone tools, grooved stone weights, and both toggle and dart harpoon heads.

Kachemak II dates from 400 B.C. to as late as 1200 A.D. Typically the assemblage contains large notched stones, grooved stone weights, primarily a flaked stone industry, houses of wood and whalebone and the possible beginnings of grave goods (Workman 1977:35).

A transitional phase called Kachemak Sub III (Workman 1977:35) existed from approximately 400 B.C. to A.D. 0 and flaking was still the primary lithic technology. Stone saws appeared and there was a continuation of elaborate burial practices with the embellishments in later periods. This phase is known from Chugachik Island (SEL-033) and Yukon Island in Kachemak Bay.

Kachemak II began about 800 A.D. (Workman 1977:35). Considering the climax of the tradition, this phase is characterized by an elaborate burial cult indicating dismemberment of the dead, a predominance of ground slate and a florescence of artists' skills. This phase is found at Cottonwood Creek and the Great Midden on Yukon Island.

The Kachemak sequence terminated in a poorly understood Kachemak IV phase during the second millenium A.D. and what is known comes from the upper level of the Great Midden on Yukon Island and the upper component at Cottonwood Creek (Workman 1977:33). Some pottery and native copper has been recovered from Yukon Island, while from Cottonwood Creek (KEN-029) come triangular stemless slate end-blades, an intricate bone knife handle, a barbed bone point and evidence of cannibalism (Workman 1977:33).

The Merrill site, KEN-029, near the Kenai River about 25 miles from the present river channel is on a former meander channel (Reger 1977:37). The lowest level dates to 2,245 ± 115 radiocarbon years or 295 B.C. Reger (1977:50) notes similarities of adze blades, straight based lanceolate points, and stemmed points to the Norton component at the Iyatayet site. Applicable to this study is the fact that the site conforms to locational data from other Norton period sites, i.e., riverine (Reger 1977:51). The riverine adaptation is suggested

3515 To 3835 BP OR 1725BC (+1984=3709)

3675 -160

3675 +160 3835

1958 1725 3683

1984 1725 3709

early every Norton period site reported

study area was inhabited by bands of late prehistoric, protohistoric and historic times... speaking variant dialects of the Athapaskan language may have been present in the area at various times. The immediate study area falls within known historical geographic limits of the region exploited by Tanaina Athapaskans; however, the present area is near other regions occupied by the Ahtna and Tanana Athapaskan groups. Since the known geographic and linguistic distribution of these groups at the time of historic contact cannot be inferred to extend very far backward in time, ethnographic information relevant to all three groups will be included here.

Of importance in developing the research design is ethnographic information concerning subsistence activities of Athapaskans, and how they affect site location and distribution.

For most non-coastal Athapaskan groups, the annual subsistence cycle largely depended on the availability of resources. Major animal resources available throughout the yearly cycle to the groups considered here were moose, caribou, sheep, fish, and waterfowl (McKennan 1959; Guedon 1975; Andrews 1975). During the summer months, fishing was the most important economic activity. Villages would move to fish camps, generally located on clear water tributaries, to catch and dry salmon, much of which was cached for winter use (VanStone 1974; McKennan 1959; Helm 1975; Guedon 1975). Moose and sheep were also hunted in upland and alpine regions during summer months. Spring activities involved muskrat, beaver, and waterfowl hunting and trapping from camps usually located along lake margins or slow-moving streams (McKennan 1959). Small hunting parties also pursued large game during the winter months (Guedon 1975).

Caribou drives took place mainly in the fall or early winter. During this time, long "caribou fences" were constructed to guide them to enclosures where they were snared and killed. Smaller game such as hares were taken throughout the year (VanStone 1974; Nelson 1973). The annual subsistence cycle kept populations mobile within a given territory or range, while focusing them at specific geographic locales at specific points in time to harvest seasonally abundant animal resources. The seasonal round thus created a variety of settlement locales of varying size, function, and duration.

A number of accounts have described interior Athapaskan material culture (McKennan 1959; Guedon 1975; Nelson 1973; Pitts 1972; Vitt 1973). House construction, as it applies to both permanent and temporary structures, would indicate the location of winter settlements. Several types of houses have been described for the early historic period (McKennan 1959; Pitts 1972; Guedon 1975; Shinkwin 1974). One type of winter house was a dome-shaped structure covered with moose or caribou skins. Another form was a rectangular, semi-subterranean log structure covered with bark and sod. Temporary structures consisted of simple brush shelters or lean-tos. The caches used for storing food were of two types--underground, and elevated with logs. Many of these features should be identifiable archeologically, if present in the project area.

The upper Susitna drainage was occupied by Western Ahtna at the time of historic contact. Their subsistence pattern differed in important respects from that of the Ahtna groups whose seasonal round was centered more to the east where fishing on the Copper River and its major tributaries was a primary subsistence activity and winter villages were located at the river (Workman 1976). The absence of the salmon resource base in the upper Susitna drainage resulted in a greater emphasis on hunting of caribou and moose (Irving 1957). Mid-summer through December was primarily devoted to fishing from lakes, their outlets or larger rivers. In late summer and early fall caribou and moose were hunted using fences, snares and surrounds. At mid-winter extensive hunting of moose, bear, and beaver occurred and was possibly accompanied by dispersal into family units from larger multifamily fall villages (Irving 1957). In spring, hunting moved into the hill country south as far as the Talkeetna Mountains where caribou were hunted until mid-summer when fishing resumed. Contacts between the upper Susitna/Lake Louise Ahtna and villages on the Tanana side of the Alaska Range were frequent but the nature of contacts is unknown (Irving 1957). The seasonal round and subsistence strategy of the Western Ahtna appears to have more closely resembled that of interior Tanana Athapaskans then that for most Ahtna centered on the central Copper River.

The Tanaina Athapaskans may have been the first Athapaskan group to come in contact with Europeans and Russians who began to heavily influence their culture by the late eighteenth century (Osgood 1937). Tanaina groups were concentrated on or near the shores of Cook Inlet and in the Iliamna-Lake Clark area as well as inland and are known to have occupied permanant villages containing semi-subterranean houses (Smith and Shields 1977), an atypical settlement pattern for Northern Athapaskans. Richness of salmon runs in the area probably had much to do with the unusual subsistence and settlement pattern (Osgood 1937; VanStone 1974). Some Tanaina groups were also heavily dependent upon coastal, tidal and sea mammal resources for their subsistence, a pattern more closely resembling Eskimo rather than other Athapaskan groups (Townsend 1973).

The Tanaina are known to have traveled widely throughout their territory and trade, as well as warfare, resulted in contact with other Interior Alaskan Athapaskan groups (Townsend 1973; Hosley 1966; Plaskett 1977). However, little is known concerning aboriginal Tanaina exploitation of the more interior portions of their territory which included the upper Susitna, Talkeetna Mountains and the Alaska Range. It is probable that at certain times of the year, i.e., fall and spring/early summer, hunting parties moved into these regions to hunt sheep, caribou and bear. Moose would appear to have been rarely present, at least in the mid-nineteenth century (Osgood 1937; VanStone 1973). Camps of hunting parties would probably have consisted of temporary shelters of skins over a wood frame, simple brush shelters or lean-tos.

During the early historic period, it appears that a gradual shift in subsistence activity occurred as a result of increased contact with non-Natives, and led to a general shift in the settlement pattern (VanStone 1970; Townsend 1973). Therefore, site locations which reflect late prehistoric subsistence activities may differ significantly from those activity-related sites of the historic period. Settlements and camps of late prehistoric and protohistoric times often were located near the mouths of clear water streams and rivers, as well as along lake margins and locations strategically suited for resource exploitation (McKennan 1959; Andrews 1975; VanStone 1974; Workman 1976; Irving 1957). Early historic Tanaina settlements were reported at several locations near the study area including Talkeetna (Townsend 1973), Valdez Creek (McKennan 1959), and on the shores of Lakes Susitna, Louise, Tyone and Grayling (Irving 1957).

3 - HISTORY

It is probable that late prehistoric and historic sites in the upper Susitna area date to as early as 1770 and may contain evidence of Western trade materials and influences. Historic, ethnohistoric and archeological data suggest that a widespread network of Native trade routes existed prior to Western contact. Western trade goods doubtless penetrated the upper Susitna region soon after the first exchanges occurred in coastal areas. Following 1900, gold discoveries in the region produced a flurry of exploration and mining activity which probably resulted in historic sites containing associated material in the upper Susitna study area. The chronology of Western man's exploration and penetration into the study area is summarized below.

Shortly after Bering's 1741 voyage, Russian fur traders began exchanging Western goods for pelts. Glass beads and iron were traded for fox and sea otter pelts by Glattov on Kodiak Island as early as 1762 (Bancroft 1886) and although such trade occurred far from the study area, Native trade networks soon dispersed such goods widely to Natives who had no direct contact with Europeans. The first explorer in Cook Inlet, Captain James

Cook, observed metal and glass beads among the Tanaina during his visit in 1778 (Cook 1785). By 1786 a Russian trading settlement had been established at St. George (Kasilof) in Tanaina territory and trade contacts soon expanded rapidly with the Tanaina.

Increased dependence upon trade and the wealth provided by Western luxury goods resulted in changes in the aboriginal settlement and hunting patterns (Townsend 1970). The Tanaina began to be drawn more intensively into the Russian fur trade, occasionally as hunters but also as middlemen in the fur trade with peoples in the interior of Alaska. There was increased hunting of certain desirable fur bearers and modification of the subsistence cycle to accomodate such hunting and subsequent travel to trade for Western goods. Thus, it is probable that the location of hunting and trapping sites as well as times of seasonal movements known from the ethnographic present differ from those of slightly older late prehistoric times.

The first explorations of the Susitna River country did not occur until 1834 when Malakoff ascended the river. It is believed that he also explored the Susitna in 1843 but little is known of his work (Bacon 1975a). In any event, it is certain that by 1845 the Russians had better knowledge of the upper Susitna region than could have been obtained via Native informants (Brooks 1973). During the next 50 years very little exploration or other activity by Westerners appears to have occurred in the upper Susitna River country which was virtually unexplored until nearly 1900 (Cole 1979). During this time one exploration of note occurred to the east of the study area. In 1885, Lt. Henry Allen and his party ascended the Copper River, crossed the Alaska Range and descended the Tanana River to the Yukon. Allen's observations of Native lifeways, villages and their locations provide data regarding Ahtna and Tanana Athapaskans at the time of early direct contact with White men (Allen 1887).

The discovery of gold in Cook Inlet in 1895 precipitated the first extensive and lasting movements of White men into the upper Susitna study area. In the summer of 1896, over 2,000 prospectors swarmed the shores of Cook Inlet and over 100 parties entered the Susitna River but only five continued any distance up the river (Cole 1979). William Dickey and Allen Monks ascended the river as far as Devil Canyon in 1886 and encountered Natives at a fish camp at the mouth of Portage Creek. W.A. Jack and eight others ascended the Susitna to the "head of boating" on the upper Susitna in 1897 and became the first recorded party to explore nearly the entire river. The Jack party avoided Devil Canyon by ascending Portage Creek, crossing a divide to Devil Creek, and descending the latter to the Susitna (Cole 1979). Jack guided George Eldridge of the USGS, up the Susitna, over Broad Pass and down the Nenana River in 1898 but their route avoided the upper Susitna area (Eldridge 1900). In 1901, H. Jack Pamo and Al Campbell tried to make an overland trip from the mouth of the Tanana River to Valdez. They descended the Susitna from its "headwaters" and Campbell apparently starved to death at an Indian hunting cabin some 50 miles above Devil Canyon (Valdez News, 7/20/01). On the south side of the Susitna other overland routes which by-passed Devil Canyon existed. One route went up the Talkeetna River to Prairie Creek, past Stephen Lake to the Susitna, while another crossed low passes at the headwaters of Kosina Creek and descended the latter to the Susitna (Cole 1979).

The difficult passage around Devil Canyon greatly reduced gold prospector traffic on the upper Susitna River and it was not until 1903 that a more feasible route from the Copper River drainage was pioneered. In that year, Pete Monahan and four others from Valdez reached the upper Susitna headwaters area. Their route took them over Valdez Glacier, down Klutina River, across Klutina Lake, along St. Anne River and thence up the Susitna. They prospected for gold along several creeks in the upper Susitna drainage and struck pay gravel on a small stream the Indians called "Galina" and later renamed Valdez Creek (Moffit 1912). The next year numerous claims were staked along this creek and its tributaries. These diggings in later years had as many as 150 men (Bacon 1975a) and continued to attract miners until the 1930's. Other, later routes, to these gold fields roughly paralleled the modern Denali Highway from Cantwell in the west and Paxson on the east. Another route followed the West Fork of the Gulkana from the Copper River to the MacLaren and thence up the Susitna (Cole 1979).

Mining equipment and supplies utilized all of these routes to the gold fields on Valdez Creek. It is possible that historic structures and features related to these gold mining activities may be present along any or all of the routes used by miners during prospecting and subsequent mining in the Valdez Creek area. Additionally, Indian hunting cabins were reported at several localities on the upper Susitna drainage by the first gold prospectors and explorers, i.e., Jack, Eldridge, Pamo, and others. It is possible that remains of these log structures may be encountered during cultural resource survey of the study area as well.

APPENDIX B

1 - LITERATURE REVIEW--GEOLOGY

1.1 - Glacial-Climatic History

During the last glaciation, south central and central Alaska were inundated with glacier ice (Karlstrom 1964; Wahrhaftig 1958; Coulter et al. 1965) in response to climatic cooling and a drop in snowline on the order of 250-300 m (Pewe and Reger 1972). Snowline in the vicinity of the western Talkeetna Mountains probably lay at about 1050-1200 m (Pewe and Reger 1972) or about 600 feet near the east flank of the Susitna lowland (Karlstrom 1964). All flat upland surfaces above that altitude, which includes much of the Talkeetna Mountains, was probably glacier covered. Below that altitude cirque and valley glaciers coalesced to form a broad inland ice sheet which drained southward via the Susitna Valley when it merged with other south-flowing trunk glaciers. Ice extended southward to the vicinity of Montana Creek, forming a prominent terminal moraine which became confluent with an east-flowing and northeast-flowing ice lobe draining the Matanuska and Knik Valleys. The southward gradient of the last glacial snowline and the progressively less extensive glaciation northward strongly suggests a southern moisture source (Karlstrom 1964; Pewe 1975). Glaciation apparently was caused by a decrease in mean summer temperatures, and an increase in summer cloudiness (Pewe 1975). Pewe (1975) estimates that, in the vicinity of Anchorage, the mean annual temperature dropped to 12.1°C in comparison to the present mean annual temperature of 13.8°C. Following expansion of glaciers to their maximum limits, they stagnated over a broad area of the Susitna lowland, then apparently retreated more rapidly. Climates warmed to a postglacial thermal maximum, then re-expanded intermittently within the past several thousand years (Williams and Ferrians 1961).

1.2 - Late Wisconsinan Time

1.2.1 - Initiation

The globally significant change from interstadial mid-Wisconsinan conditions to full glacial late Wisconsinan conditions is dated at about 32,000 yr BP in the marine isotope record (Shackleton and Opdyke 1973) and at about 32,000 yr. B.P. in the Camp Century Ice Core (Langway et al. 1973). Glaciers in south central Alaska expanded in response to the climate change. The date of 29,600 ± 460 from organic material beneath till of the last glaciation near the inferred mid-Wisconsinan terminal position in the White River Valley, provides the youngest maximum limiting dates in Alaska for late Wisconsinan glacier expansion. Maximum limiting dates from identical stratigraphic position in the nearby Klutlan Glacier are all beyond the range of radiocarbon dating (Rampton 1971). Karlstrom (1964) reports that late Wisconsinan glaciation began sometime after about 37,000 yr BP in the Kenai lowland. The Copper River Basin began filling with glaciolacustrine deposits sometime after a date of 38,000 yr BP (Ferrians and Schmoll 1957). Maximum dates for initial late Wisconsinan time from the southern Brooks Range are more closely limiting, ranging from 28,500-31,000 ^{14}C yr BP, closely corresponding to the global climates changes (Hamilton 1976). The youngest dates on mid-Wisconsinan muck near Fairbanks range up to about 30,700 to 33,700 yr BP (Sellman 1967).

1.2.2 - Termination

A pronounced global climate change around 13,000-14,000 yr BP which, from a climatological standpoint ended the Wisconsinan Stage, was accompanied by rapid warming (Shackleton and Opdyke 1973; Langway et al 1973; Denton 1974). Evidence for rapid response of Alaskan glaciers and vegetation to this climate change is widespread and surprisingly uniform in age. An abrupt change in vegetation from tundra steppe to shrub tundra occurred about 13,500-14,000 years ago in the Tanana lowland (Ager 1975). Similarly, a rapid change from a dominance of nonarboreal pollen to arboreal pollen occurred shortly after 13,960 ± 360 yr BP in the Ogilvie Mountains, Yukon Territory (Terasmae and Hughes 1966). Heusser (1965) and Terasmae (1974) recognized a major vegetation change indicating warming sometime between 13,000 and 14,000 yr BP, respectively.

Glacier response to terminal Wisconsinan climate change was also rapid. Glaciers began rapid wastage about 14,000 BP in the White River-Skolai Pass area (Denton 1974). The abrupt halt in loess deposition about 13,500 ± 300 yr BP in Antifreeze Pond is interpreted by Rampton (1971) as having formed immediately after moraine formation. Retransported bone material in the Fairbanks area that dates 13,470 ± 420 yr BP and 14,280 ± 230 yr BP directly overlies a late Wisconsinan unconformity (Sellman 1967) and may suggest thawing at about this time.

Other minimum age dates for the late Wisconsinan time in Alaska are less closely limiting than dates from the St. Elias Range. Glaciers began a fluctuating retreat in the Kenai lowland sometime after 12,900-13,500 yr BP (Karlstrom, 1964). Moraine formation and rapid retreat of glaciers from the Anchorage area probably occurred shortly after 14,160 ± 1400 yr BP (Schmoll et al. 1972). Basal peat dates in the Susitna lowland extend back to about 12,500 yr BP (Richard Reger, personal communication). Late Wisconsinan glaciers began receding from their maximum positions sometime prior to 10,565 ± 225 yr BP and 10,560 ± 200 yr BP in the Amphitheater Moutains (Pewe 1964) and the Nenana Valley 10,560 ± 200 yr BP (Wahrhaftig 1958), respectively. Wisconsinan age dunes began stabilizing in the Tanana lowland sometime prior to 12,400 ± 450 yr BP (Fernald, 1965). Glaciolacustrine sedimentation in the Copper River Basin ceased sometime prior to 9400 yr BP.

1.2.3 - Maximum Extent of Ice

Full glacier conditions affected the entire globe about 17,000-22,000 yr BP, culminating in full glacial conditions in the northern hemisphere at about 18,000 yr BP (CLIMAP 1976). At this time the southern sectors of the Laurentide, Scandinavian, and Cordilleran ice sheets had reached their maximum extents (Denton 1974). Following a period of ice recession these ice sheets all readvanced to nearly their maximum positions between about 15,000 and 14,000 years ago and then underwent rapid retreat.

Dates from glacier sequences in Alaska are incomplete, but generally support the concept of a two-fold late Wisconsinan Stade. Intervals of alluviation in the Southern Brooks Range between about 16,000-25,000 yr BP (Kobuk Valley) and 17,000-29,000 yr BP (Koyukuk Valley) may correspond to the earliest advances (Hamilton et al. 1980). A maximum limiting date from the McKinley River (Thorson unpub. ms.) suggests that glaciers in north Alaska Range had not yet reached their maximum extents by about 20,000 yr BP.

Support for the younger advance is more common. Late Wisconsinan glaciers readvanced in the Alaska Range sometime after 15,000 yr BP (Hamilton 1976). Glaciers in the upper Cook Inlet advanced to their terminal late Wisconsinan positions sometime shortly after 14,160 ± 400 yr BP (Schmoll et al. 1972; Kachadoorian et al. 1977). The Russell and Kaskawulsh glaciers advanced to near their maximum extents in the White River Valley and Shakwak Valley just prior to about 14,000 yr BP (Denton 1974). In the southern Brooks Range, glaciers readvanced between about 13,000 and 12,500 yr BP (Hamilton et al. 1979).

1.2.4 - Rates of Deglaciation

The rapid and nearly synchronous climate change about 13,000-14,000 yr BP can well be documented for most parts of Alaska. Subsequent rates of glacier retreat were generally rapid, with valleys largely ice free by 10,000 yr BP. The Kaskawulsh glacier (Yukon Territory) retreated to within 17 km of its present terminus by 12,500 ± 200 yr BP, suggesting extremely rapid deglaciation for this large glacier (Denton and Stuiver 1967). In the White River Valley, ice had receded to a position within 2 km of its terminus by 11,270 ± 200 yr BP (Denton 1974). The nearby Klutlan Glacier retreated to a position upstream from the present terminus by 9780 ± 80 yr BP (Rampton 1971). The Muldrow Glacier retreated to a position upstream from its Neoglacial limit by 9580 ± 100 yr BP (Thorson unpub. ms.).

Valleys elsewhere in Alaska and the Yukon Territory were largely deglaciated by 11,500-12,000 yr BP (Hamilton 1976; Denton 1974). The valley bottom of the Susitna River near Willow Creek was deglaciated prior to 11,930 ± 250 yr BP (Karlstrom 1964). The nearby Matanuska Valley was also rapidly deglaciated following a period of initial ice stagnation (Williams and Ferrians 1961; Miller and Dobrovolny 1959). Dates of 11,250 ± 160 yr BP and 12,120 ± 140 yr BP from the North Fork Pass and Hart Lake areas in the Olgilvie Mountains, Yukon Territory, respectively, indicate nearly complete deglaciation by this time (Hughes et al. 1969). On the south flank of the Alaska Range, the Tangle Lakes area was deglaciated 11,800 ± 740 yr BP (Schweger 1973) and the Nenana Glacier had retreated well upstream from the Carlo Creek archeologic site by 9000-10,000 yr BP (Bowers 1979). The Nelchina Glacier, in the North Chugach Mountains, retreated to a position within 8-15 mi of the terminus by 8,400 ± 200 yr BP (Olson and Broecker 1959). Adams Inlet in Glacier Bay was largely deglaciated by about 11,000 yr BP (McKenzie and Goldthwait 1971). Dunes are largely stabilized on the floor of the Tanana lowland by about 11,250 yr BP (Fernald 1965).

1.3 - Holocene Time

1.3.1 - Early Holocene Readvance

Evidence for an early Holocene glacier readvance which lasted between about 8500 and 9500 yr BP and culminated about 9000 yr BP, is widespread in south coastal Alaska. Cirque glaciers advanced in the lower Copper River Valley and built moraines about 8800 yr BP (Sirkin and Tuthill 1971). On Prince of Wales Island, two moraines were formed by advancing glaciers between 8000 and 9510 yr BP (Swanston 1969). Goldthwait (1966) interprets the stratigraphy in Muir Inlet to indicate a prominent readvance between 9100 and 10,000 yr BP. Till near Cold Bay is bracketed between dates of 6700 and 9700 yr BP (Funk 1973). Glacier advances and stillstands and a pronounced cooling suggested by pollen trends occurred in the Boundary ranges of Canada between 9000 and 10,000 yr BP (Miller and Anderson 1974). Pollen data from south coastal Alaska (Heusser 1965) also suggest an early Holocene cooling between 8500 and 9000 yr BP. An earlier possible readvance sometime between 10,500-13,000 yr BP may have occurred in the large coastal glaciers (Terasmae 1974; Miller and Anderson 1974; Goldthwait 1966).

Evidence for glacial readvances in interior south central Alaska is conspicuously absent, perhaps suggesting that most glaciers had retreated upvalley from their Neoglacial limits prior to about 9000 yr BP. The Matanuska glacier, which experienced a prominent early Holocene readvance sometime prior to 8000 ± 300 yr BP (Williams and Ferrians 1961), is the only well documented occurrence of this readvance away from Alaska's southern coast. A pronounced unconformity in the permafrost tunnel near Fairbanks (Sellman 1967), which occurs between 8400 and 11,000 yr BP, may represent an interval of greatly reduced muck deposition.

1.3.2 - Hypsithermal

Postglacial Holocene warming culminated during Hypsithermal time, an interval of increased warmth (and possible dryness) and glacier contraction. Glacier contraction and inferred warming occurred in south Alaska during the interval between 4500-6800 yr BP in Cool Inlet (Karlstrom 1964), 4700-9100 yr BP in Muir Inlet (Goldthwait 1966), 3200-5500 yr BP in Boundary Ranges (Miller and Anderson 1974), 4150-7050 yr BP in Glacier Bay (McKenzie and Goldthwait 1971), and 4500-6500 yr BP in the north Pacific (Huesser 1960). Inland from the coast, pollen and treeline data suggest that the thermal maximum occurred between 5000 and 8400 yr BP (Terasmae 1974; Ager 1975), peaking at about 5200 yr BP (Denton and Karlen 1976).

1.3.3 - Neoglaciation

Following Hypsithermal warmth and dryness, climates cooled and possibly moistened during the last several thousand years, causing renewed glacier expansions during Neoglacial time. The Neoglaciation probably began between about 3500-3700 yr BP in interior Alaska and Yukon Territory (Hamilton 1976; Miller and Anderson 1974), reaching a culmination in the White River Valley area between about 2675 and 2780 yr BP (Denton and Karlen 1973) and terminating by 2000 yr BP (Terasmae 1974) or possibly as early as 2640 yr BP in the Kluane area (Borns and Goldthwait 1966). The Tanana River began actively aggrading by 3000 yr BP (Fernald 1965), presumably in response to Neoglacial conditions.

In coastal southern Alaska, the Neoglaciation may have begun earlier than in areas farther north. McKenzie and Goldthwait (1971) document glacier expansion in Glacier Bay as early as 4150 ^{14}C yr BP, and Huesser (1965) inferred a change to cooler, wetter climates beginning about 4500 yr BP. Karlstrom (1964) dated the earliest of multiple glacier advances into the Kenai lowland at about 4500 yr BP. The termination of Neoglacial time in southern Alaska is inferred from glacial retractions and/or vegetation change beginning 2200 yr BP (Glacier Bay, McKenzie and Goldthwait 1971), 2100-2200 yr BP (Lituya Bay, Post and Streveler 1976), and 2500 yr BP (N. Pacific, Heusser 1965). Though evidence for multiple Neoglacial advances in south central Alaska is present in many areas (Thorson unpub. ms.; Reger and Pewe 1969; Karlstrom 1964; Wahrhaftig and Cox 1959), only in the White River Valley are they firmly bracketed by closely limiting radiocarbon or lichenometric dates. Culminations of glacier advances in the White River Valley occurred between 3000-2675 and 1230-1050 ^{14}C yr BP (Denton and Karlen 1973). An earlier advance, for which there is no direct evidence, may have occurred sometime between 5250 ± 130 and 3600 ^{14}C yr BP (Denton and Karlen 1973).

1.3.4 - Little Ice Age

Renewed glacier advances of the "Little Ice Age" (last 1000 yr) brought an end to the interval of warming that followed Neoglacial time. Glaciers throughout central and southern Alaska advanced and retracted intermittently during the Little Ice Age, but no consistent pattern can be easily inferred, especially for central Alaska. Little Ice Age moraines were built sometime after AD 1500 in the White River Valley (Denton and Karlen 1973). Glaciers in central and southern Alaska have generally retreated during the 20th Century (Denton and Karlen 1973; Goldthwait 1966; Reid 1970).

1.4 - Inferred Regional Chronology of the Susitna Valley

The upper Susitna Valley was largely ice-covered during most of late Wisconsinan time between about 30,000-14,000 ^{14}C yr BP. Coalesced valley glaciers extended from the valley bottoms to altitudes as high as 3500-4000 feet, and the snowline may have dropped to nearly that altitude as well. Glaciers were probably widening and deepening their valleys at this time, probably destroying most pre-Late Wisconsinan deposits. Within the Susitna and Tyone River lowlands, however, considerable pre-Late Wisconsinan stratigraphy may exist.

Advances of Late Wisconsinan time in the Susitna Valley probably remained near, but some distance upvalley from their maximum extents between about 25,000-17,000 yr BP. Following the marine transgression which deposited the Bootlegger Cove Clay about 14,100 yr BP, coalesced glaciers in the Cook Inlet lowland readvanced about 14,000 yr BP reaching their maximum Late Wisconsinan extents. Following a period of inferred stagnation and downwasting in the terminal zone, which may have continued long after retreat began, ice probably receded rapidly northward. Thinning of the ice in the upper Susitna River Valley accompanied northward retreat in the lowland. Glaciers retreated north of Willow Creek by about 12,000 yr BP, and much of the Susitna Canyon area may have been deglaciated by 11,000 yr BP. Rapid ice recession probably continued with the ice tongues receding upvalley from their present terminii by 9000 yr BP. Ice retreat was almost certainly complete by 8000 yr BP. Glaciers may have experienced a minor early Holocene readvance prior to 8500 yr BP, but if so, they probably did not extend more than several km beyond their present terminii.

During the Middle Holocene, between about 4000-8000 yr BP, the Susitna Valley may have been slightly warmer and possibly drier than present. Maximum glacier retraction, and the culmination of warmth may have occurred about 5000-6000 yr BP.

Cooler conditions returned during Neoglacial time, which spans the last 3500 years. Glaciers probably expanded slightly at this time reaching terminal positions only several kilometers from their present terminii. At least three episodes of cooling and glacier expansion are thought to have occurred since about 3500 yr BP. Present climates occur within the framework of the Little Ice Age. The general ice retreat and warming of the 20th Century may be followed in the future by more severe climates and a return to minor glacier advances.

APPENDIX C

1 - DESCRIPTIONS FOR GEO-ARCHEOLOGIC TERRAIN UNITS IN THE MIDDLE SUSITNA RIVER VALLEY

Age — Geology-terrain character — Relief

Glacial

(Refers to all of those units that were modified during the last glaciation. The highest hills of unit Rh_3 may have stood above the glacial limit, but frost shattering and mass movement during the last glaciation caused their surfaces to be essentially equivalent or younger in age than other glacial units)

R Rock surfaces - modified by erosion by glacier ice. Usually rounded surfaces, but may include some very steep terrain in the highest peaks. Drainage is excellent, soil cover is usually minimal. Surface usually covered by patchy or complete tundra cover, but may be bouldery at high altitudes. Contains rare isolated patches of drift, but not enough to obscure rock surfaces. Bedrock structure is responsible for much of the topography.

h Hills - rock occurs as part of a hill or complex of hills. Slopes are usually irregular, but continuous.

s Surfaces - rock occurs as a surface of varying relief (rather than as a steadily inclined surface such as a hill). Surfaces can exhibit very high relief.

1 Low local relief
2 Medium local relief
3 High local relief

b Rock valley walls - rock occurs as part of a broad sloping, often gradual surface without secondary relief (walls of glacial valleys). A thin mantle of drift may be present. Drainage is very good in most places.

d Rock with thin or patchy drift - bedrock structure is evident throughout, and surface has most of the character of a bedrock slope. Can be rough in some areas or smooth, depending on the nature of the underlying rock. Typically poorly drained where drift reaches sufficient thickness.

D Drift - dominantly till with some ice contact stratified drift. Generally forms poorly drained slopes because of the clay-rich nature of the till.

t Thick - drift obscures all bedrock structure. Slopes generally gentle and poorly drained. Local relief generally low, but some significant gullying can occur due to the erodable nature of the till.

p Patchy - poorly drained areas interspersed with well drained, usually high relief rocky areas. Similar to unit R_d but more poorly drained areas.

u Undifferentiated - generally includes much till and low relief, poorly drained areas, but also contains boggy areas, irregular ice contact stratified drift areas, and broad open surfaces.

I Ice contact stratified drift - hummocky irregular, commonly gravelly mounds and ridges. Commonly occurs in chaotic pattern, but ridges can be continuous for about 1 km.

o Open hummocks - generally broad swales and mounds in irregular pattern. Surface only moderately well drained, usually very brushy.

t Tightly nested hummocks - very well drained gravelly ridges tightly clustered to provide much well drained areas. Terrain very irregular and discontinuous. Contains numerous small lakes and ponds, commonly with gravelly edges.

p Patchy - mounds and ridges occur thinly over bedrock. Relief generally very low, but sharp.

O Outwash - broad, extremely low gradient, surface without relief.

p Outwash plain - broad open area of continuous outwash - shows some primary relief as surface channels.

v Valley train - flat outwash surface in valley bottom. Surfaces flat, but commonly terraced.

f Fan - occurs downstream from tributary mouths in some localities. Forms flat well drained sloping bench.

L Lacustrine - surfaces generally low relief, and extremely poorly drained. Underlain by silts and clays. Earthflows common where water is available and slopes are sufficiently steep. Can occur as thin mantle over broad areas.

m Mantle - lacustrine deposits subdue, but not obscure the underlying topography. Very poorly drained, with widespread solifluction.

s Surface - lake plain. Deposits thick enough to obscure the underlying topography. Very poorly drained, with silts and clays to surface.

Holocene

(Deposits and features formed since deglaciation. In some places a steep valley wall, which is either modified by Holocene erosion or covered by Holocene deposits, may have been largely formed during glaciation.)

V Valley slide slopes - steep slopes which represent Holocene erosion or modification. Slopes generally provide good exposures of bedrock, with till and other surficial units at the surface. Much of the valley walls may have formed prior to Holocene time, but there is enough modern or recently past activity to justify use of this age category.

g Gullied - either deep rocky gullies in tributaries, or badlands-like dissection on the valley sides. Extremely difficult terrain to traverse.

s Smooth - valley walls are not highly gullied, but still quite steep. May contain a great degree of colluvium in some places.

A Alluvium - coarse gravel surfaces which are generally of low relief. Can occur in the upper reaches of tributaries, but generally occurs in the Susitna Valley bottom. Surfaces are generally well drained, thickly forested, and slightly sloping. Recent alluvium (as island in the river) not mapped separately.

s Susitna Valley bottom alluvium - occurs a gravelly alluvium derived from and deposited by the Susitna River. Often has numerous drainage channels which are parallel to the river, and may have small terraces.

t Tributary floor and fan alluvium - sloping surfaces which occur at the mouth and within tributary valleys. Generally well drained, but steep fans may show poorly drained surfaces.

S Slope deposits - nonsorted, poorly drained, often steeply sloping mixed deposits.

- c Colluvium - poorly drained, steeply sloping irregular surfaces which commonly parallel the steep valley walls.
- s Solifluction - broad, open areas of slope deposits. Rubbly and silty deposits. Surfaces poorly drained.

M Bog sediments - highly organic and presently wet.

APPENDIX D

FORMS - 1. SITE FORM

2. UNIT EVALUATION FORM

3. ALASKA HERITAGE RESOURCES SITE SURVEY FORM

ARCHEOLOGY
UNIVERSITY MUSEUM
UNIVERSITY OF ALASKA

FIELD SITE NO.: ______
SITE NAME: ______
AHRS NO: ______

SUSITNA HYDROPOWER PROJECT

I. SITE LOCATION:
   A. USGS QUAD: Talkeetna Mountains____ Scale: 1:63,360
   B. AIR PHOTO REFERENCE: Roll____ Frames ____
   C. TWP ______, RNG ______, Seward Meridian
      ______¼ of the ______¼ of the ______¼ of Section ______.
   D. UTM: Zone 6 Easting______ Northing ______
   E. LATITUDE: ___° ___' ___" LONGITUDE: ___° ___' ___"
   F. GEOLOGICAL UNIT: ______ No. ______
   G. REGION: Devil Canyon ______ Watana______ Other:______

II. ENVIRONMENT:
   A. Site morphology. (See back of form for information required.)

   B. Surrounding terrain morphology. (See back of form for information required.)

FIELD SITE NO.____________

C. Ecosystem. (See back of sheet for descriptions.)

1. _____Moist Tundra _____ High Brush _____Other: __________

   _____Lowland spruce-hardwood _____Upland spruce-hardwood

2. Site vegetation and surface description:

3. Vegetation in surrounding area and surface description:

FIELD SITE NO.____________

III. SITE:

A. Description:

1. Characteristics. (lithic scatter, stratified site, cabin, etc.)

2. Number, size and spatial relationship of features, etc.

3. Stratigraphy (if relevant):

FIELD SITE NO. ______

B. Artifact inventory.
   1. Surface:
      a. Artifacts collected:

______
______
______
______

      b. Artifacts observed but not collected:

______
______
______
______

   2. Systematically excavated artifacts:

______
______
______
______

C. Period: ____Unknown ____Precontact
   ____Historic: Native____ Non-Native____

D. Size:
   1. Observed Size: ____ x ____ meters

      Justification for boundaries:

______
______
______

   2. Estimated Size: ____ x ____ meters
      Justification for boundaries:

______
______
______

E. Site disturbance (current and anticipated).
   1. Natural:______

______
______
______

   2. Human: ______

______
______
______

FIELD SITE NO.______________

F. What prompted you to survey this location?

____
____
____
____

G. Draw and attach map(s) of site with location of tests and surface features; soil profile(s); and general location and vegetation map.

IV. PHOTOGRAPHIC RECORD:

Frame #	Direction	Content
____	________	Site ID with date and Crew ________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________
____	________	______________________

V. CREW: (include relevant pages in fieldbook)

A. Names: ______________, ______________, ______________

______________, ______________, ______________

______________, ______________, ______________

B. Date(s) visited: ______________________________

VI. Field Recommendation for further testing:

____
____
____
____

II. A. Site morphology.

1. What terrain feature is the site on: flat plain, sloping plain, continuous ridge, hill, point, shoreline, terrace, valley, etc.
2. What is the topographic context:
   a. no topographic relief relative to surrounding terrain, higher topographic relief than surrounding terrain, lower topographic relief than surrounding terrain.
   b. give elevation: 1) above sea level; 2) Relative to surrounding terrain.
3. Is the terrain feature continuous or discrete?
4. What is the size, shape and direction of this feature?
5. What is the relative position of the site on this feature?
6. Field of view:
   a. direction and range of view;
   b. what is in view?
   c. would a change in the present vegetation increase or decrease view? How?
7. Describe any special attributes that make this site location unique.
8. Are there other settings similar to that of this site in the unit? Where?

II. B. Surrounding terrain morphology.

Describe surrounding landforms and water features in relation to the site. What is the direction, distance and difference in elevation of surrounding features? The following characteristics should provide a guide:

1. Streams and rivers:
   a. proximity to site
   b. access from site
   c. are any in view from site?
   d. has downcutting created valley wall constriction in this area?
   e. is stream or river (1) shallow with rapids and sandbars, or (2) deep and smooth in this vicinity, etc.
   f. is water clear or turbid?
   g. what is the general width in this vicinity?
   h. is terracing present?
   i. in this area is the river course:
      1. straight;
      2. bending;
      3. serpentine.
   j. are confluences with other streams or rivers nearby? How far?
   k. what kind of terrain does this stream or river drain? (lakes, hills, marsh)

2. Lakes:
   a. size in hectares using template.
   b. inlet present? outlet present?
   c. single lake or part of lake system?
   d. characterize terrain surrounding lake (low, wet, steep, etc.)
   e. is there any evidence that lake size is changing (vegetation overgrowth, old shorelines, etc.)
   f. characteristics of shoreline. Old shorelines present?

ECOSYSTEMS LIKELY TO BE ENCOUNTERED IN PROJECT AREA

MOIST TUNDRA: Moist tundra ecosystems usually form a complete ground cover and are extremely productive during the growing season. They vary from almost continuous and uniformly developed cottongrass tussocks with sparse growth of other sedges and dwarf shrubs to stands where tussocks are scarce or lacking and dwarf shrubs are dominant. Associated species are arctagrostis, bluejoint, tufted hairgrass, mosses, alpine azalea, wood rush, mountain-avens, bistort, low-growing willows, dwarf birch, Labrador tea, green alder, Lapland rosebay, blueberry and mountain cranberry.

HIGH BRUSH: These are dense to open deciduous brush systems. Floodplain thickets: The subsystem is similar from the rivers of the southern coastal areas to the broad-braided rivers north of the Brooks Range. It develops quickly on newly exposed alluvial deposits that are periodically flooded. The dominant shrubs are willows and alders. Associated shrubs are dogwood, prickly rose, raspberry, buffaloberry and high bush cranberry. Birch-alder-willow thickets: This subsystem is found near timberline in interior Alaska. It consists of resin birch, American green alder, thinleaf alder and several willow species. Thickets may be extremely dense, or open and interspersed with reindeer lichens, low heath type shrubs, or patches of alpine tundra ecosystems. Other associated species are Sitka alder, bearberry, crowberry, Labrador tea, spirea, blueberry and mountain cranberry.

UPLAND SPRUCE-HARDWOOD FOREST: This ecosystem is a fairly dense interior forest composed of white spruce, birch, aspen and poplar. Black spruce typically grows on north slopes and poorly drained flat areas. Root depths are shallow. Fire scars are common. White spruce averaging 40 to 80 feet in height and up to 16 inches in diameter occurs in mixed stands on south facing slopes and well drained soils; forms pure stands near streams. Aspen and birch average 50 feet in height. Poplar averaging 80 feet in height and 24 inches in diameter occurs in scattered stands along streams. Undergrowth consists of mosses with grasses on drier sites and with brush on moist slopes. Typical plants are willow, alder, ferns, rose, high and low bush cranberry, raspberry, current and horsetail.

LOWLAND SPRUCE-HARDWOOD FOREST: This ecosystem is a dense to open interior lowland forest of evergreen and deciduous trees, including extensive pure stands of black spruce. Black spruce are slow growing and seldom exceed 8 inches in diameter or 50 feet in height. Cones of this tree open after fire and spread abundant seed, enabling black spruce to quickly invade burned areas. The slow-growing stunted tamarack is associated with black spruce in the wet lowlands. It seldom reaches a diameter of more than 6 inches. Rolling basins and knolls in the lowlands have a varied mixture of white spruce, black spruce, paper birch, aspen and poplar. Small bogs and muskegs are found in the depressions. Undergrowth species include willow, dwarf birch, low bush cranberry, blueberry, Labrador tea, crowberry, bearberry, cottongrass, ferns, horsetail, lichens and a thick cover of sphagnum and other mosses. Large areas burned since 1900 are covered by willow brush and very dense black spruce sapling stands.

AFTER: Major Ecosystems of Alaska. Joint Federal-State Land Use Planning Commission for Alaska. July 1973.

Museum Archeology
University of Alaska
Fairbanks, Alaska 99701

Geological Unit: ________
Number: ________

SUSITNA HYDROPOWER PROJECT
UNIT EVALUATION FORM

This form is intended to insure that four kinds of data for each unit are recorded. These data will guide additional survey, the development of strata for 1981 sampling, evaluation of areas that may need no further work, and document areas surveyed and tested on-the-ground. If supplementary information to this form is included in fieldnotes, please note this on the form along with your name(s) and field book page number(s).

I. A field comparison of the geological/morphological unit and its definition (given on the back of this form) is needed. The field description of the unit should include the uniformity and variability of surface morphology. The information which you record will be used to compare this unit with other units to determine similarity and aid in the development of strata for sampling:

a. Describe the surface morphology noting topographic features, drainage, soils, variation in surface slope, etc.

Geological Unit: ______________
Number: ______________

b. What, if any, are the discrepancies between the definition of the unit (based on air photo interpretation) and the field observation of the unit? Would you characterize the total area as a single unit based on the homogeneity of surface morphology?

II. Identify areas within the unit that potentially may be eliminated from further archeological survey. Please provide <u>objective</u> criteria in your evaluation such as: 1) areas where testing is not feasible using standard archeological field techniques (areas of standing water, talus rubble); 2) areas where the substrata have been removed by natural erosion (indicate whether these areas have been surface examined for archeological materials); and 3) overly steep slopes. This would include slopes of greater than 15° to horizontal which you deem unlikely for site occurrence (describe and measure slope angle).

Geological Unit:____________
Number:____________

III. Identify locales within the unit which may have high archeological potential, based on known site locales from other areas and your field experience, including overlooks, river terrace and bluff edges, lake and stream margins, etc. Describe the location, extent, salient features, and tests (if applicable) for these locales, record these locations on USGS maps.

IV. Locate on maps where the survey team actually went on-the-ground, and location, number, size, and depth of test pits excavated and natural exposures examined. Describe the topographic setting, and relation to other physical features, such as lakes, streams, rivers, bluff, edges, nearby hills, elevation, etc., for sterile test pits.

NAMES OF FIELD TEAM: (include relevant pages in fieldbook)

____________________ Date__________ ____________________ Date__________

____________________ Date__________ ____________________ Date__________

____________________ Date__________ ____________________ Date__________

DEFINITIONS OF GEOLOGICAL UNITS

G= Glacial L= Late Glacial R=Recent M=Modern

b. Surfaces mapped as "b" are sloping bedrock surfaces that formed the valley walls of glacial troughs. In most cases slopes are very steep, and usually bedrock is exposed directly underneath the thin recent soil mantle. In some places patchy thin drift may be present within the boundaries of areas mapped with the subscript "b". This unit commonly grades both upward and downward in elevation to rock slopes above the glacial trough (r) or to drift mantle slopes (d, d/b). Minor windblown sedimentation and solifluction processes have occurred, but in most cases the glacial trough is relatively unmodified.

d. Surfaces mapped as "d" include those areas thickly mantled with glacial drift. Relief is generally very low and the unit can have a monotonous gradually sloping undulating expression. Drainage is typically poor, with small ponds forming in a few places. The surface character is controlled largely by the varying thickness and composition of the till mantle. Most of the sediment underlying the surfaces mapped "d" is probably stony, clayey, dense till, which may be overlain by a thin gravel cap.

d/b. Surfaces mapped as "d/b" are underlain by thin or patchy drift which overlies bedrock. Both ice-scoured bedrock and a mantle of poorly drained drift can occur locally. The topographic relief is usually lower than "r" surfaces because the drift fills in the original depressions. It is higher than "d" surfaces because the surface irregularities are not completely masked by a drift mantle. Locally, this unit can be well drained (as in the gravelly areas), but usually well drained bedrock areas are randomly interspersed with poorly drained drift areas. Minor areas of subdued morainal topography can be present locally.

m. Surfaces mapped as "m" are underlain by hummocky irregular, commonly gravelly drift which extends to some depth. The surface expression is morainal. Topographic relief is generally less than 100 feet, but numerous chaotic small ridges (morainal) or isolated mounds (kames) typically less than 100' relief may be present. In most areas, the surfaces mapped as "m" are well drained and gravelly. Small lakes are commonly present, and large irregular poorly drained areas may be present as well. Very little morainal topography is present west of the Watana Dam Site. Extensive areas near the Tyone River, although morainal in form (m), are more subdued and poorly drained, possibly because they are partly buried by eolian sediments.

m2. Surfaces mapped as "m2" are similar to "m" surfaces and grade directly into them. They are, however, more irregular in form, with more prominent ridges, and better drained topography. In the vicinity of Tsisi Creek and the Oshetna River, "m2" surfaces include some prominent valley lateral moraines.

v. Surfaces mapped as "v" include all bedrock surfaces that were formed by recent incision of tributaries and the Susitna River. The surfaces are very steep, commonly gullied, and are still commonly in the process of being eroded. The country between "v" surfaces and the next higher surface is usually sharp. "v" surface also includes some colluvium, small talus cones, and a few possible landslides.

a. Surfaces mapped as "a" include all alluvium of modern or relatively recent age. The alluvium is generally well drained and vegetation covered, especially in the Susitna Canyon. Alluvium in the tributaries may contain minor colluvial debris and some fine material, but along the Susitna and Chulitna River "a" is indistinguishable from outwash. The alluvium is derived largely from reworked outwash, hence the similarity. The contact between alluvium (a) and steep gullied slopes (v) is usually abrupt, but difficult to map because of the narrow outcrop pattern.

ALASKA HERITAGE RESOURCES SITE SURVEY FORM (ARCHEOLOGY) OH&A 5/76 Page 1
(Attach continuation sheets as needed.)

RECORDER:

1. Name(s)________________________ 2. Date__________

3. Address____

4. Project________________________ 5. Permit Number__________

SITE REFERENCE/LOCATION:

1. Field Designation______________ 2. (AHRS) Designation__________

3. Name(s) of Site________________________________

4. Map Name______________________, Map Scale__________

5. Latitude____ Deg.____ Min.____ Sec./Longitude____ Deg.____ Min.____ Sec.____

6. Legal Description________________________________

7. Aerial Photo Reference______________, Photo Scale__________

8. UTM Grid Reference________________________________

9. Bibliographic References (manuscripts, etc.) ________________

LAND USE CONDITIONS:

1. Present Land Use________________________________

2. Recent Surface Modifications______________________

3. Natural Erosion: Kind__________________ Extent__________

4. Vandalism: No___ Yes___; Heavy___ Medium___ Light ___

5. Past Surface Modifications________________________

6. Future Surface Modifications______________________

7. Property Owner/Manager____________________________

ENVIRONMENTAL DESCRIPTION:

1. Vegetation at Site________________________________

2. Surrounding Vegetation____________________________

3. Topography at Site________________________________

4. Surrounding Topography____________________________

5. Geology (surface/bedrock)__________________________

6. Nearest Water to Site: Distance______ Direction________ Type__________

(Attach continuation sheets as needed.)

Site Reference______________
From Page 1

SOIL MATRIX:

1. Thickness (sod)____________, (soil)__________, Description___________

____

____

3. Samples Taken: No____Yes____; Number/Description______________________

____

1. Field Book(s)__________________________Pages__________________

2. Photographs Taken: B&W____Color Slides____Color Prints____, Description of Subject(s)____

____

ARCHAEOLOGICAL OBSERVATIONS/DATA COLLECTED:

1. Estimated Extent of Site (use sketch map)_____________________________
2. Number of Cultural Components__________________________________
3. Stratigraphy: No____Yes____ (attach profile)
4. Number of Test Pits Dug____(indicate their relative positions on sketch map)
5. Organic Preservation: No____Yes____; Good____Moderate____Poor____
6. Faunal: No____Yes____; Description (ID)____________________________
7. Human Remains: No____Yes____; Description____________________________
8. Charcoal: No____Yes____Collected____; Description/Provenience___________

____

9. Other Features____

____

10. Artifacts: No____Yes____Collected____; Description_____________________

____

____

11. Repository____

SKETCH MAP ATTACHED:

1. Indicate North, give scale, provide appropriate labels, and include landmarks.

APPENDIX E

MAPS OF SITE LOCATIONS AND SURVEY LOCALES

A number of federal laws, as well as ethical considerations, mandate that site locational data not be released to the general public if there is a possibility the release of this proprietary data could create a risk of harm to such resources. The specific laws and ethical standards concerning the confidentiality of such data are summarized below:

(a) The National Historic Preservation Act, 1966 (Public Law 89-665), Title I, sec. 101, (a)4. Information relating to the location of sites or objects listed on, or eligible for, inclusion in the National Register, should be withheld from the general public if it would create a risk of destruction or harm to such sites or objects.

(b) Procedures of the Advisory Council on Historic Preservation, 36 CFR 800, Part 800.15(a). Information concerning the undertaking and effects of sites on or eligible for the National Register, should be made available to the general public within the limits of the Freedom of Information Act (5 U.S.C. 552), but need not include information on budget, financial, personnel and other proprietary matters, or the specific location of archaeological sites.

(c) Archeological Resources Protection Act of 1979 (Public Law 96-95), Section 9(a). Information concerning the nature and location of any archeological resource for which the excavation or removal requires a permit or other permission under this Act or under any other provision of Federal Law, may not be made available to the public unless the federal land manager concerned determines that such disclosure would not create a risk of harm to such resources or to the sites at which such resources are located.

(d) Code of Ethics and Standards of Performance for the Society of Professional Archeologists, Sec. III, 3.2. An archeologist shall not reveal confidential information unless required by law.

Because of the possibility that cultural resources in the Upper Susitna Basin could be damaged if their locations were made available to the general public, this appendix is not being distributed.

Although township, range, and section locational data for cultural resources is presented in the text of this annual report, it is felt that due to the nature of this type of description disclosure will not create any risk of harm to cultural resources.

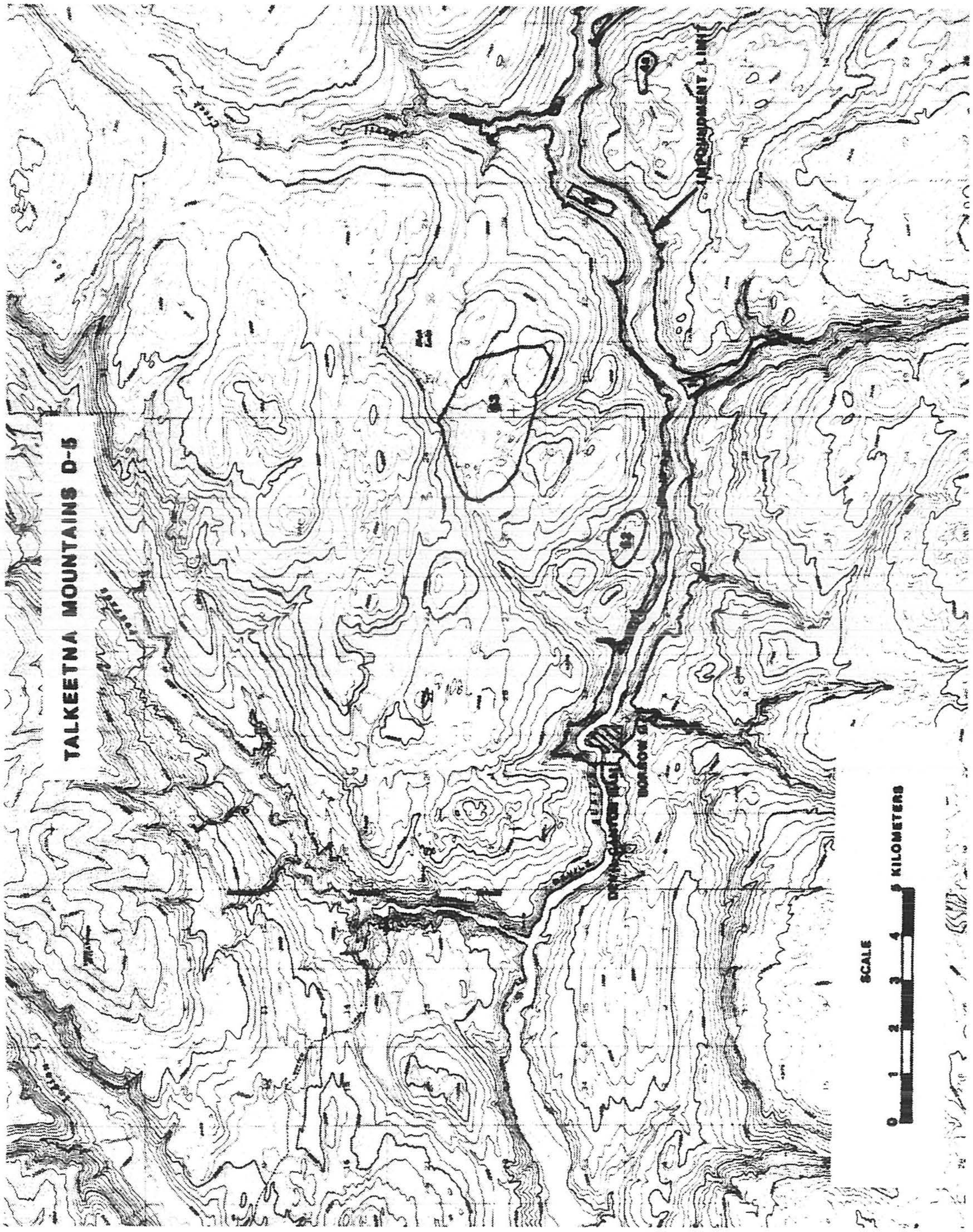


Figure 99.

Location of survey locales, Talkeetna Mts. D-5.

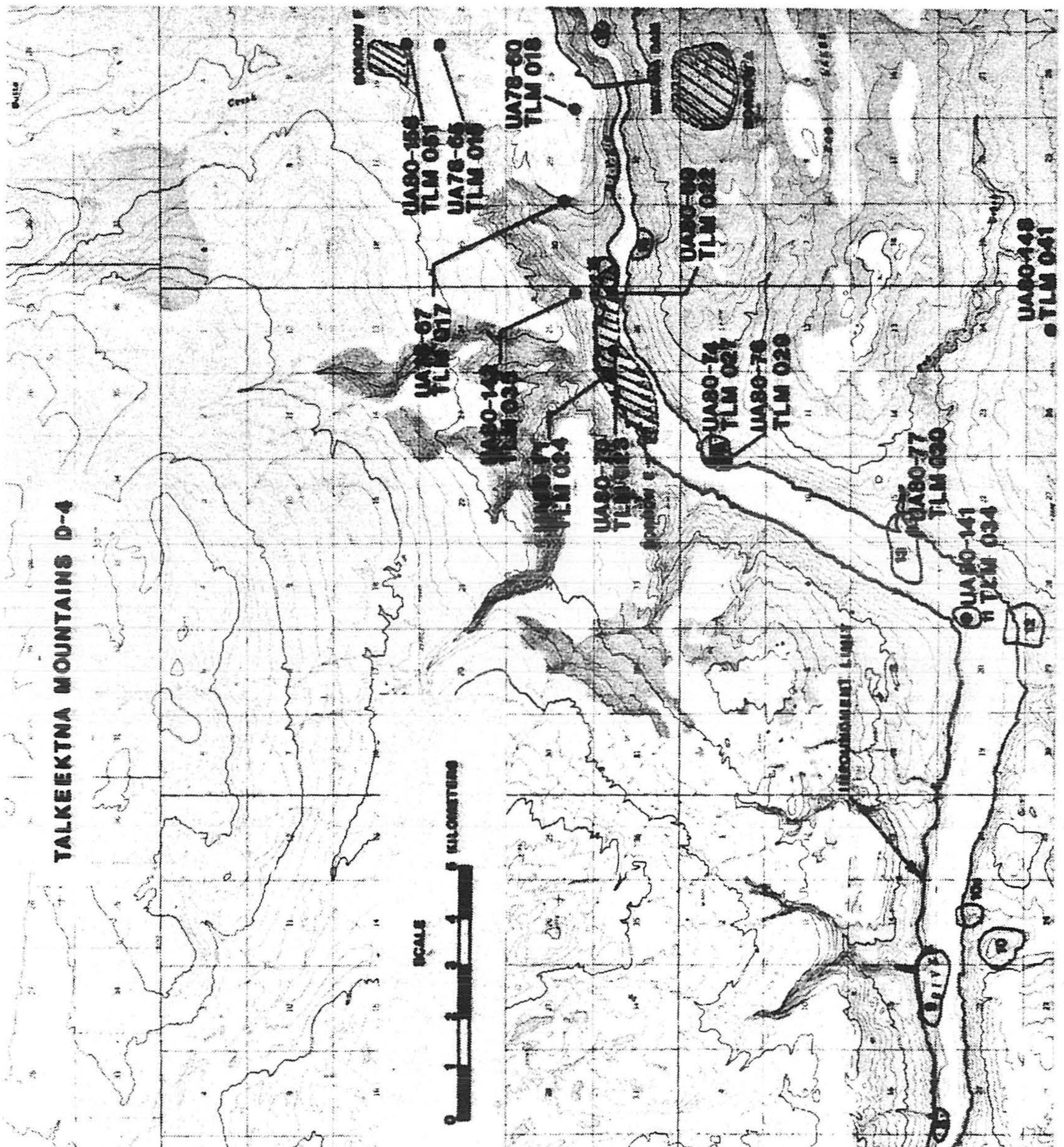


Figure 100.

Location of survey locales and archeological sites, Talkeetna Mts. D-4.

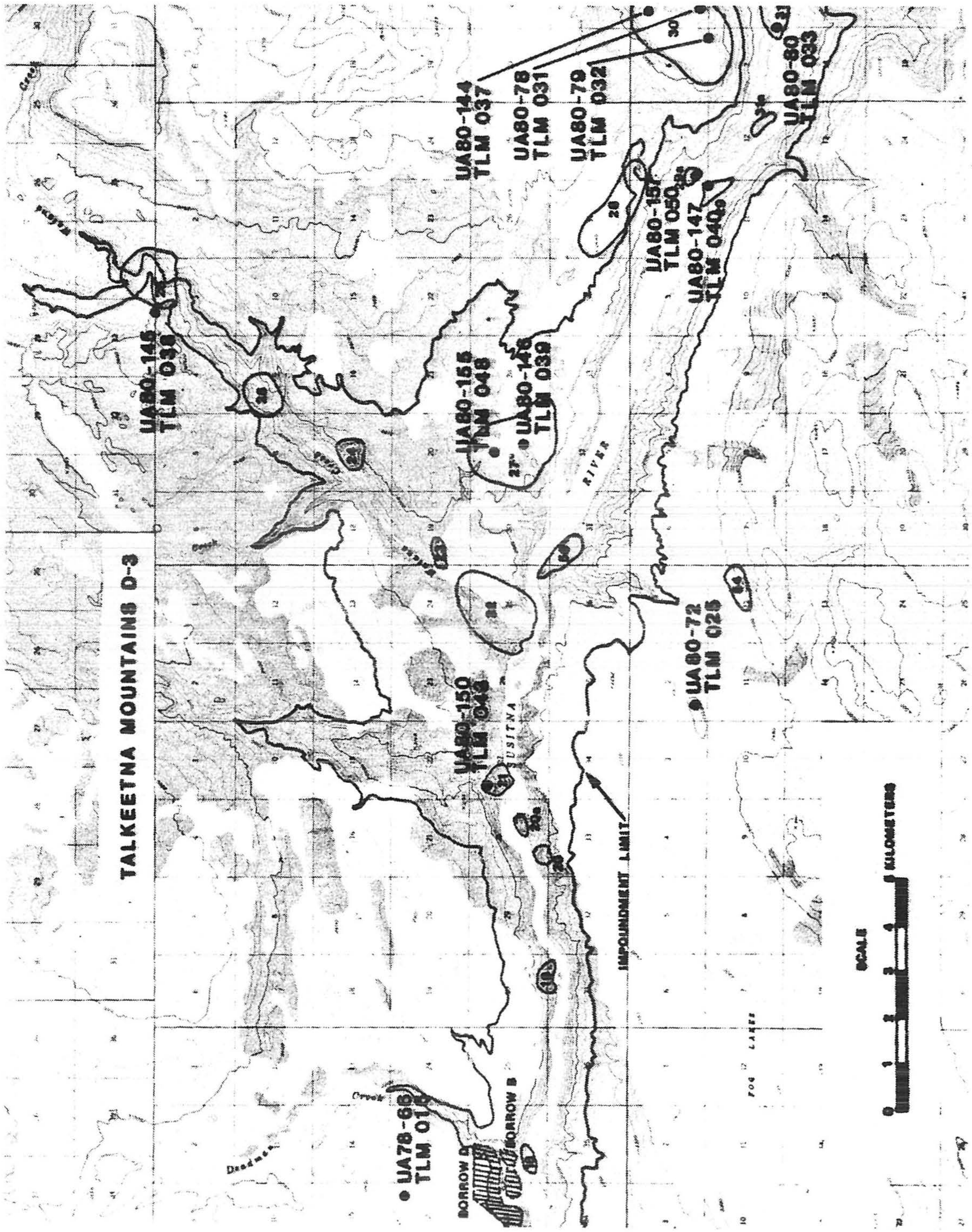


Figure 101.

Location of survey locales and archeological sites, Talkeetna Mts. D-3.

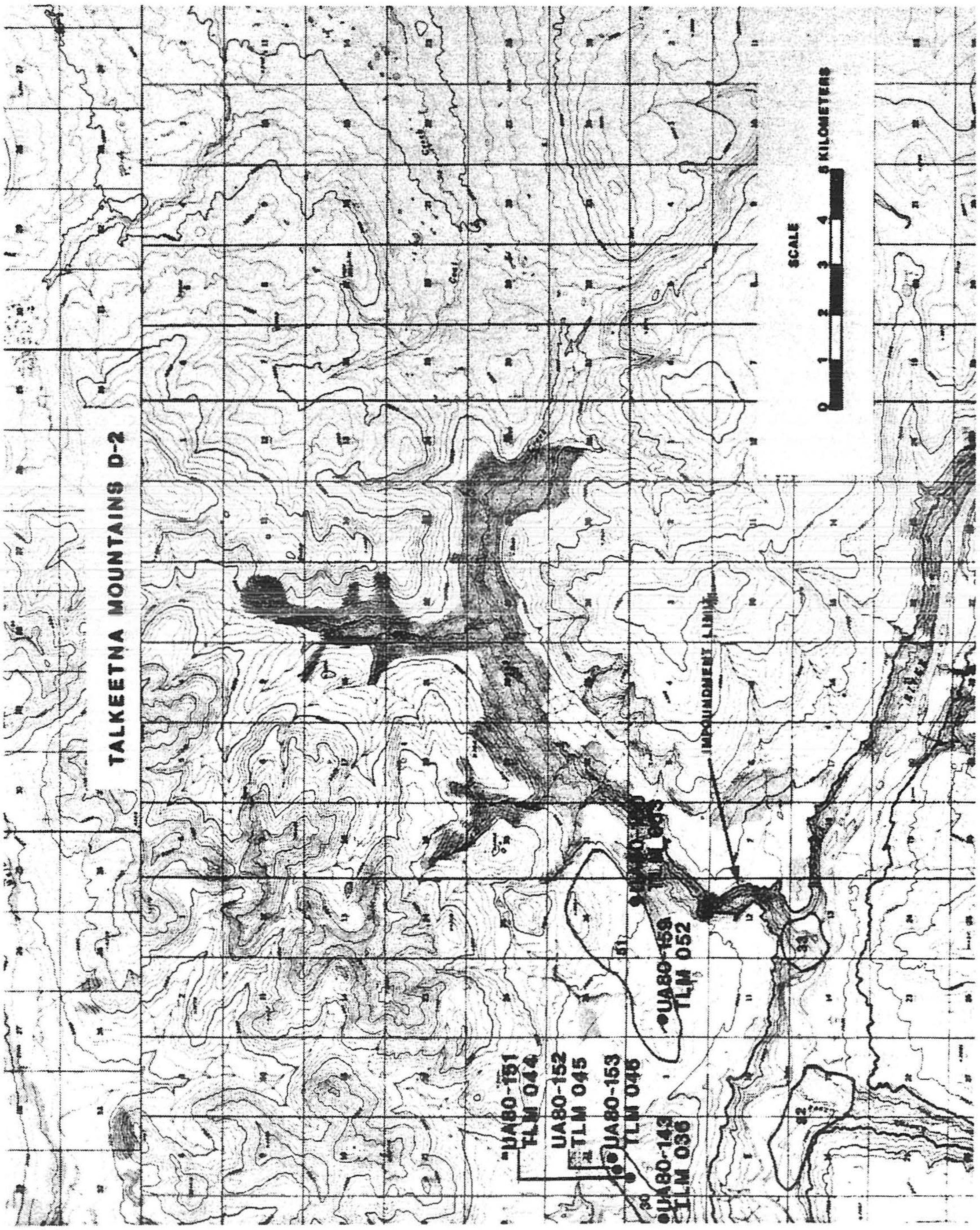


Figure 102.

Location of survey locales, Talkeetna Mts. D-2.

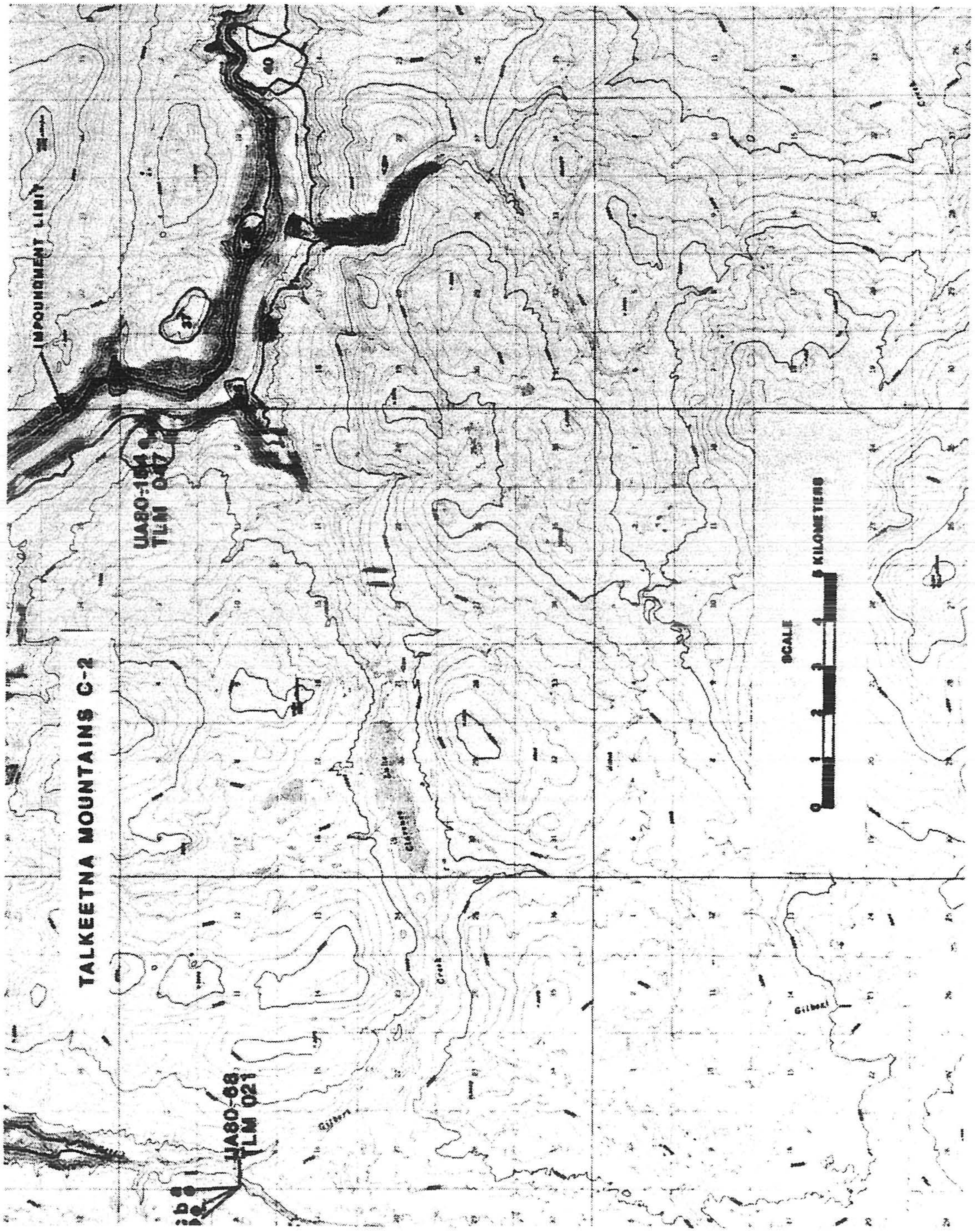


Figure 103.

Location of survey locales, Talkeetna Mts. C-2.

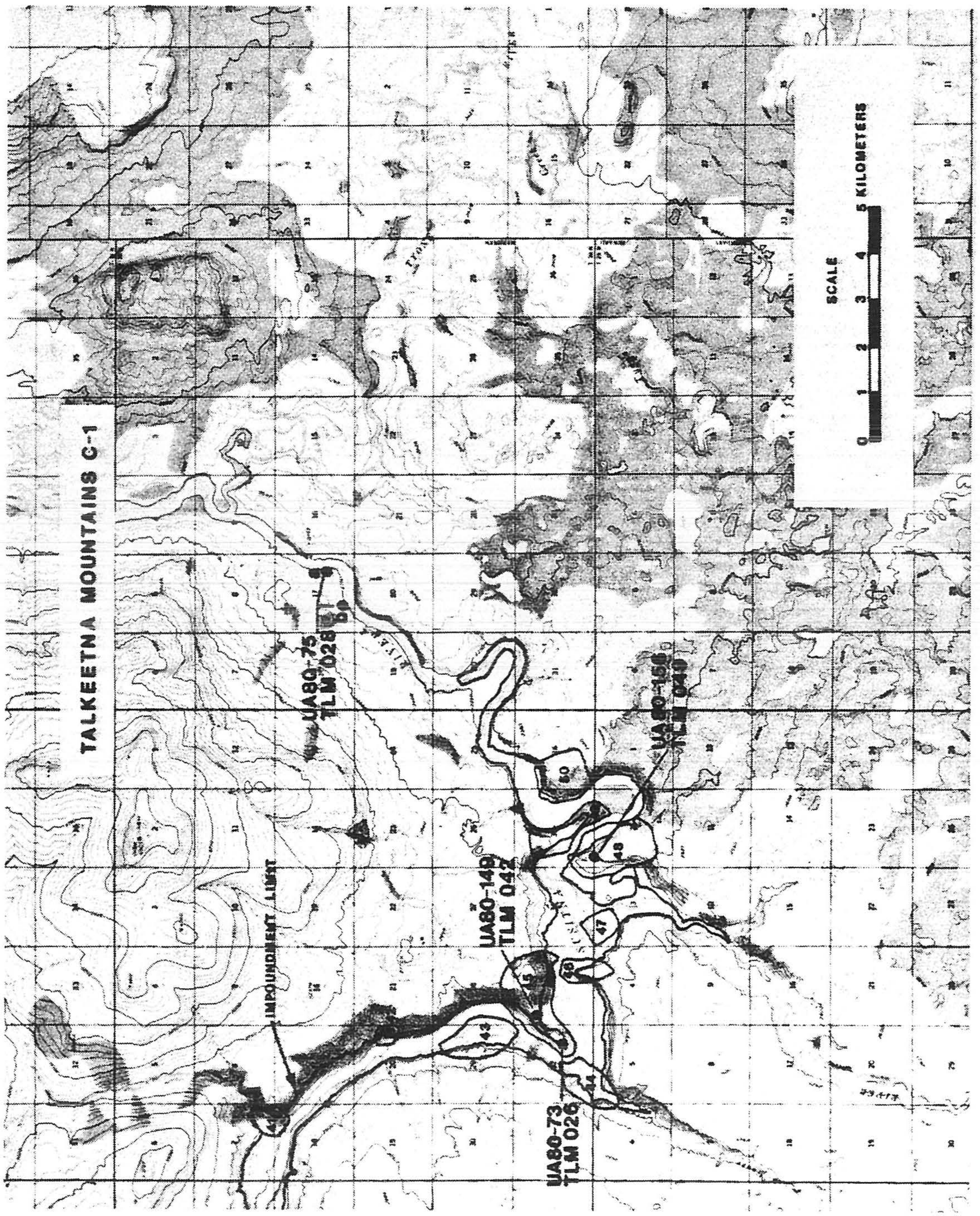


Figure 104.

Location of survey locales and archeological sites, Talkeetna Mts. C-1.

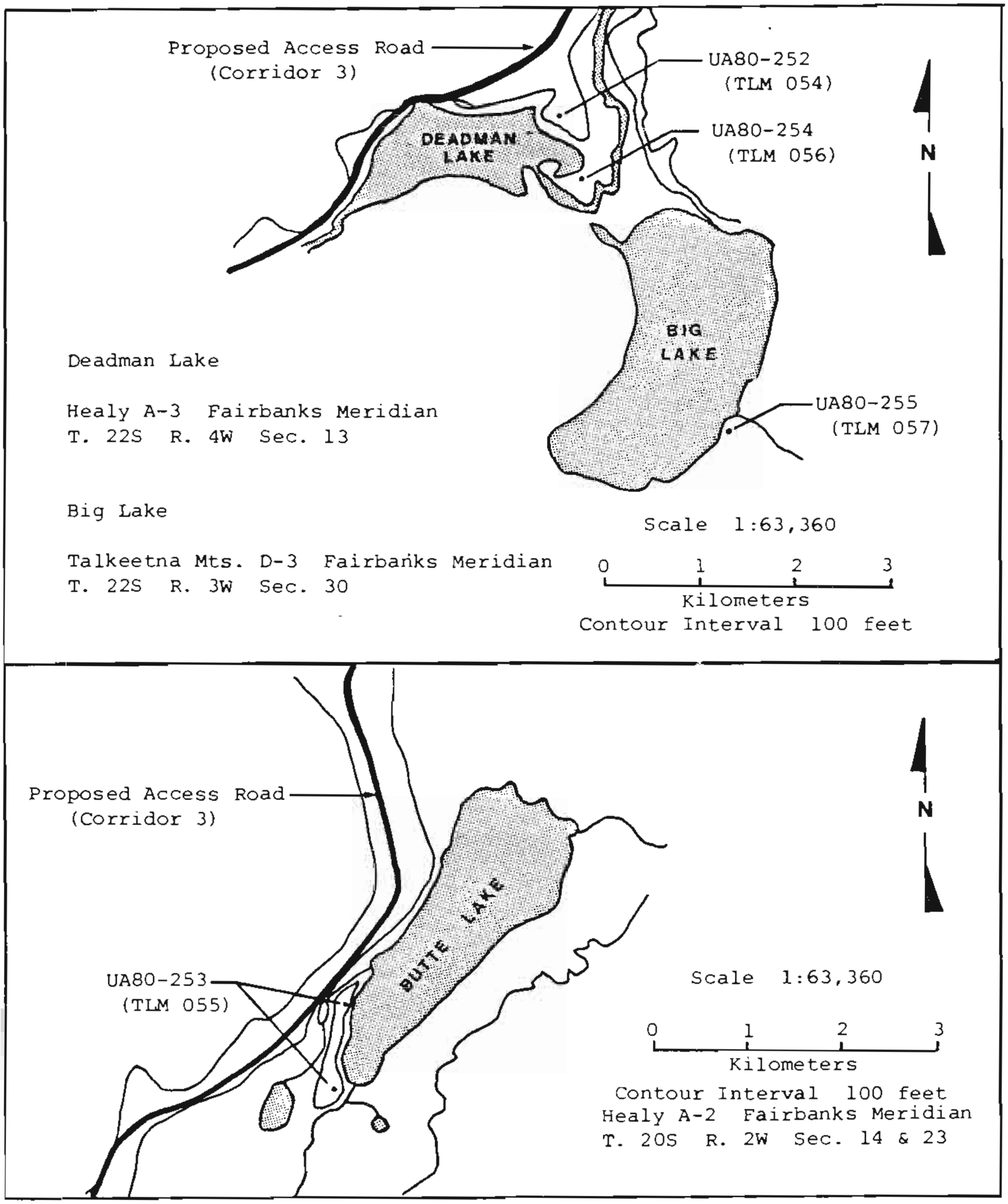


Figure 105.

Location of sites UA80-252 (TLM 054), UA80-253 (TLM 055), UA80-254 (TLM 056) and UA80-255 (TLM 057).

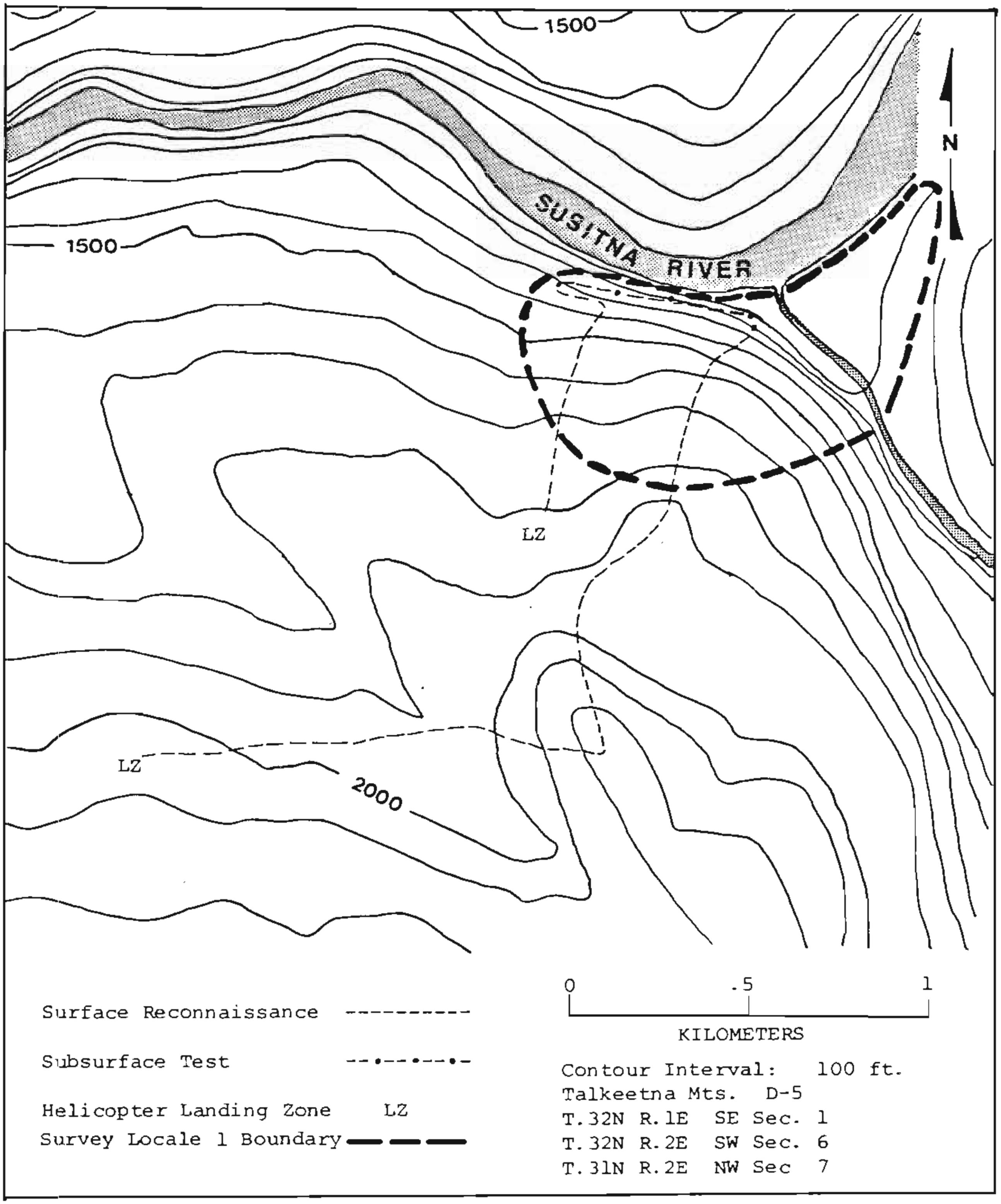


Figure 106.

Surface reconnaissance and subsurface testing in survey locale 1.

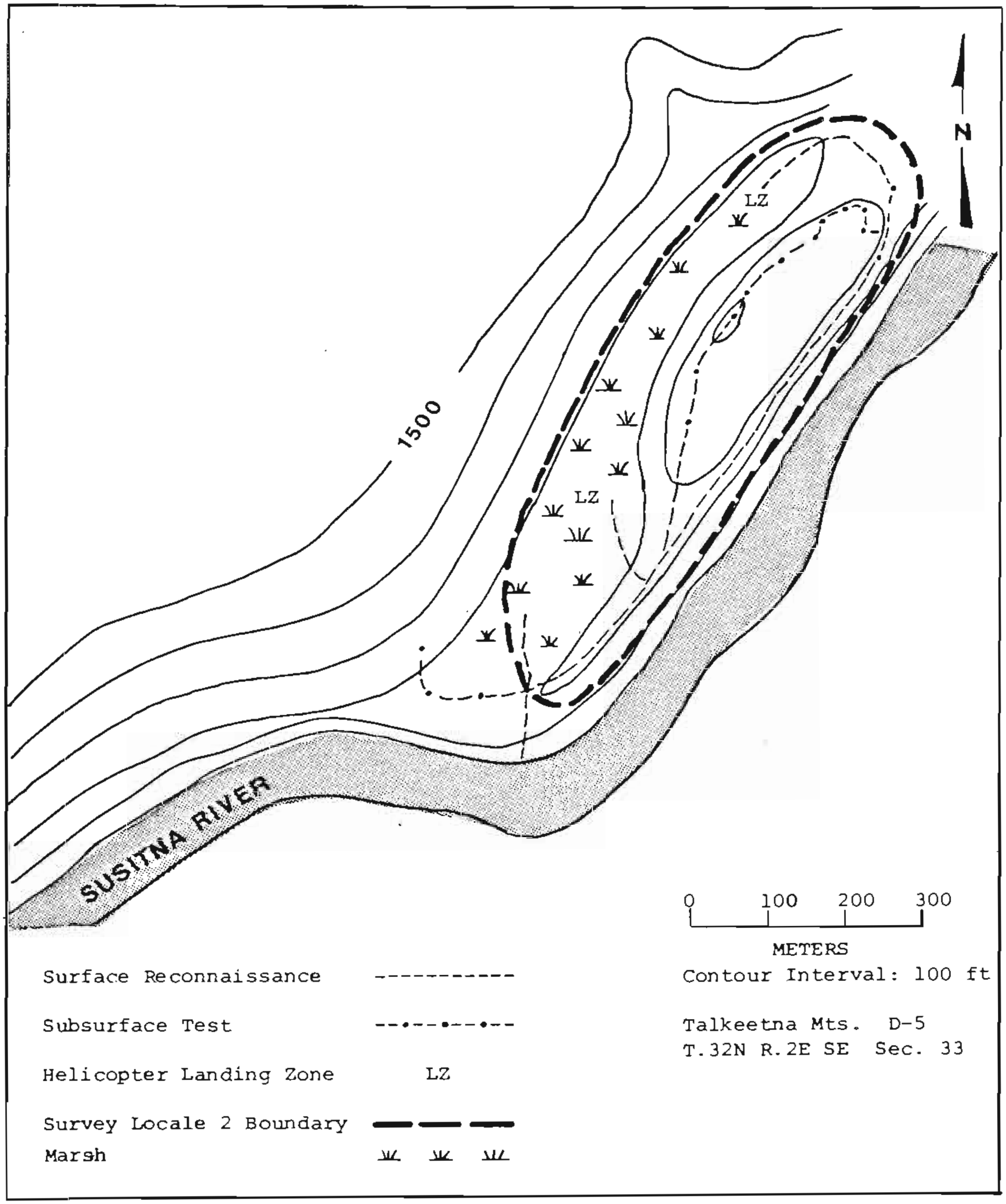


Figure 107.

Surface reconnaissance and subsurface testing in survey locale 2.

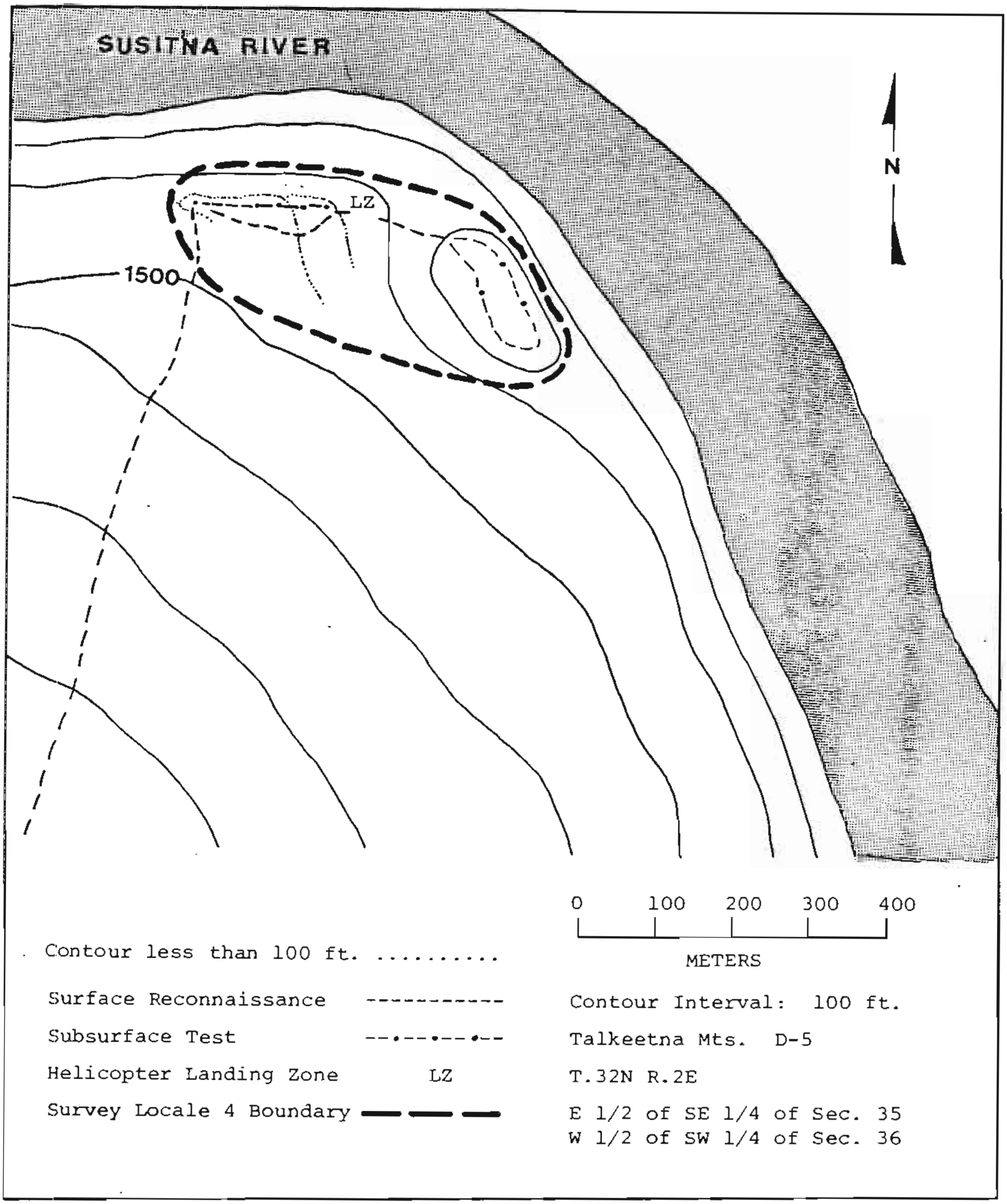


Figure 108.

Surface reconnaissance and subsurface testing in survey locale 4.

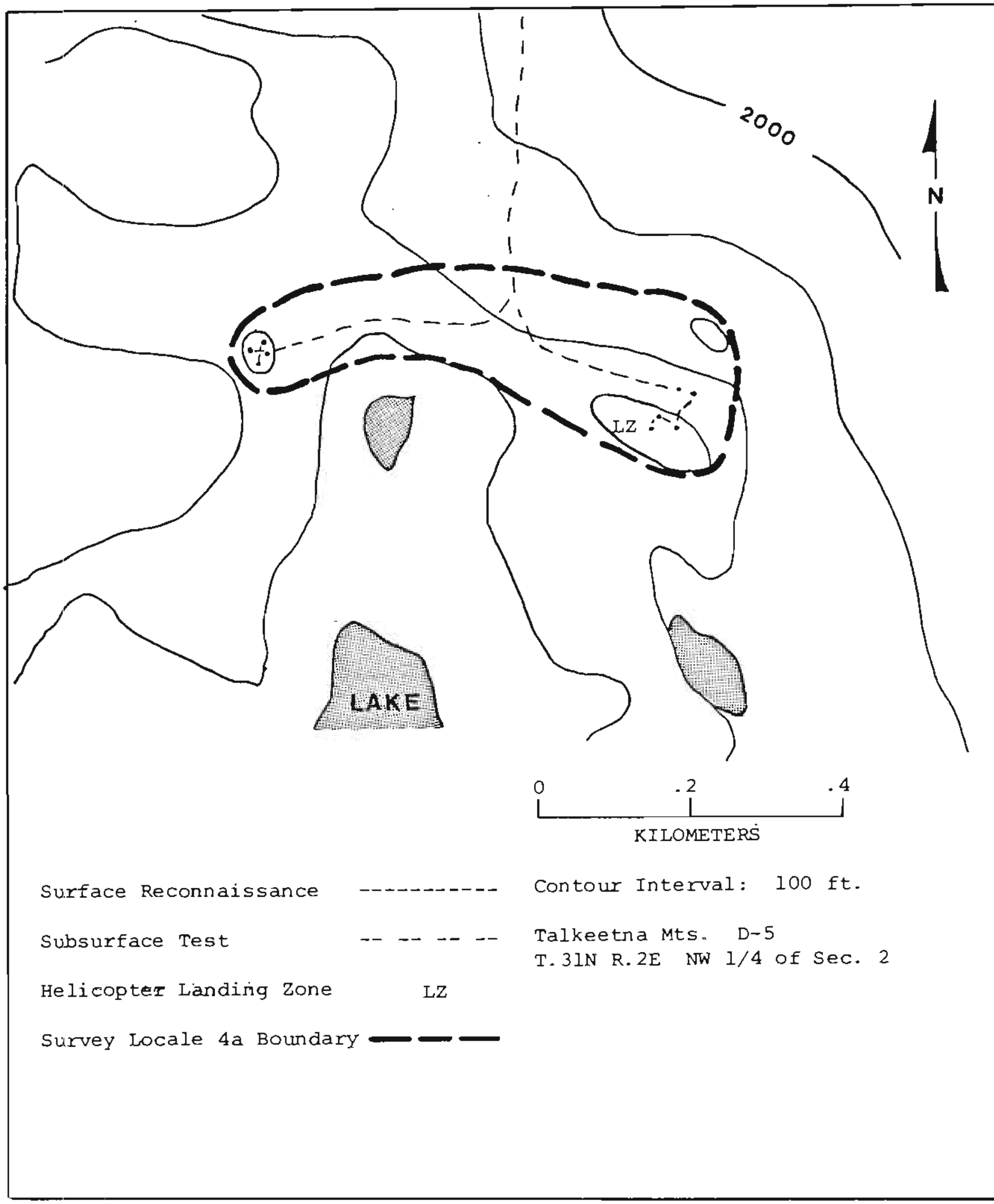


Figure 109.
Surface reconnaissance and subsurface testing in survey locale 4a.

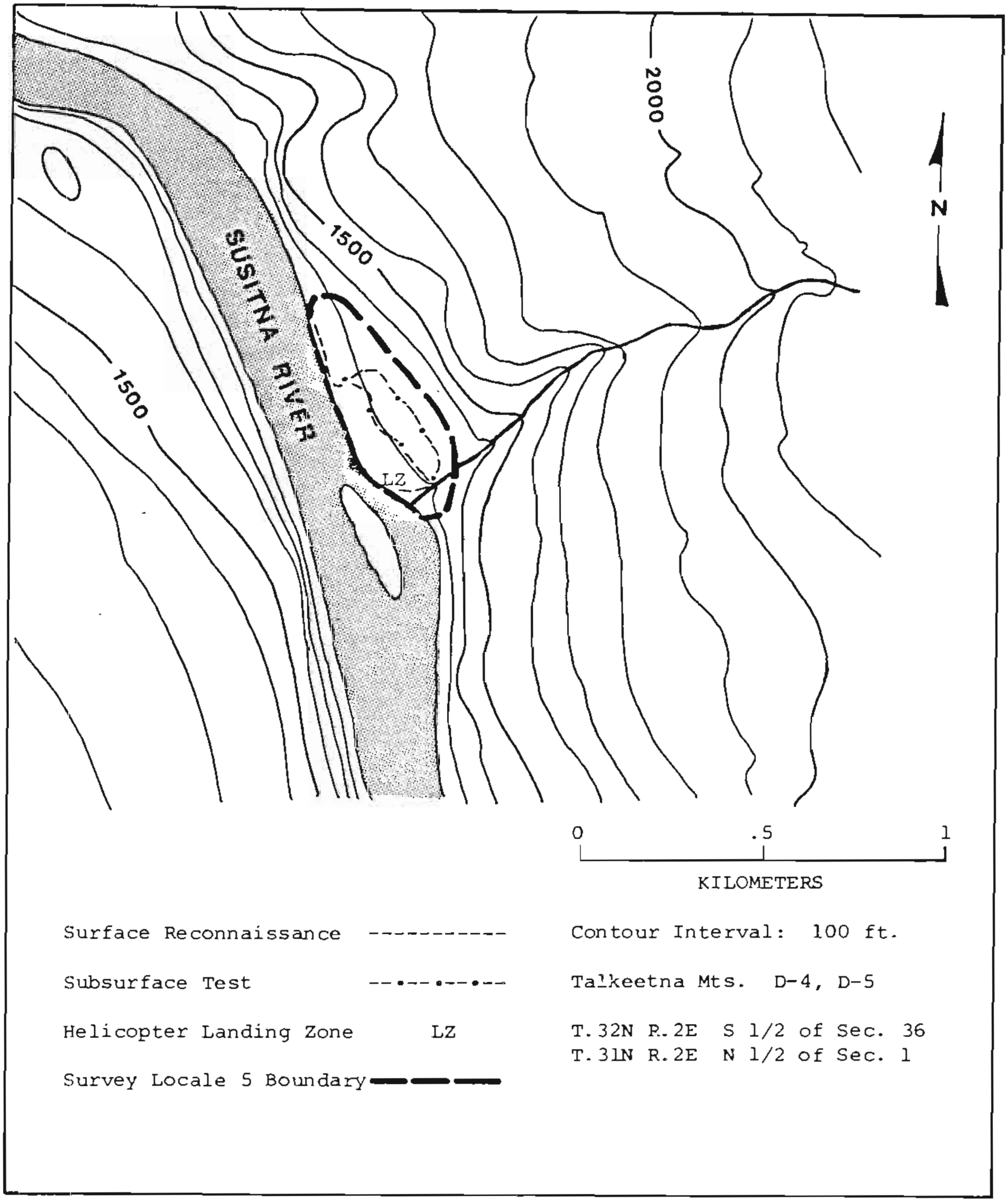


Figure 110.

Surface reconnaissance and subsurface testing in survey locale 5.

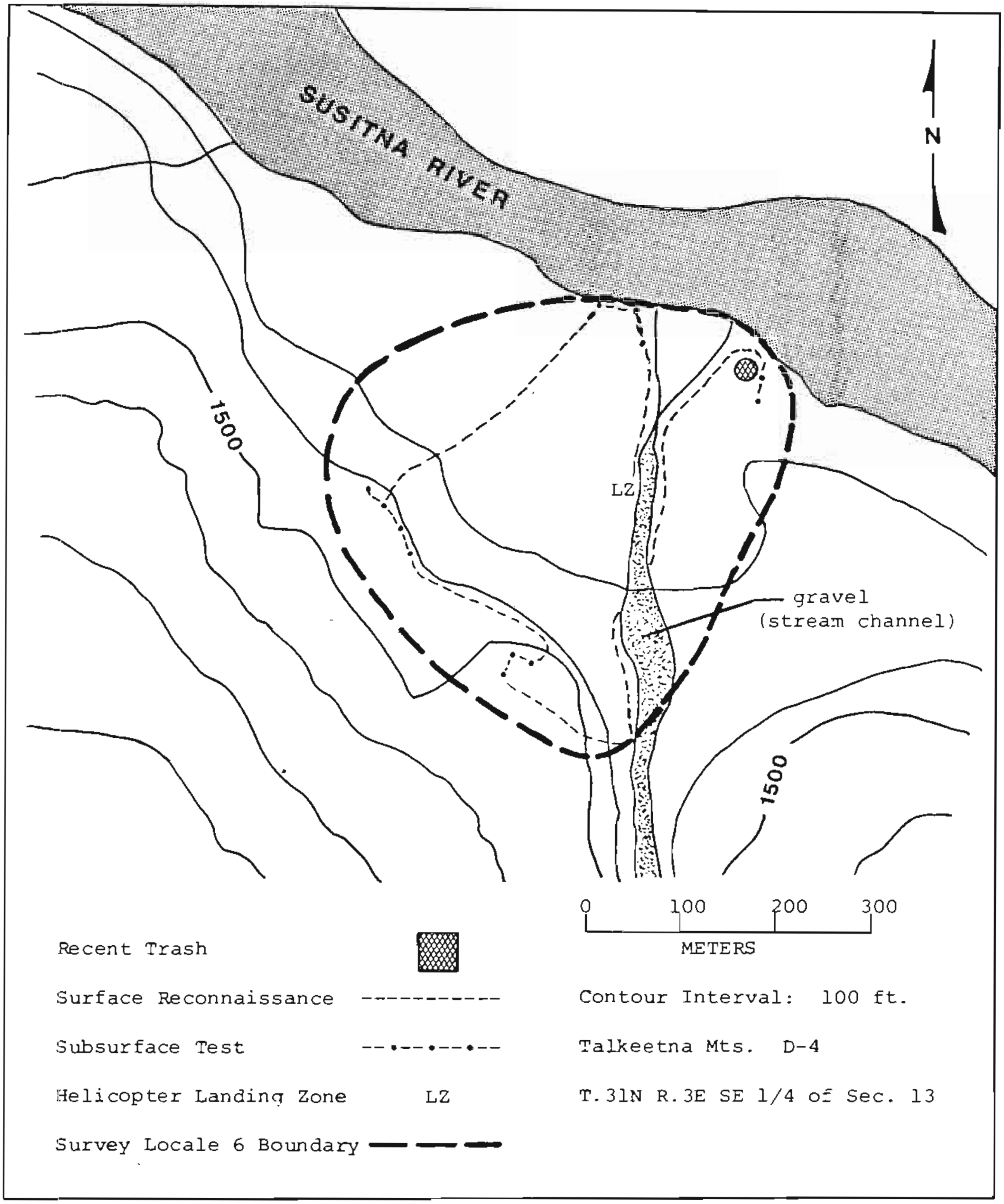


Figure 111.

Surface reconnaissance and subsurface testing in survey locale 6.

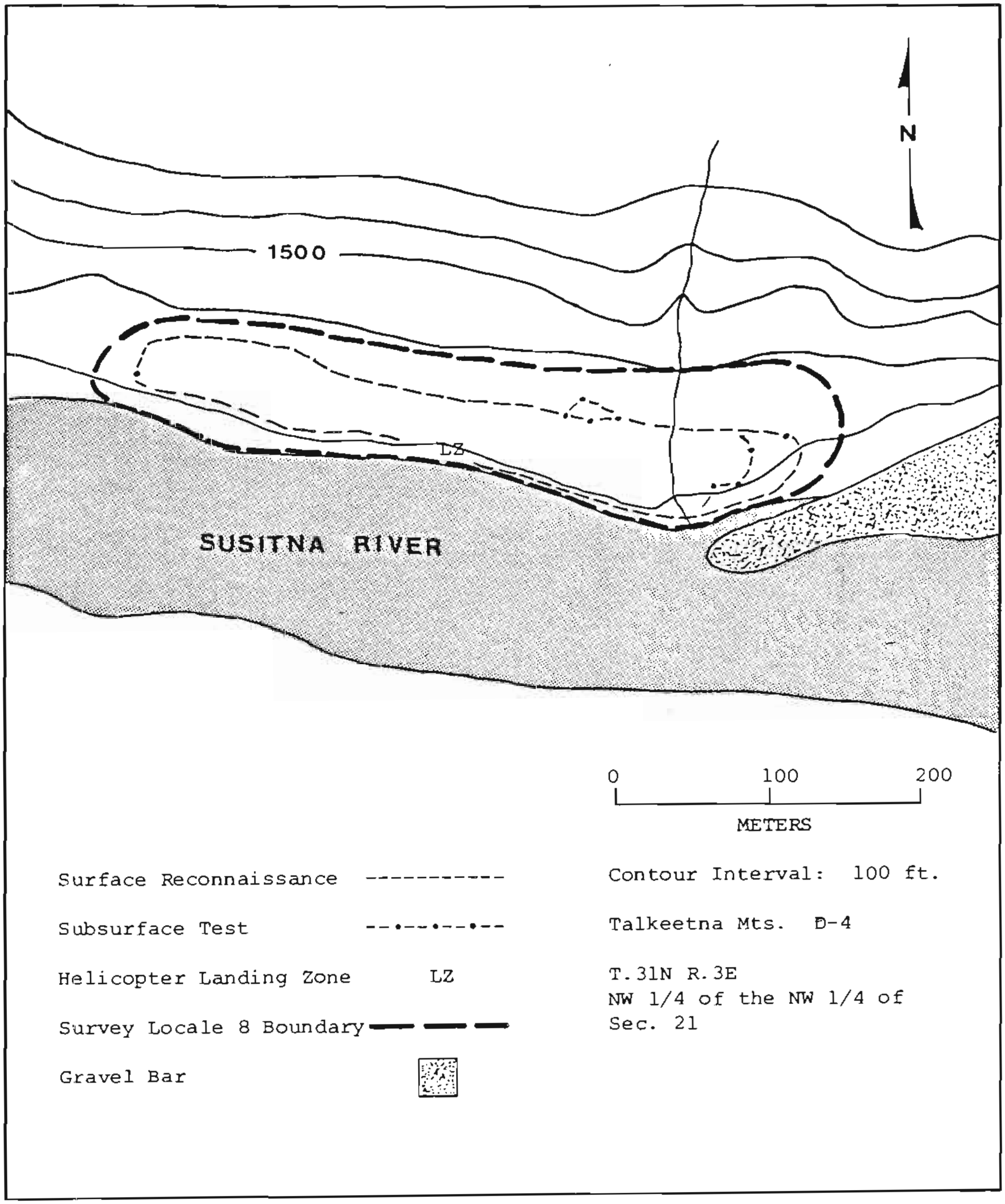


Figure 112.

Surface reconnaissance and subsurface testing in survey locale 8.

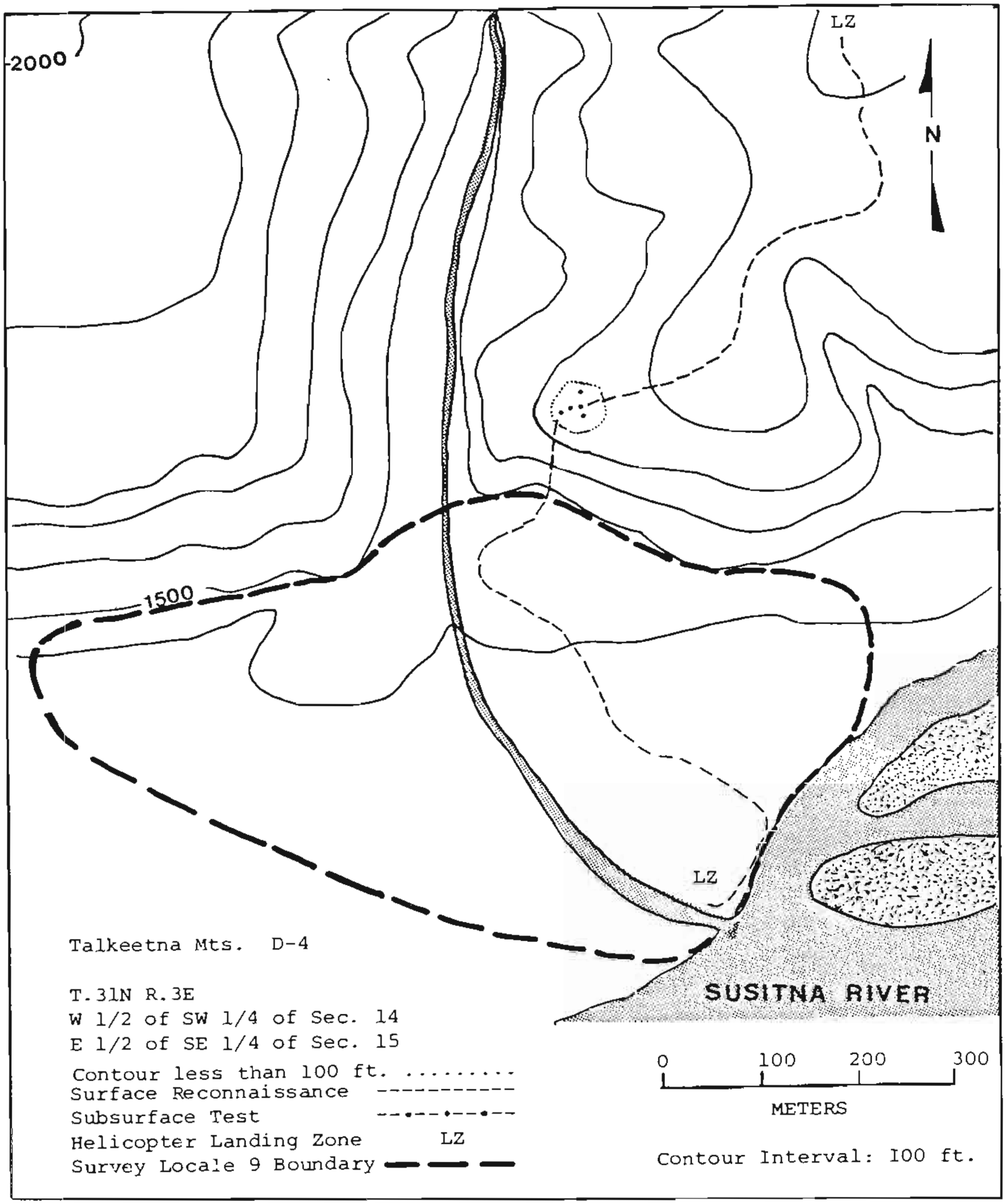


Figure 113.

Surface reconnaissance and subsurface testing in survey locale 9.

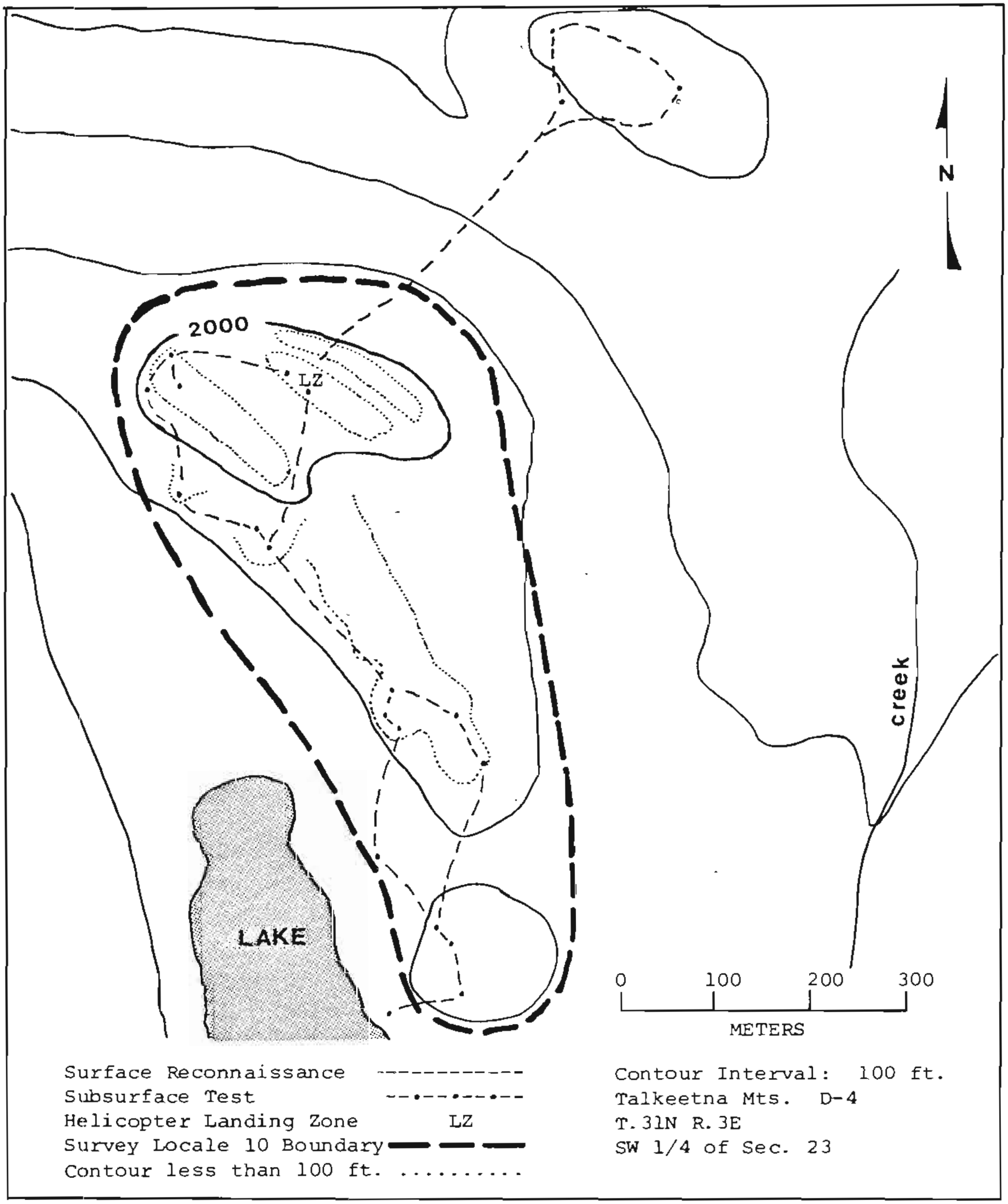


Figure 114.

Surface reconnaissance and subsurface testing in survey locale 10.

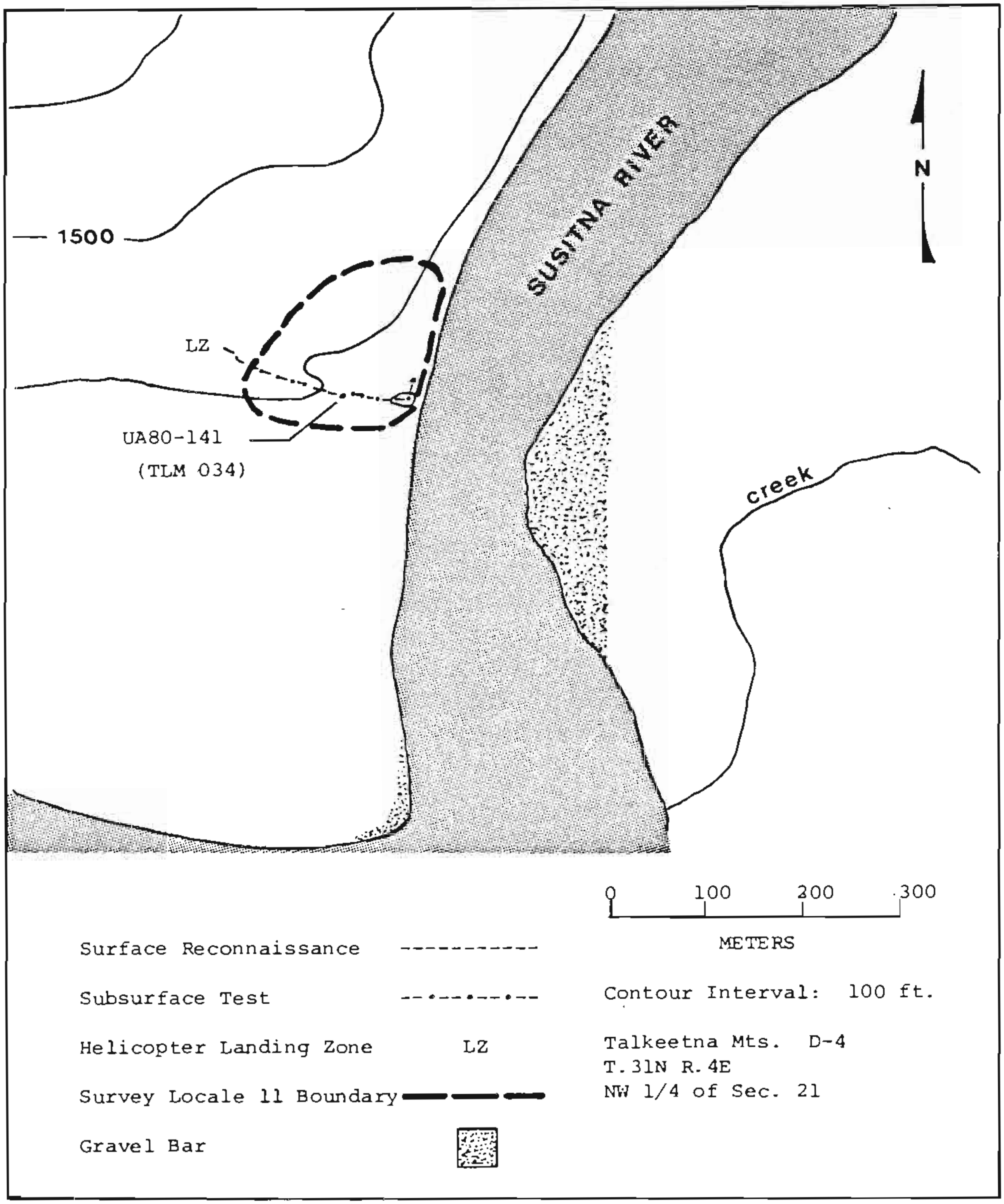


Figure 115.

Surface reconnaissance and subsurface testing in survey locale 11.

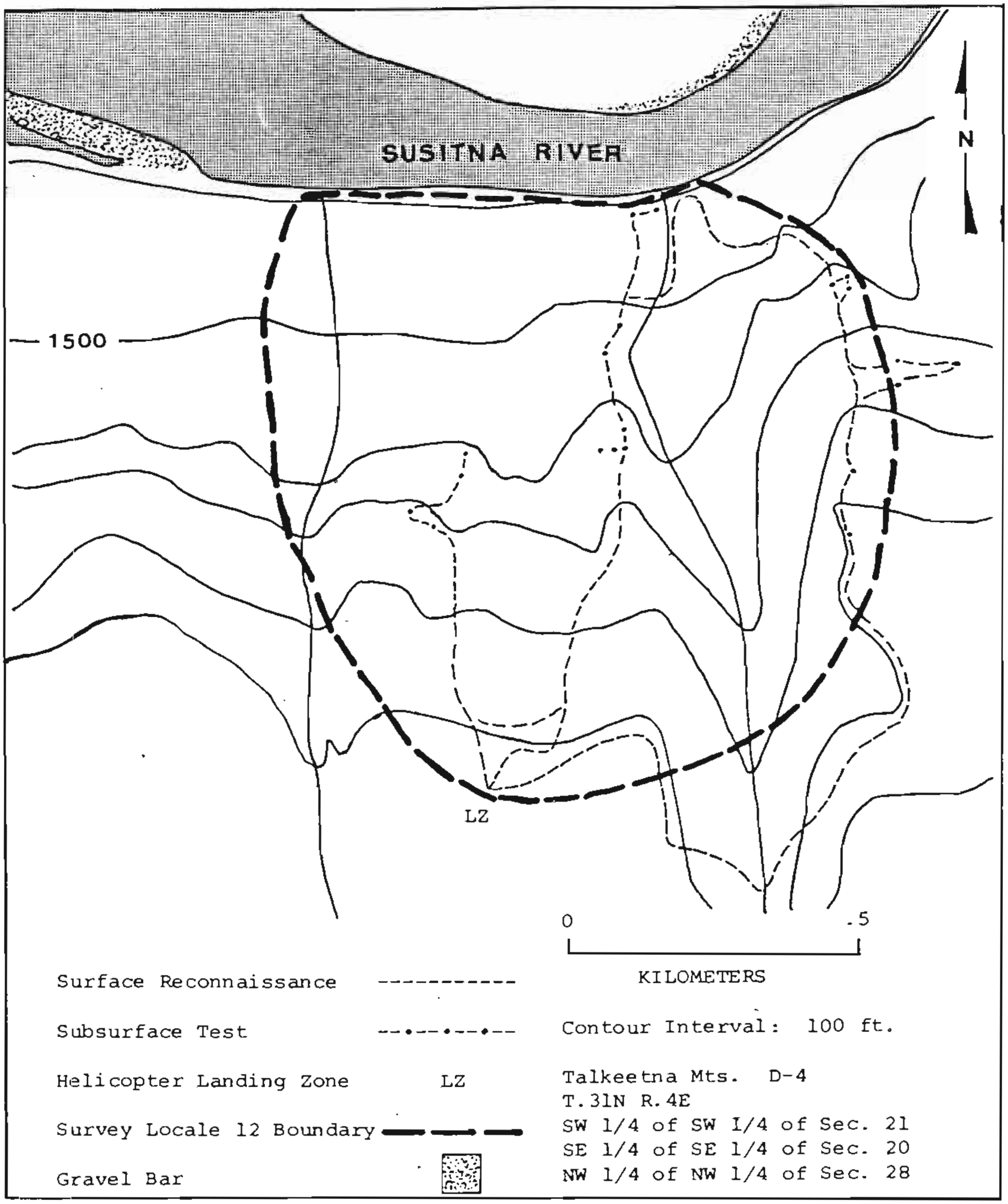


Figure 116.

Surface reconnaissance and subsurface testing in survey locale 12.

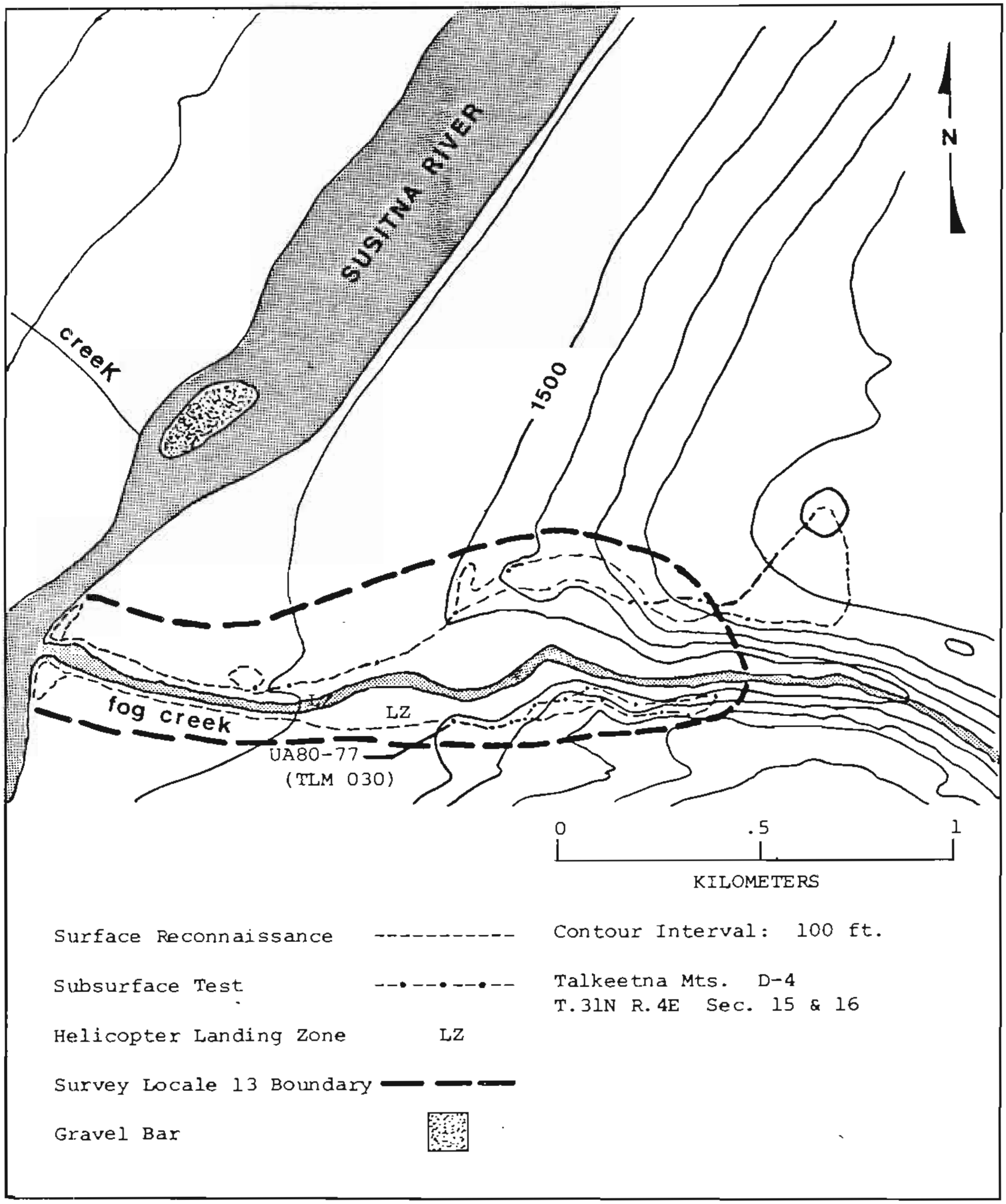


Figure 117.

Surface reconnaissance and subsurface testing in survey locale 13.

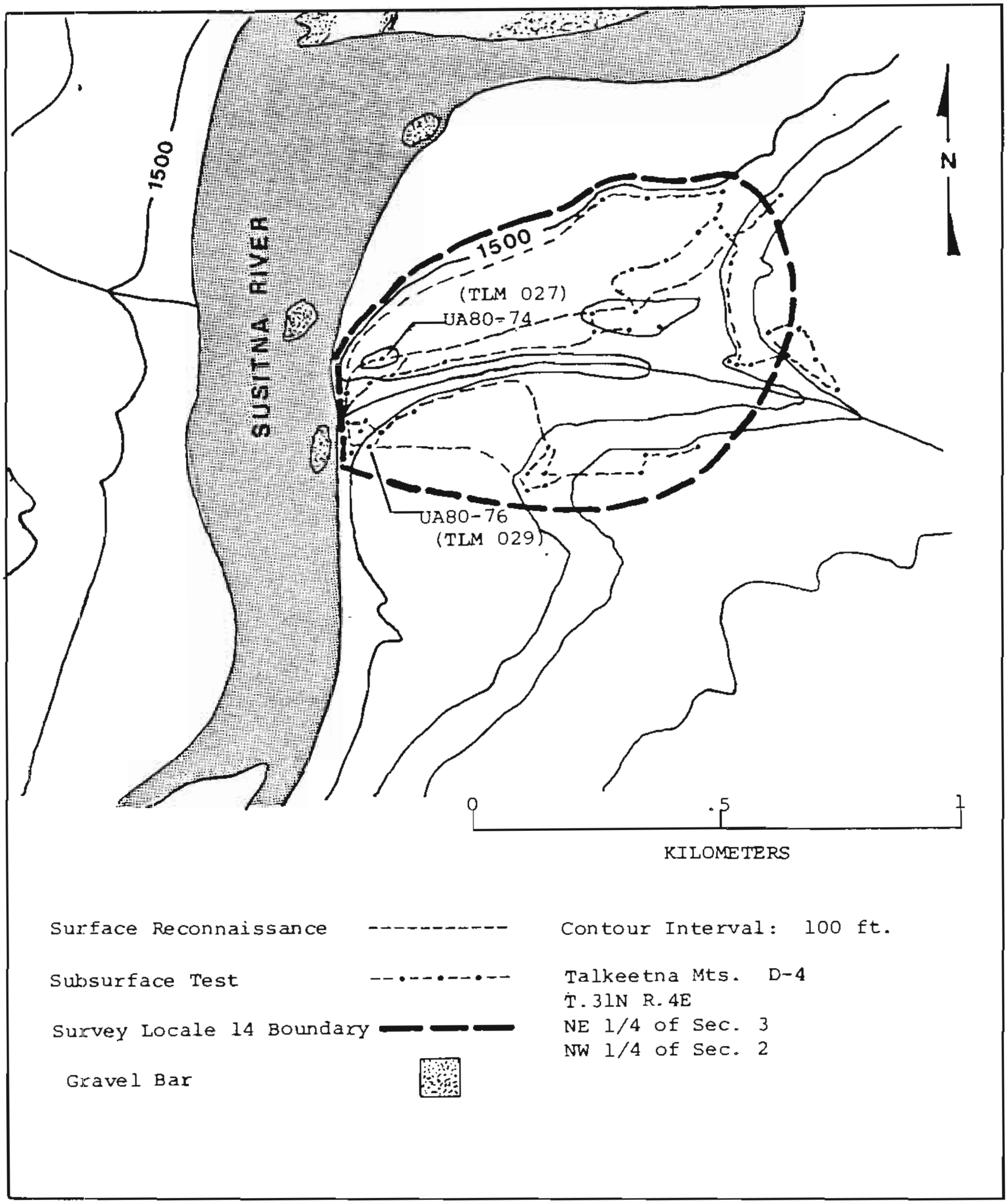


Figure 118.

Surface reconnaissance and subsurface testing in survey locale 14.

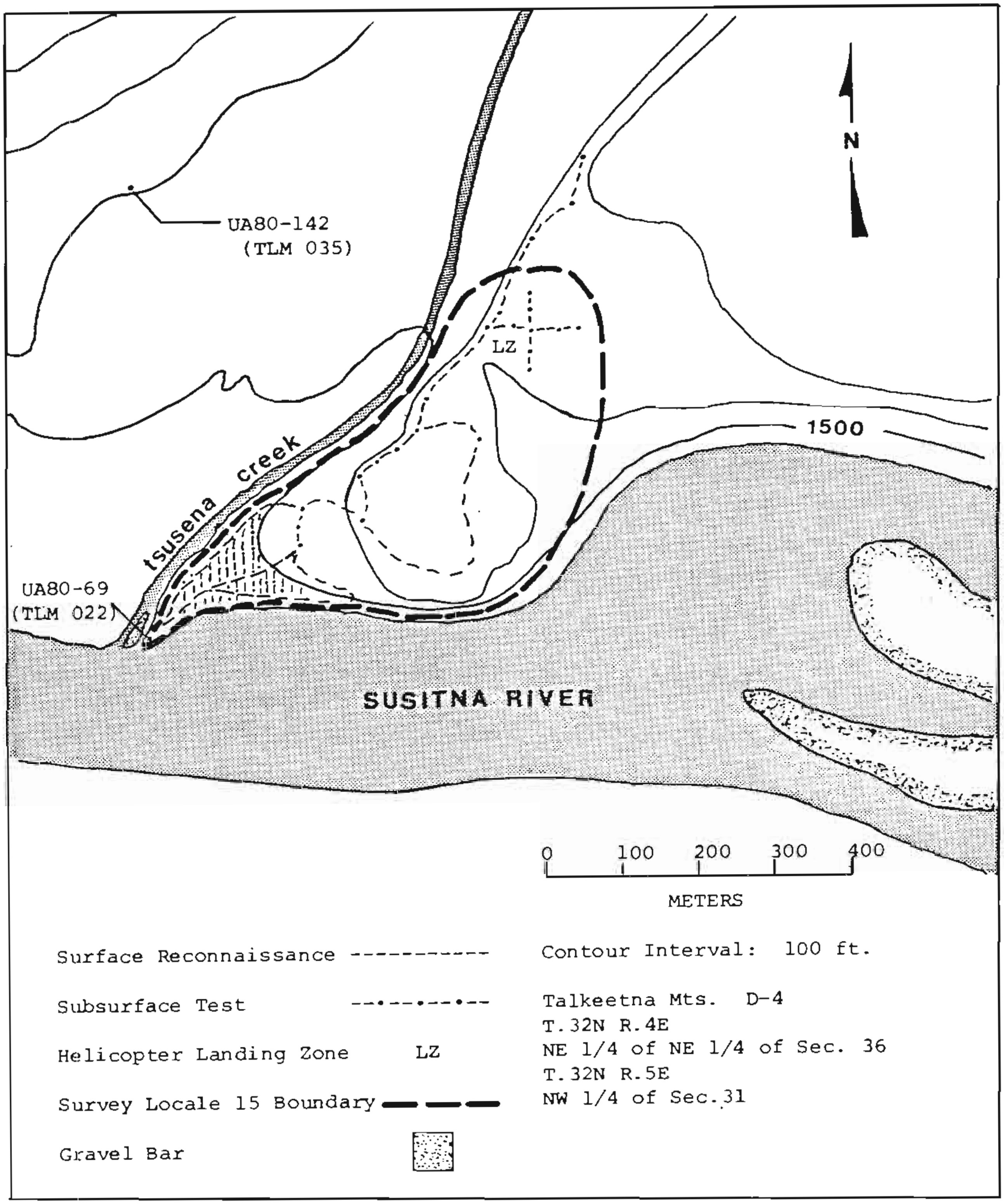


Figure 119.

Surface reconnaissance and subsurface testing in survey locale 15.

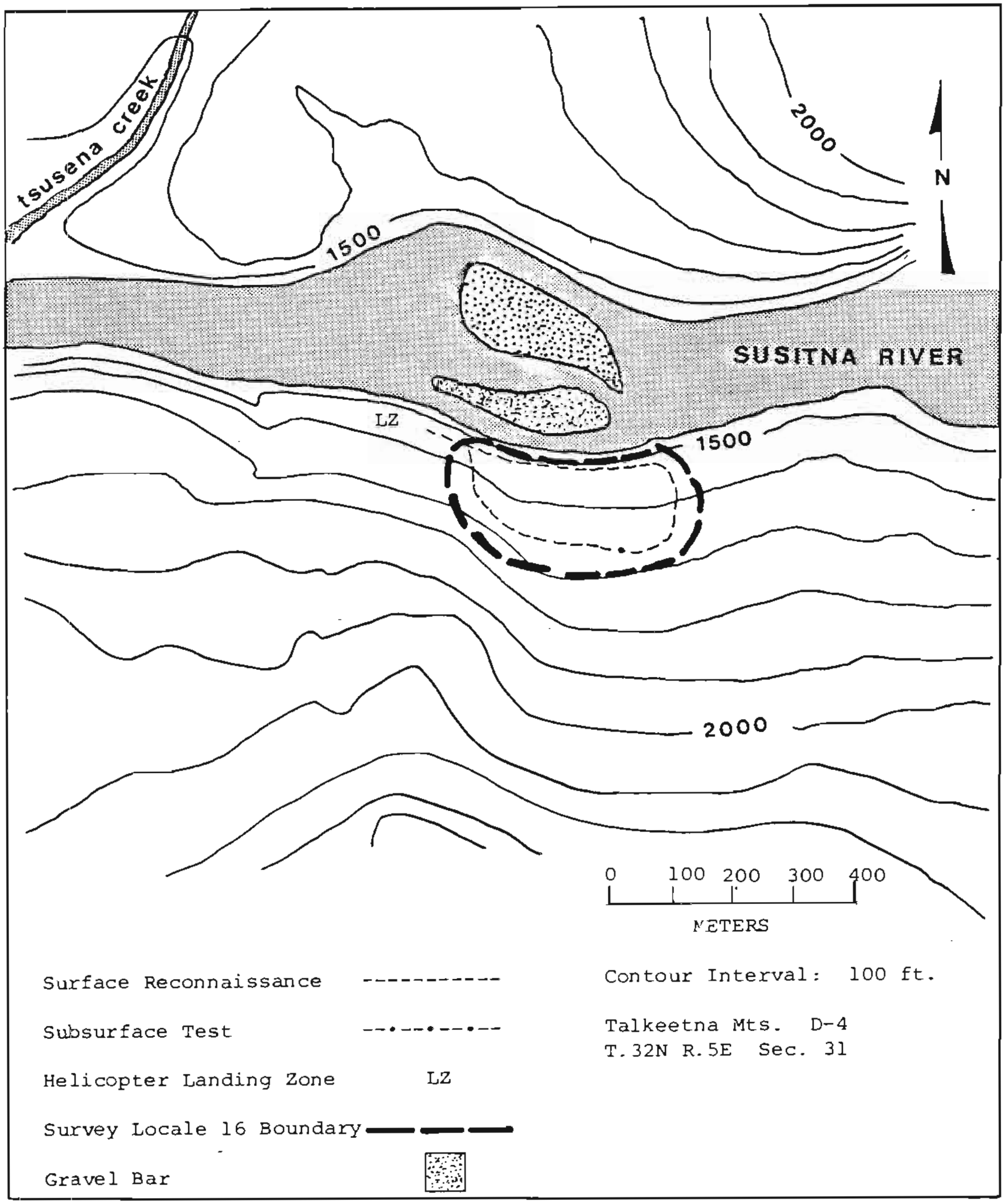


Figure 120.

Surface reconnaissance and subsurface testing in survey locale 16.

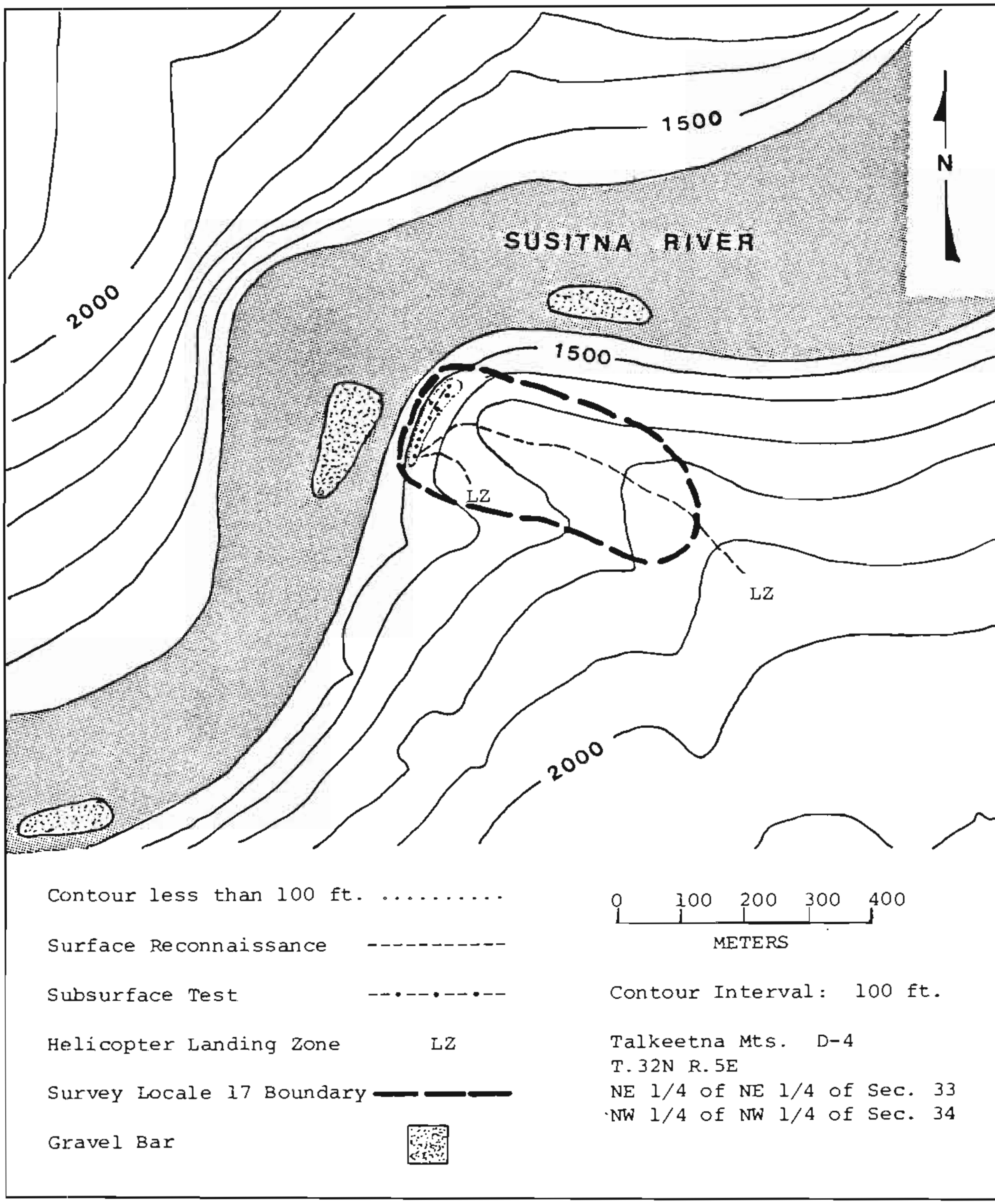


Figure 121.

Surface reconnaissance and subsurface testing in survey locale 17.

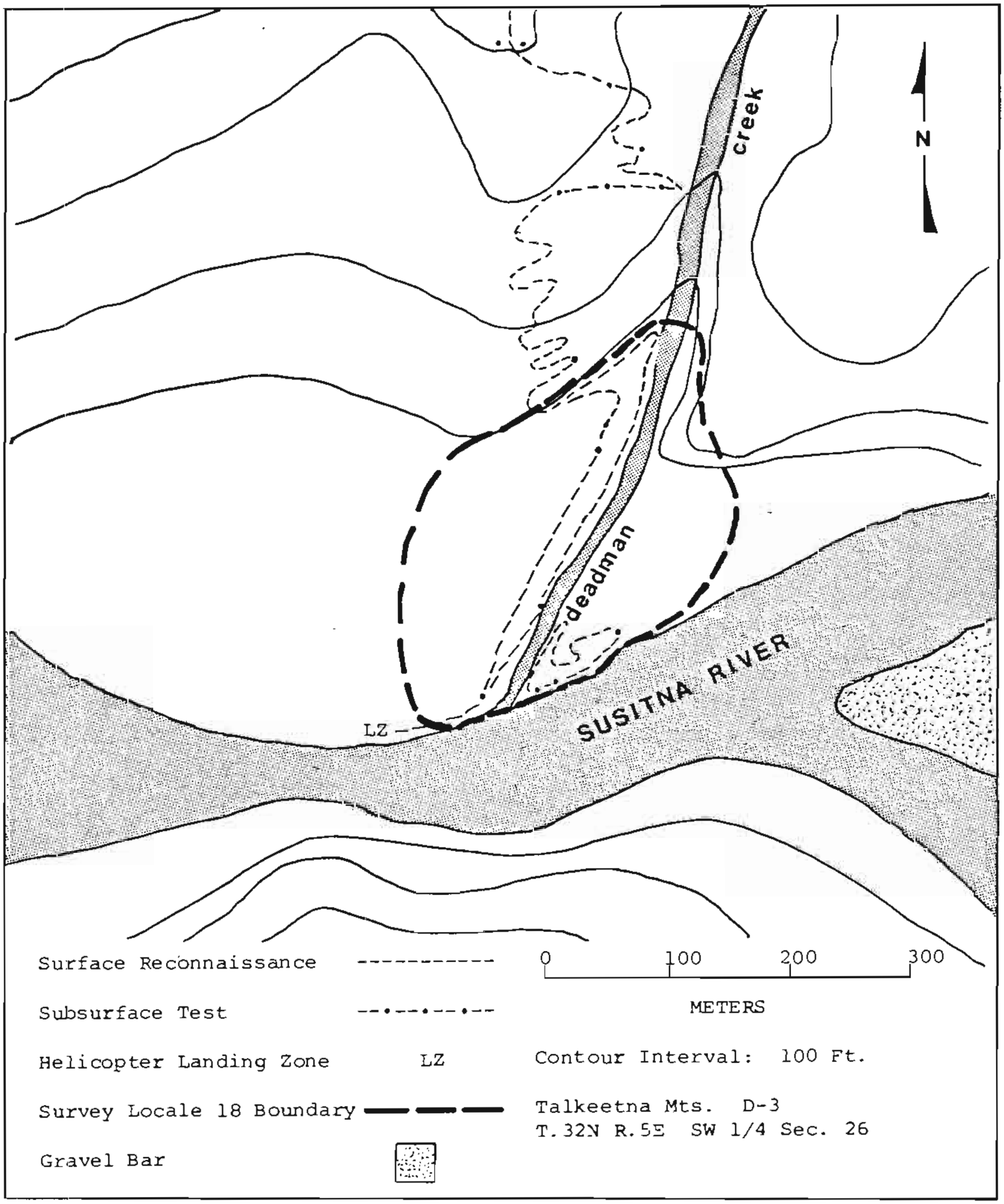


Figure 122.

Surface reconnaissance and subsurface testing in survey locale 18.

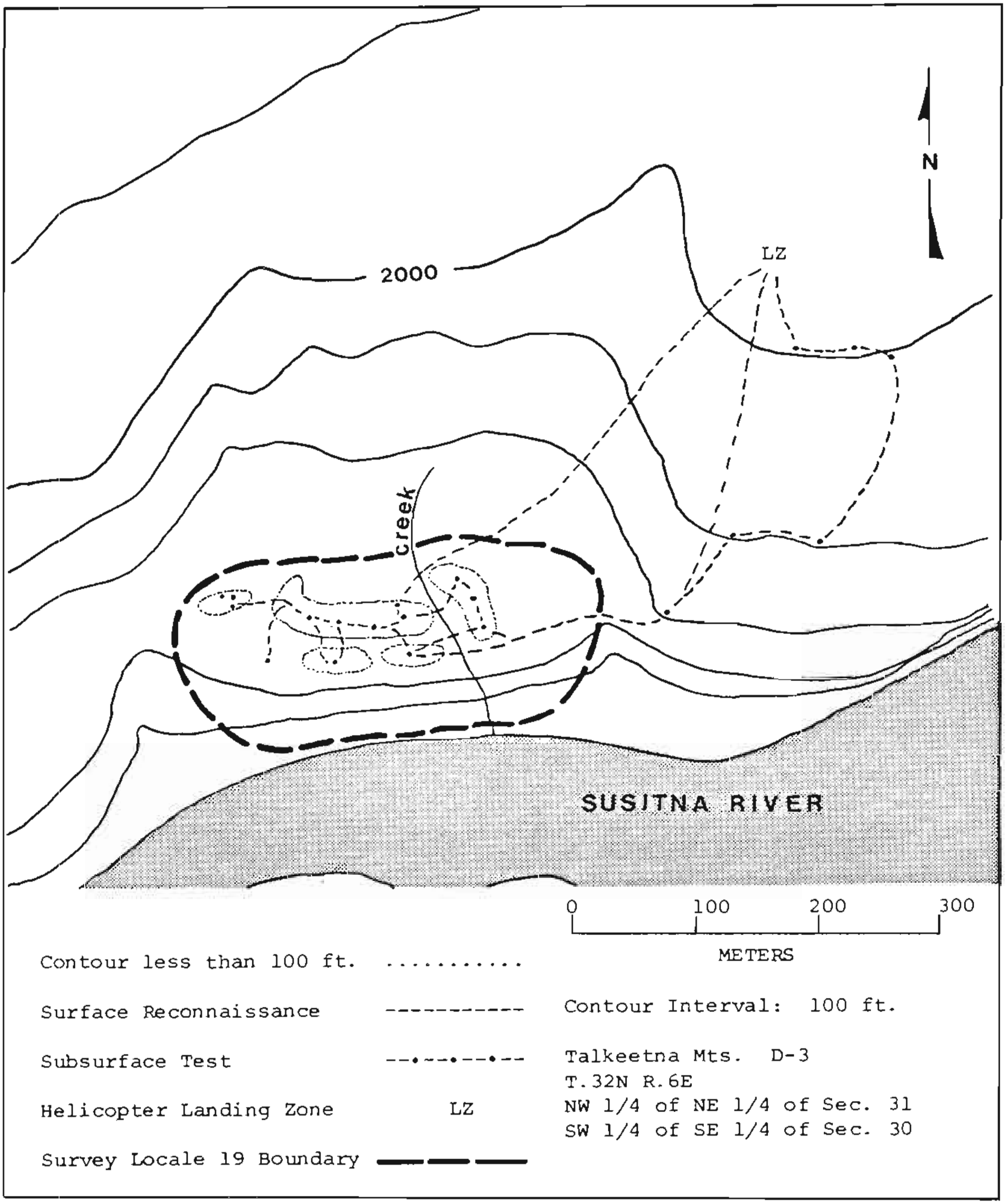


Figure 123.

Surface reconnaissance and subsurface testing in survey locale 19.

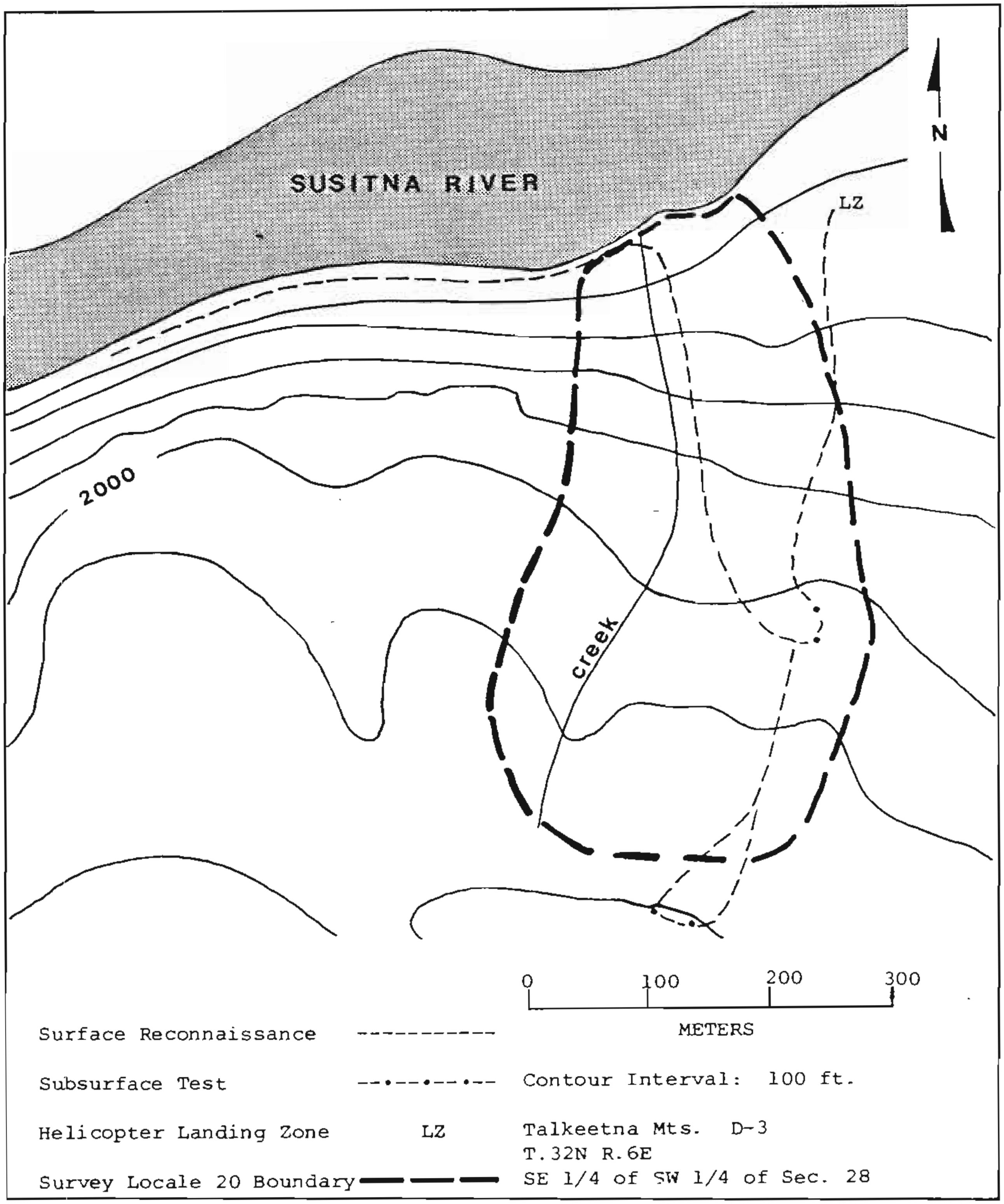


Figure 124.

Surface reconnaissance and subsurface testing in survey locale 20.

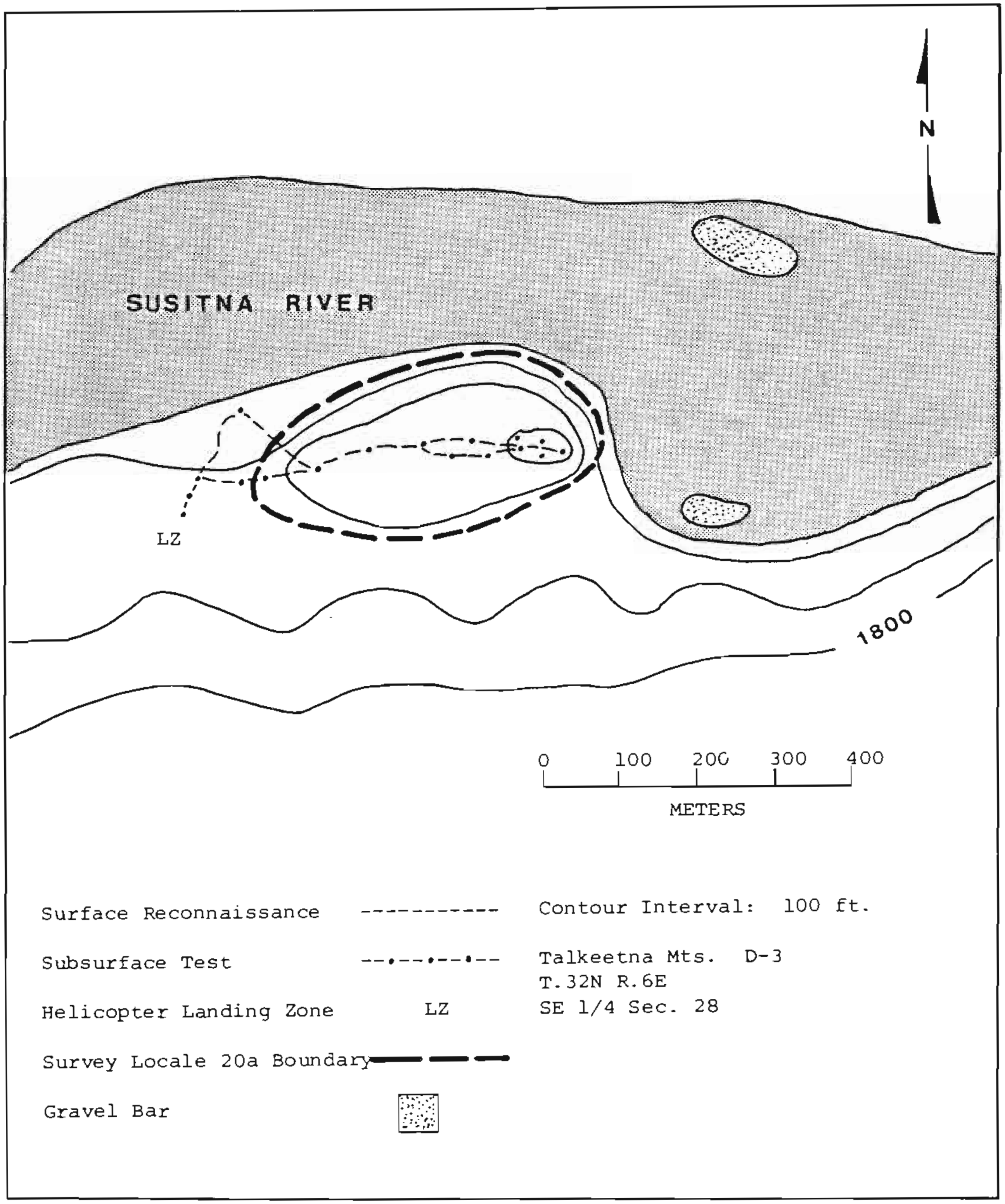


Figure 125.

Surface reconnaissance and subsurface testing in survey locale 20a.

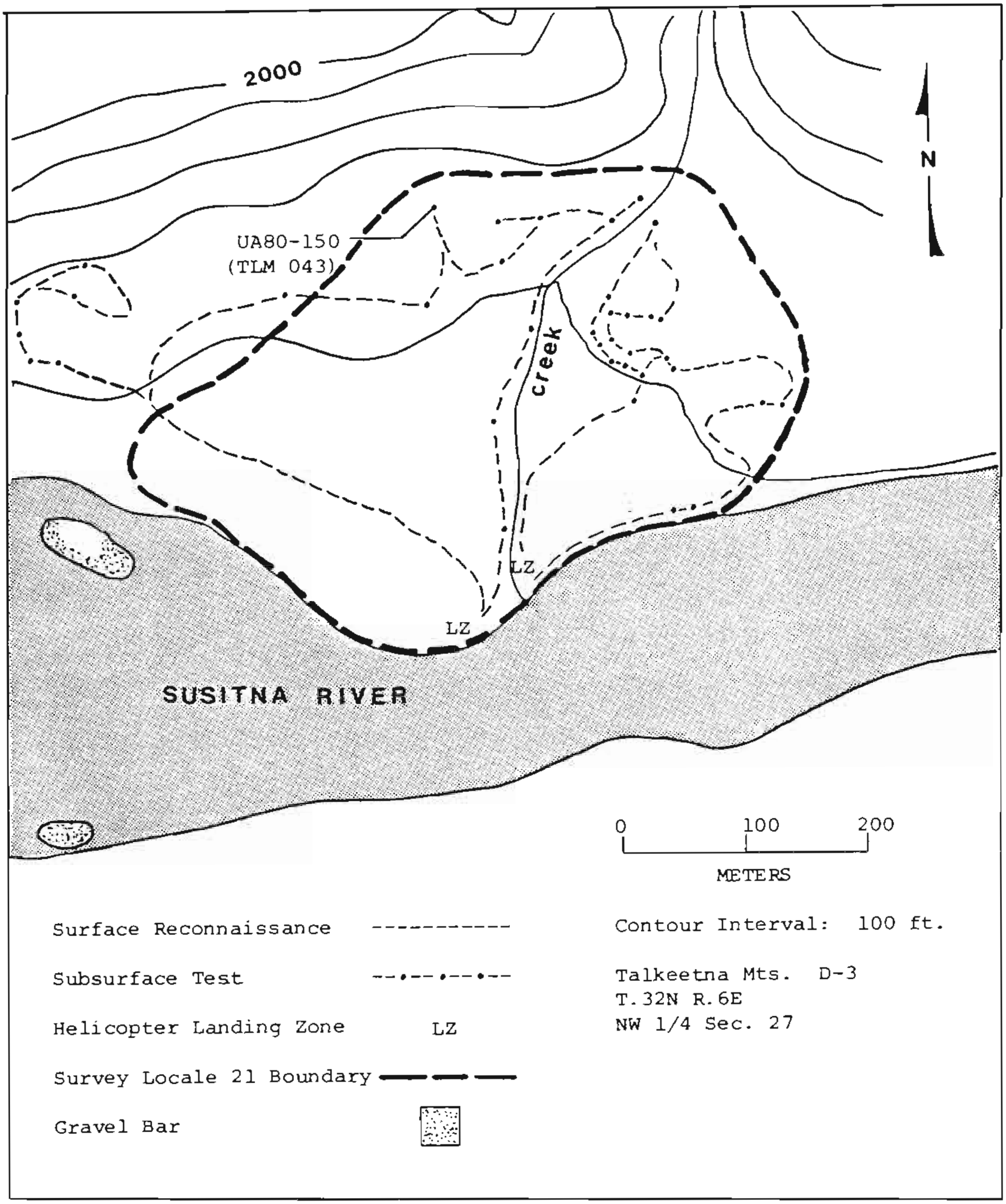


Figure 126.

Surface reconnaissance and subsurface testing in survey locale 21.

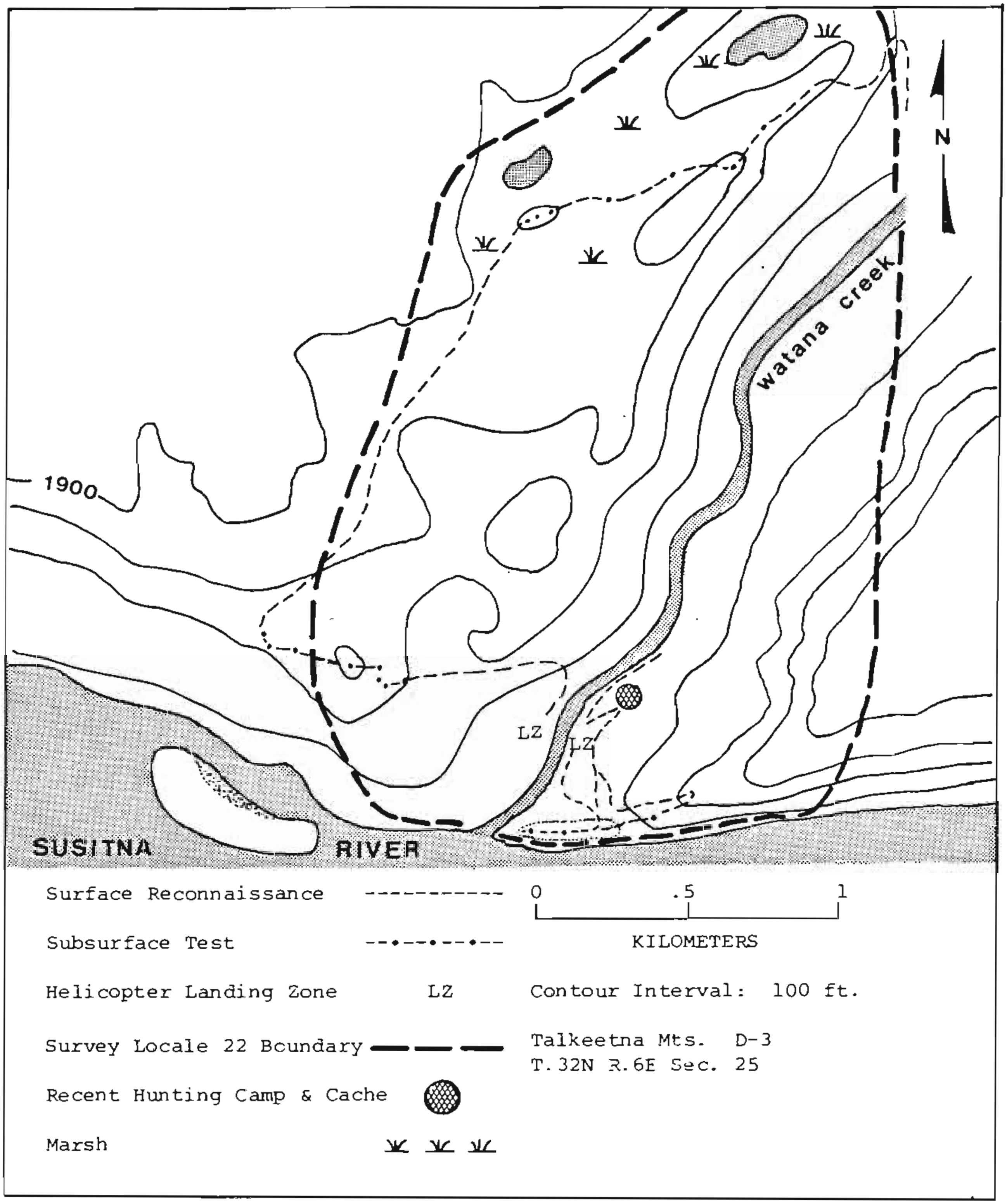


Figure 127.

Surface reconnaissance and subsurface testing in survey locale 22.

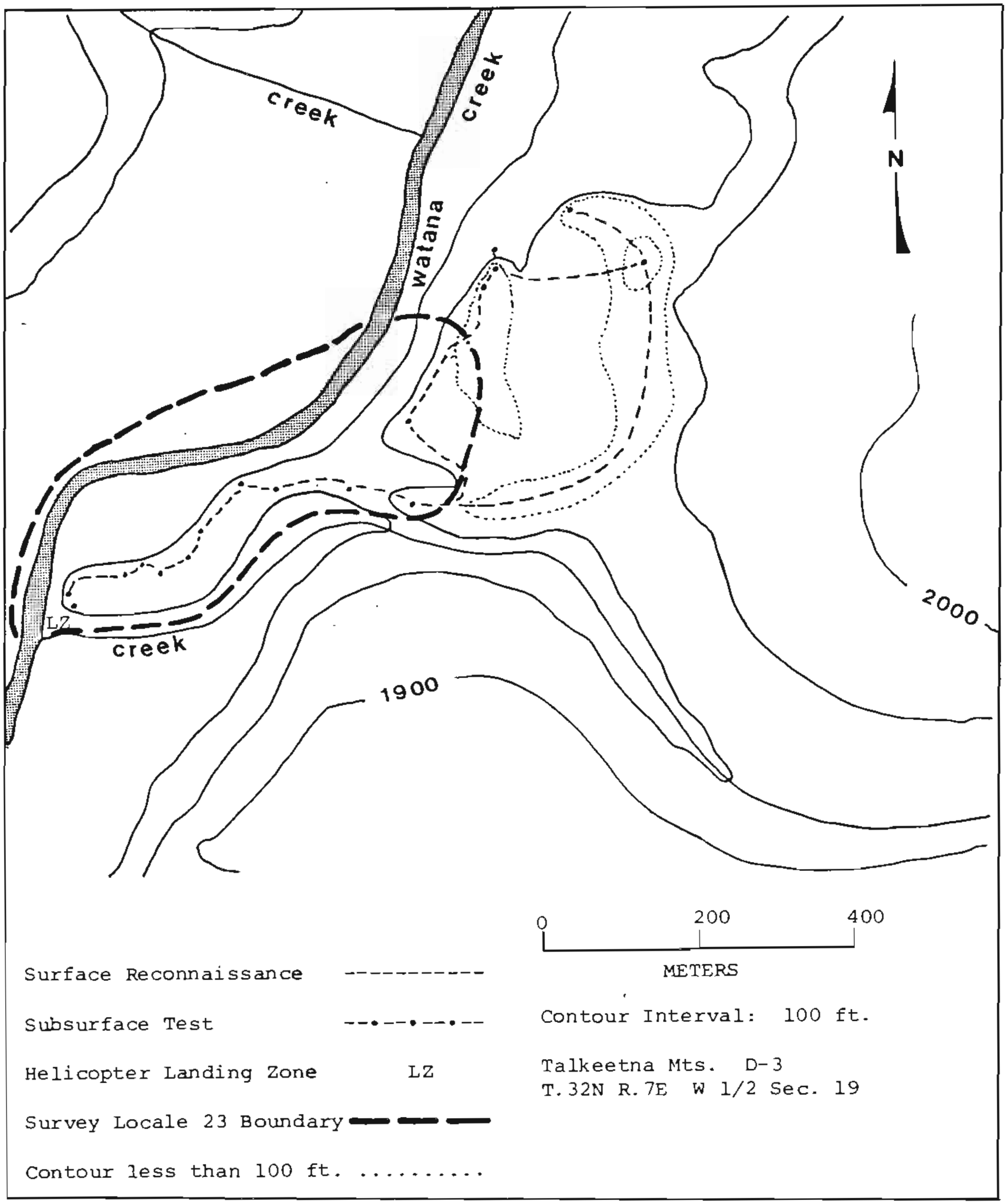


Figure 128.

Surface reconnaissance and subsurface testing in survey locale 23.

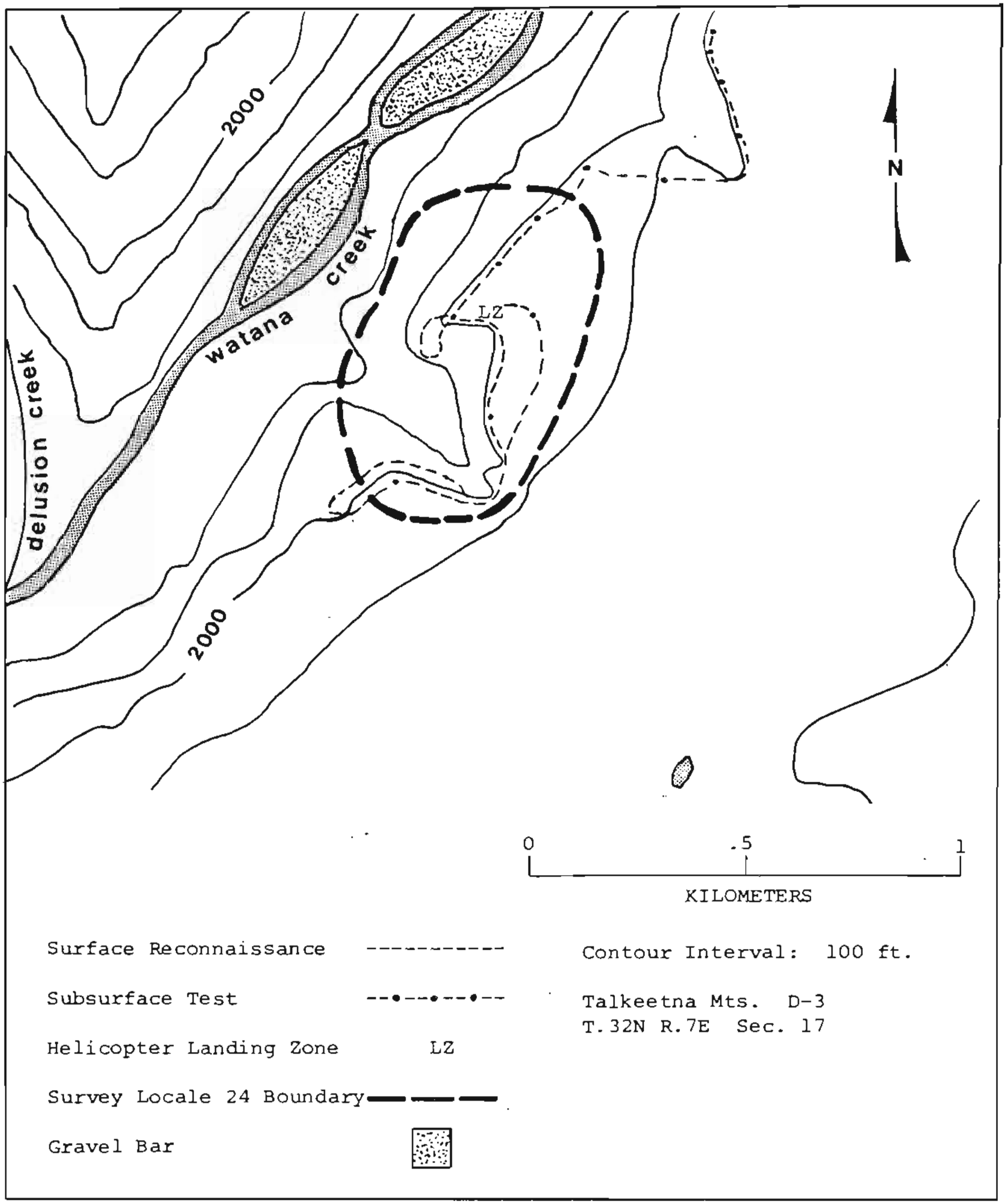


Figure 129.

Surface reconnaissance and subsurface testing in survey locale 24.

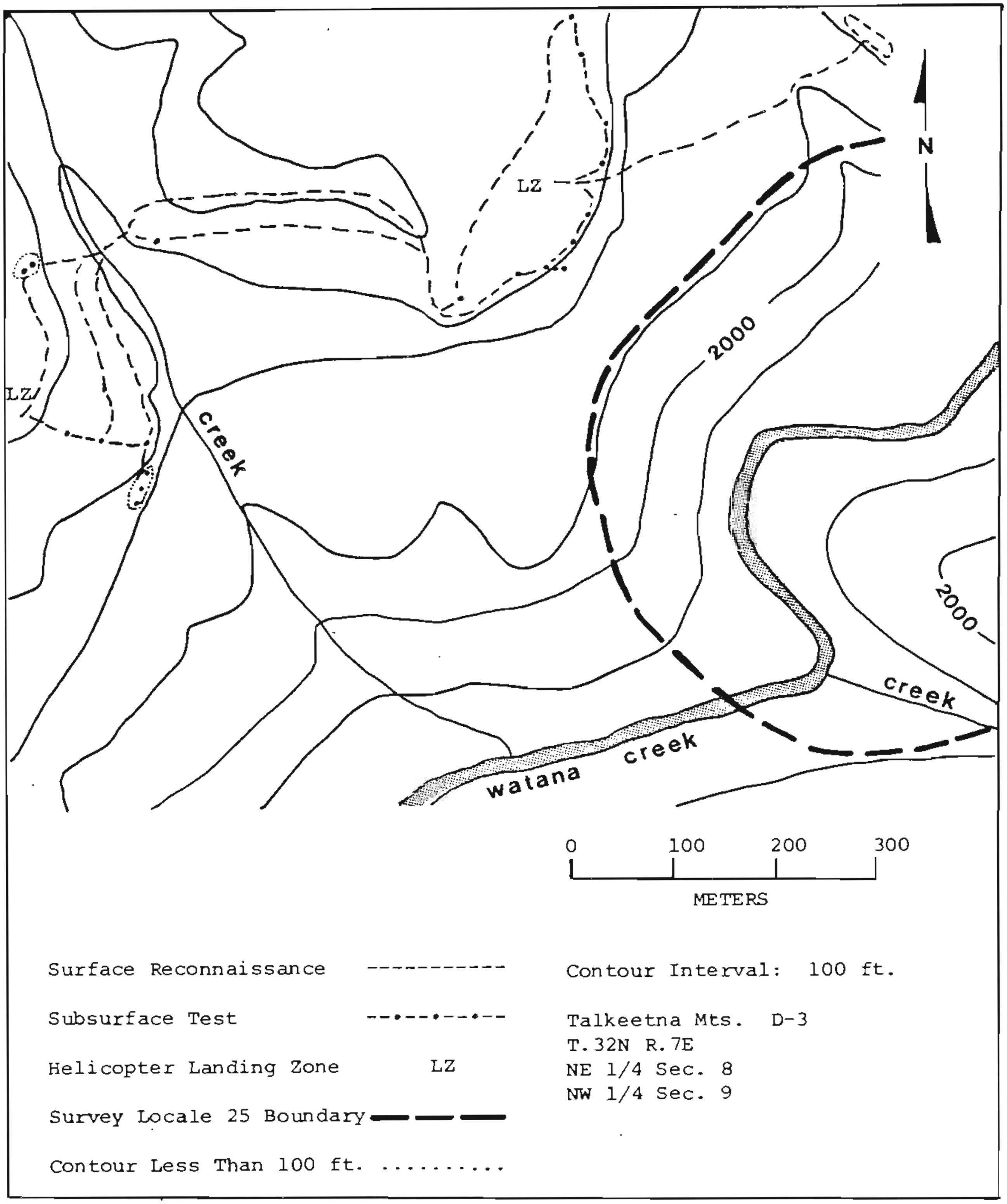


Figure 130.

Surface reconnaissance and subsurface testing in survey locale 25.

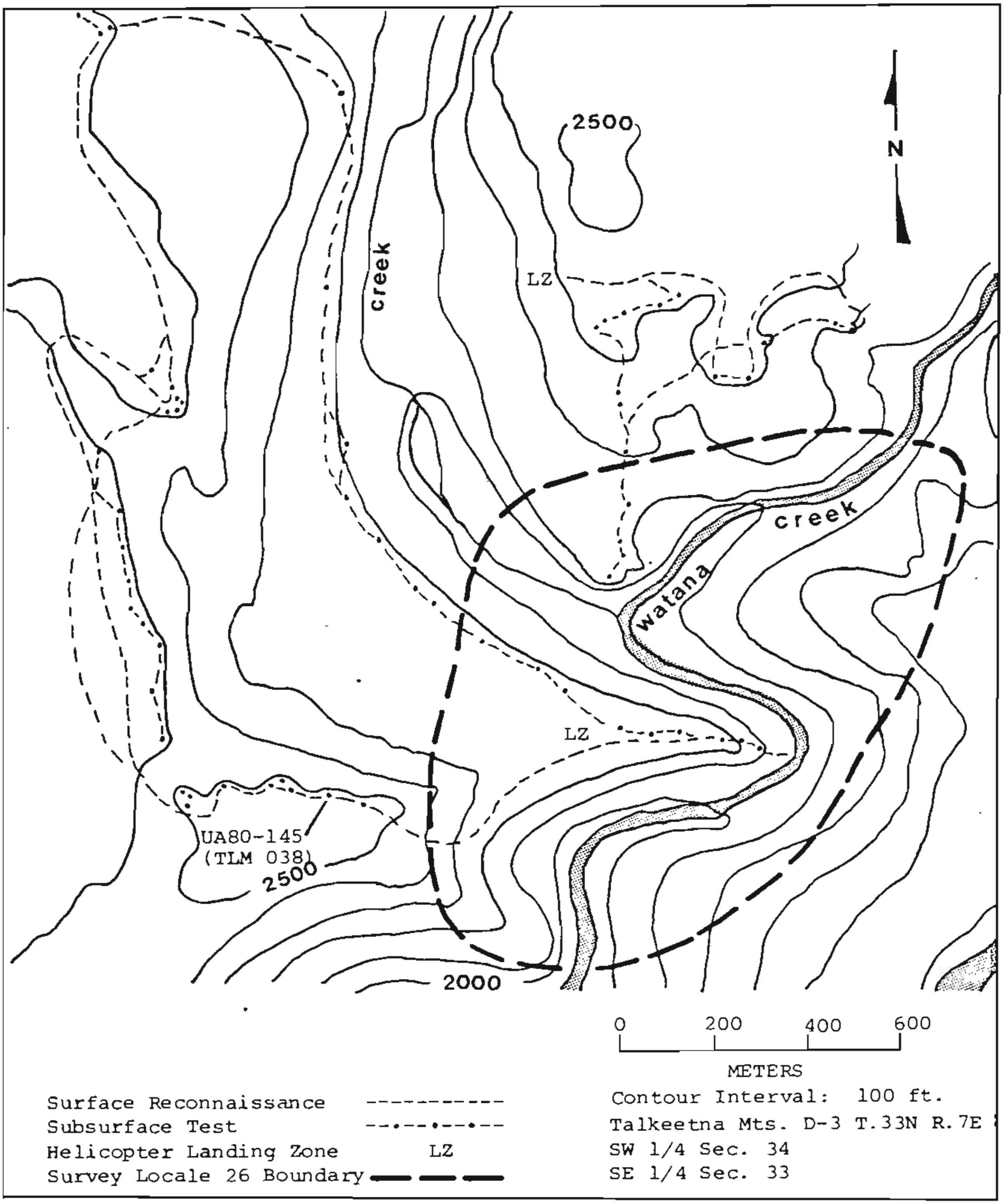


Figure 131.

Surface reconnaissance and subsurface testing in survey locale 26.

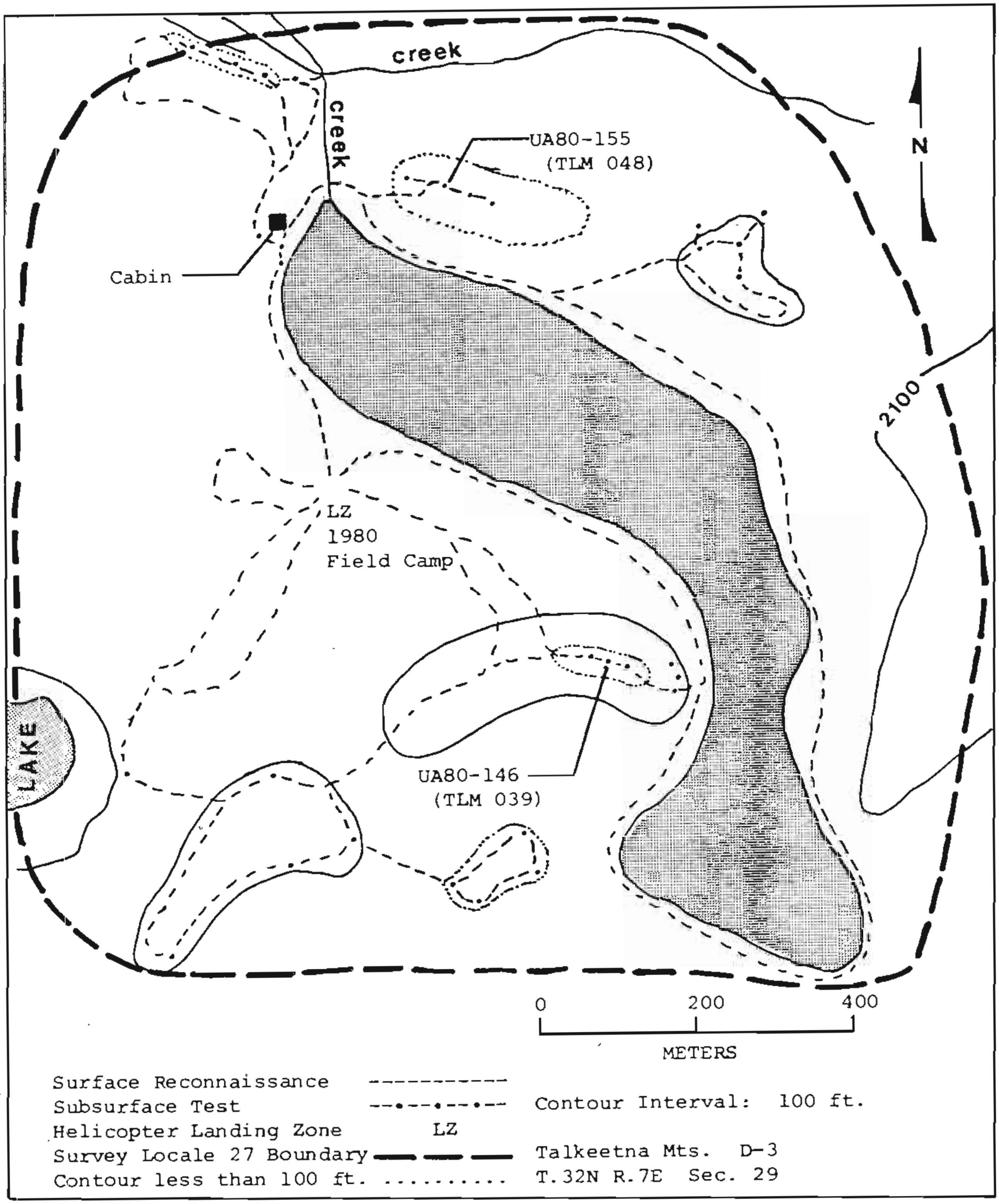


Figure 132.

Surface reconnaissance and subsurface testing in survey locale 27.

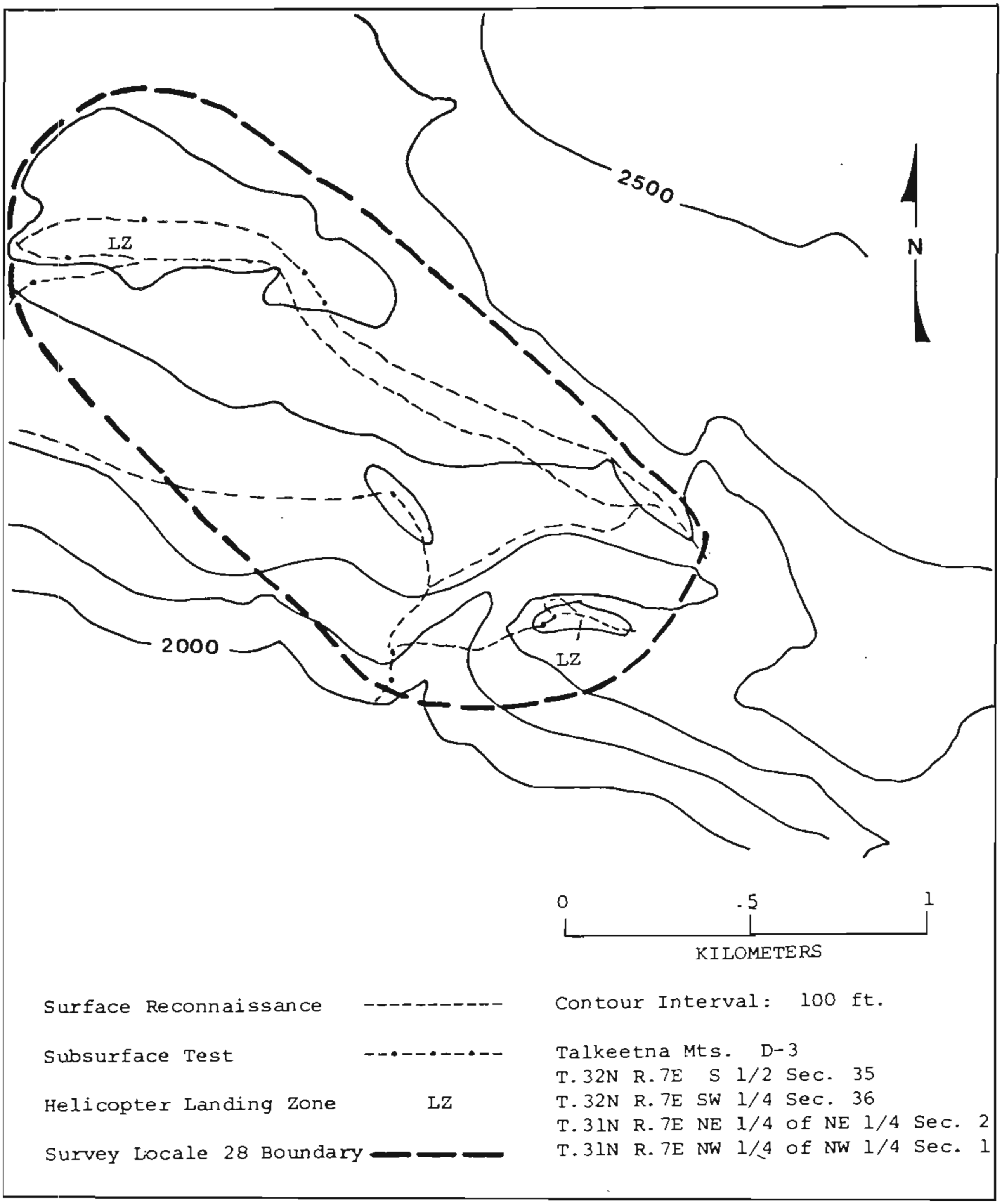


Figure 133.

Surface reconnaissance and subsurface testing in survey locale 28.

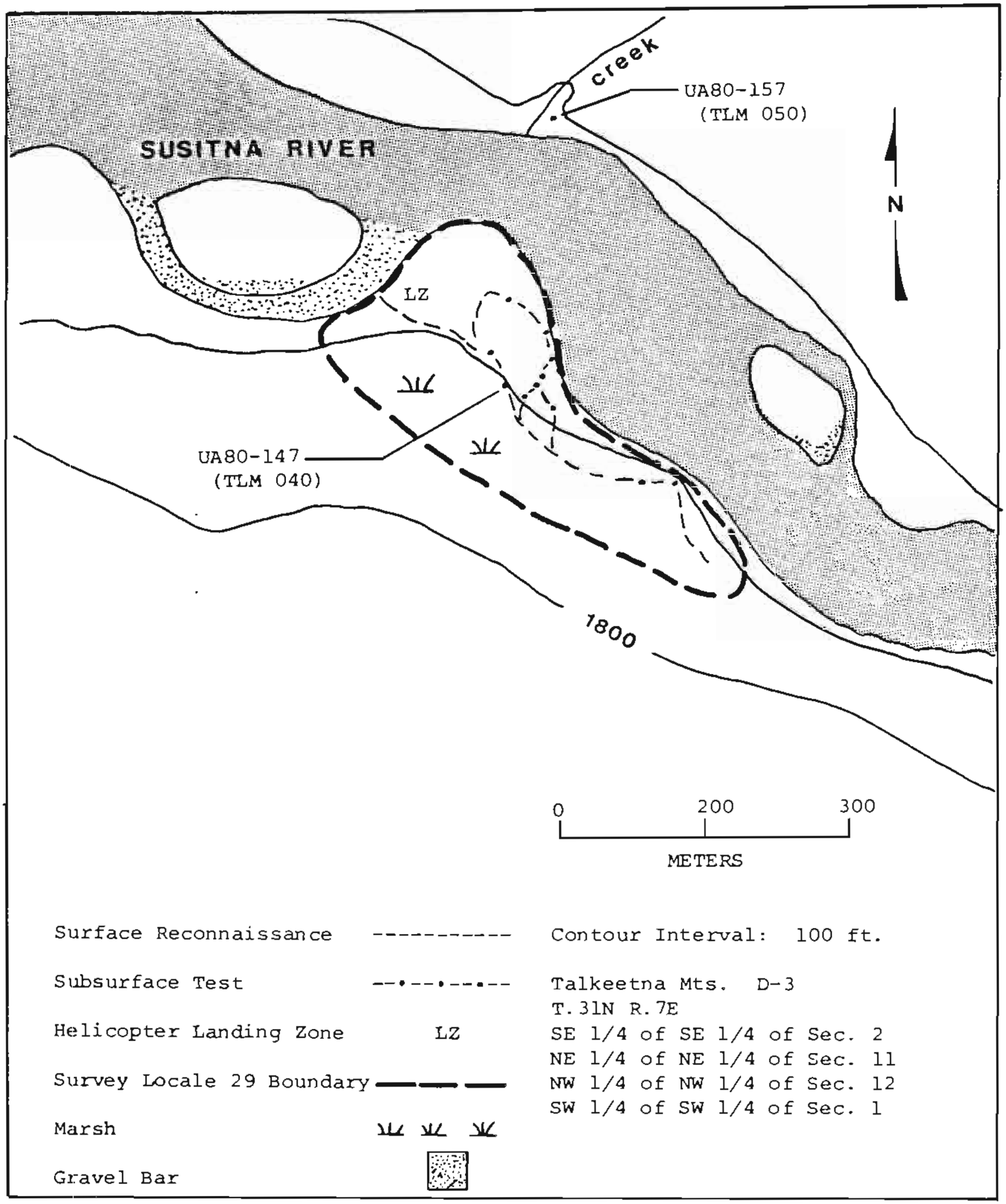


Figure 134.

Surface reconnaissance and subsurface testing in survey locale 29.

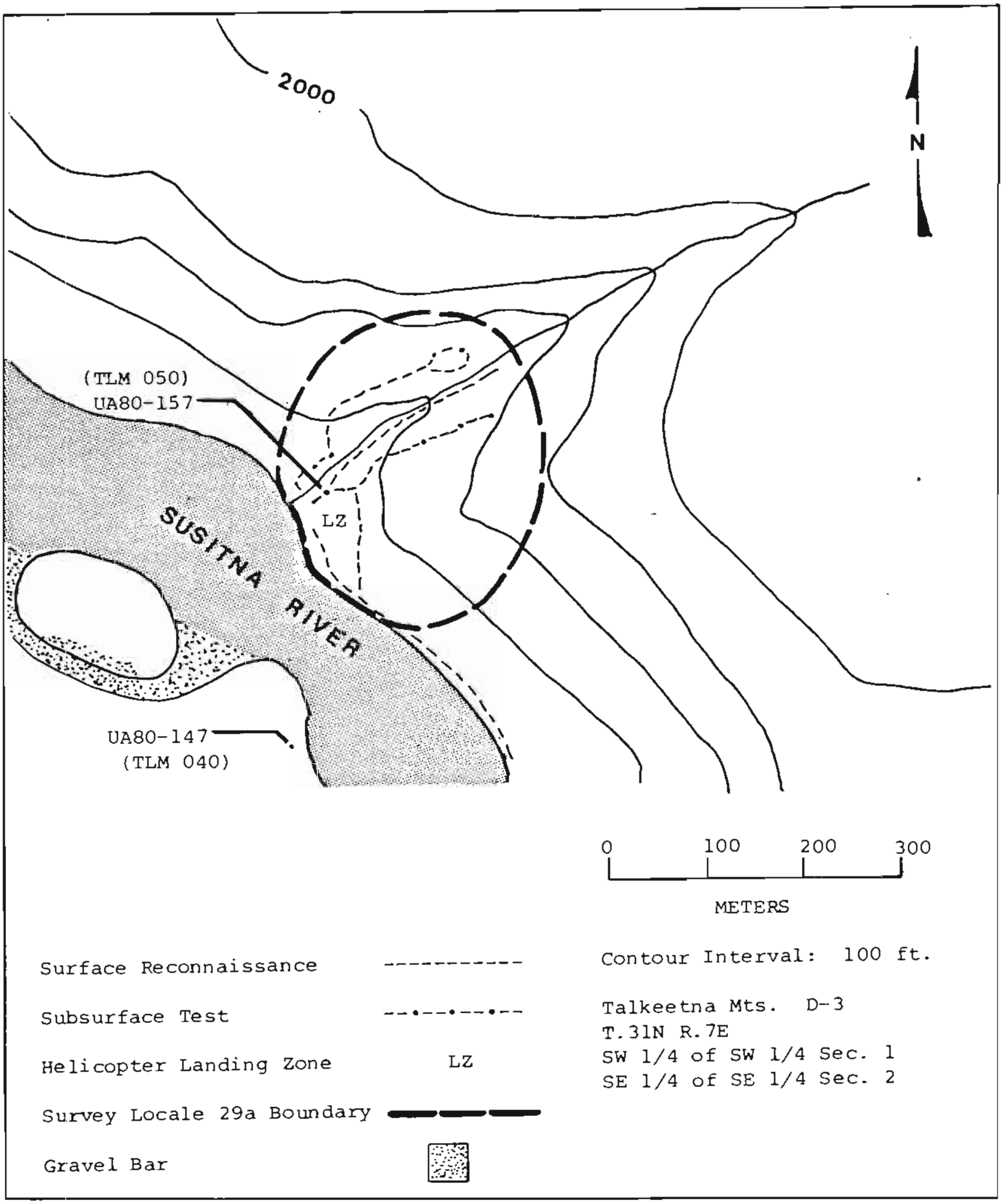


Figure 135.

Surface reconnaissance and subsurface testing in survey locale 29a.

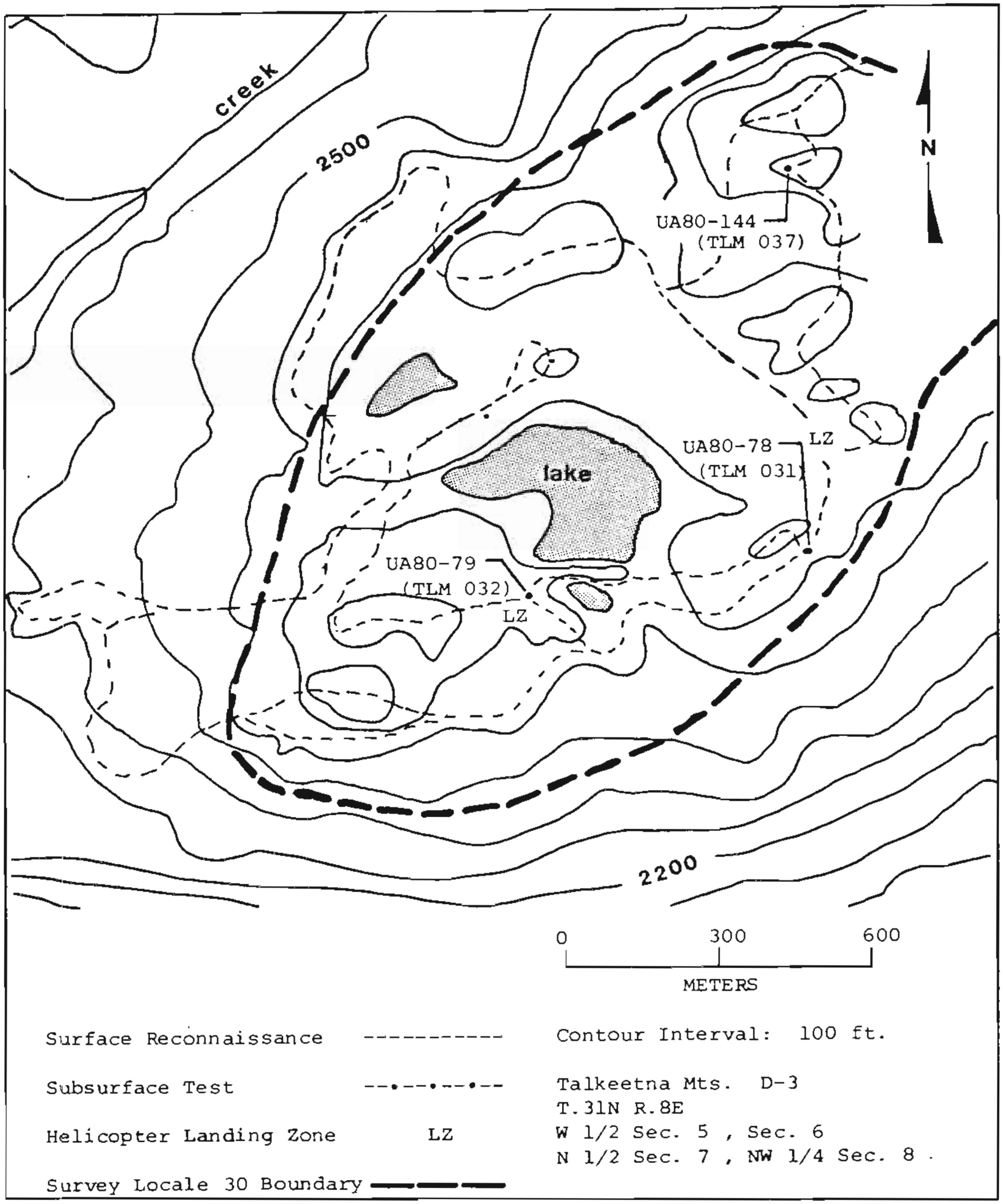


Figure 136.

Surface reconnaissance and subsurface testing in survey locale 30.

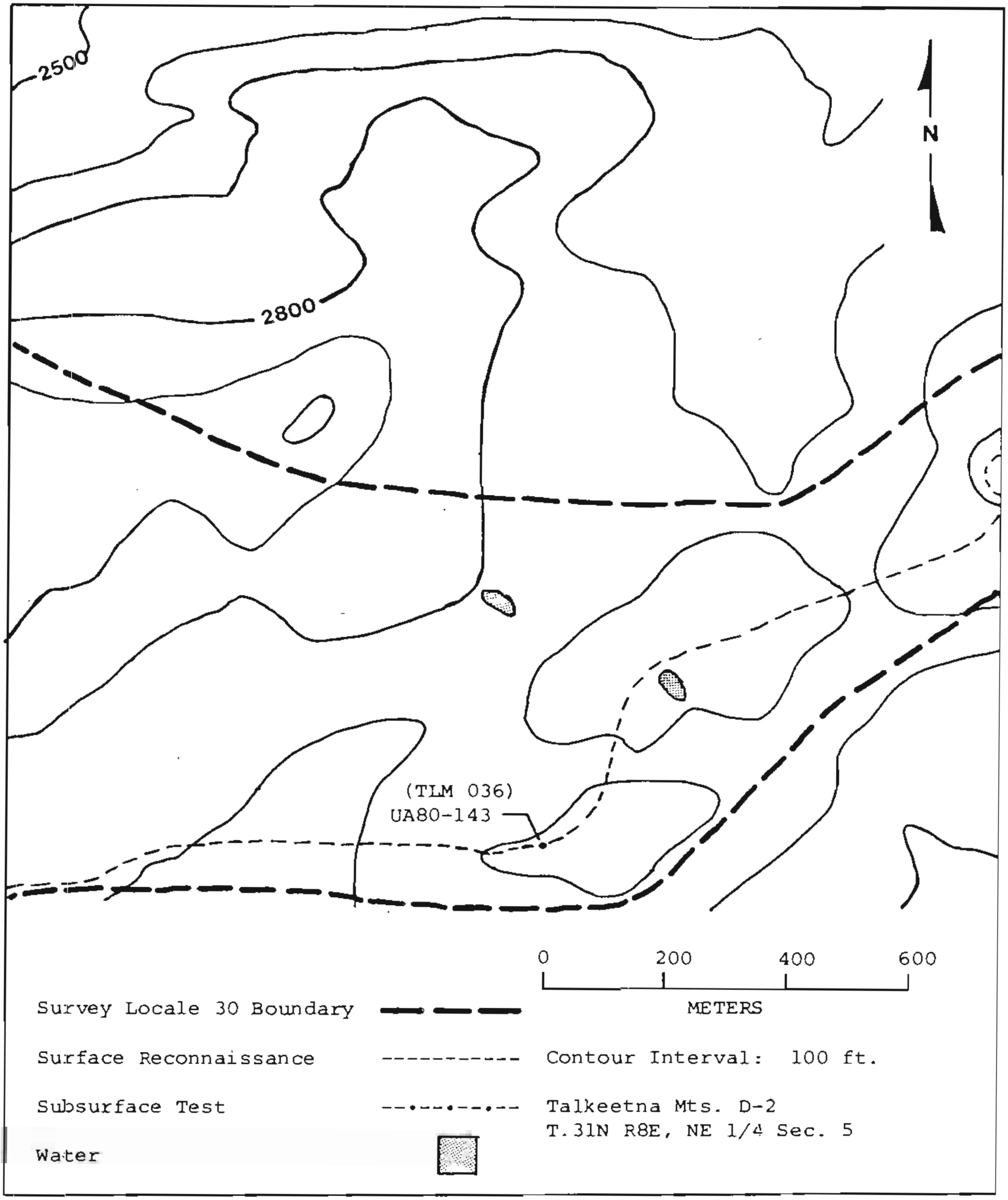


Figure 137.

Surface reconnaissance and subsurface testing in survey locale 30.

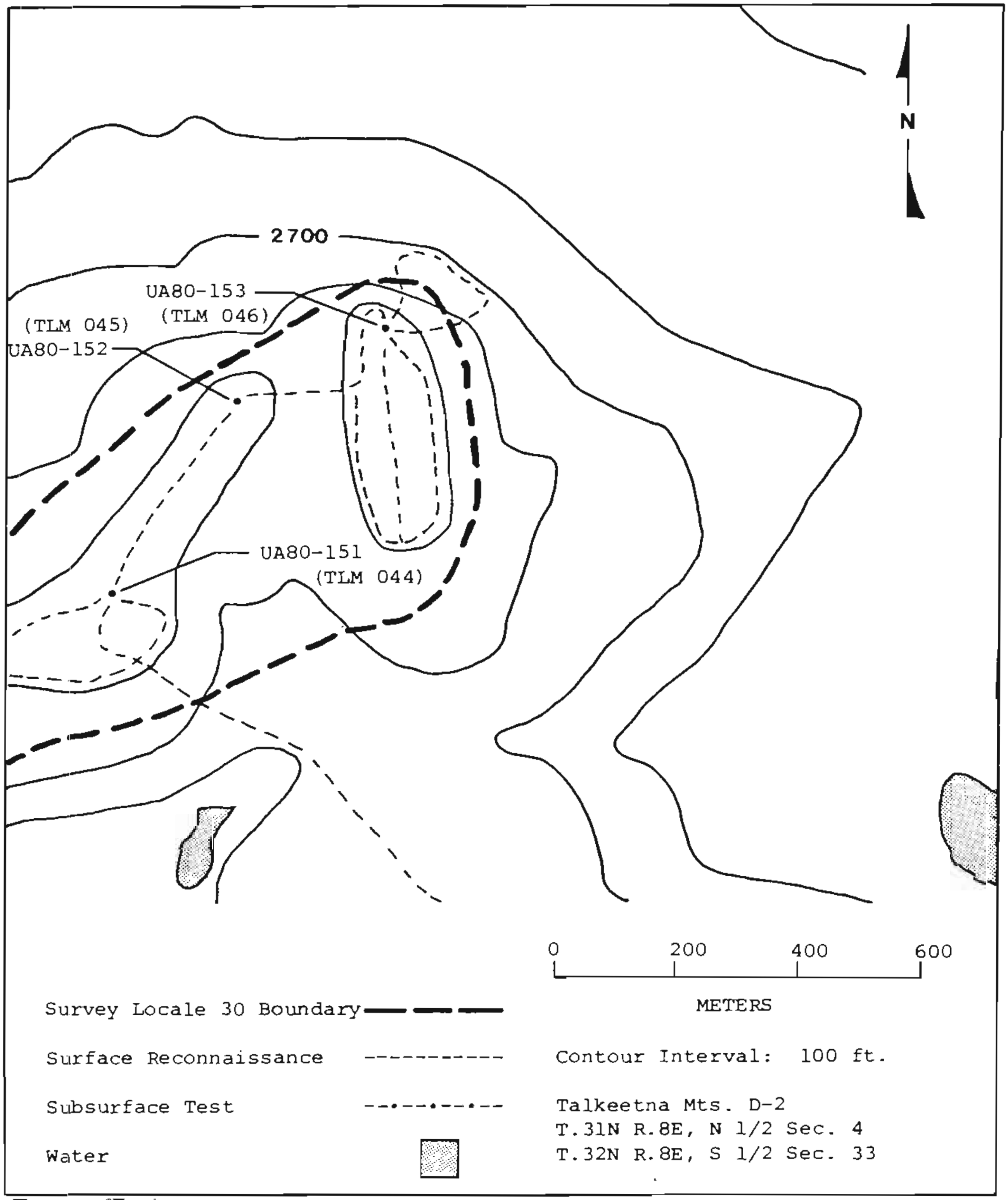


Figure 138.

Surface reconnaissance and subsurface testing in survey locale 30.

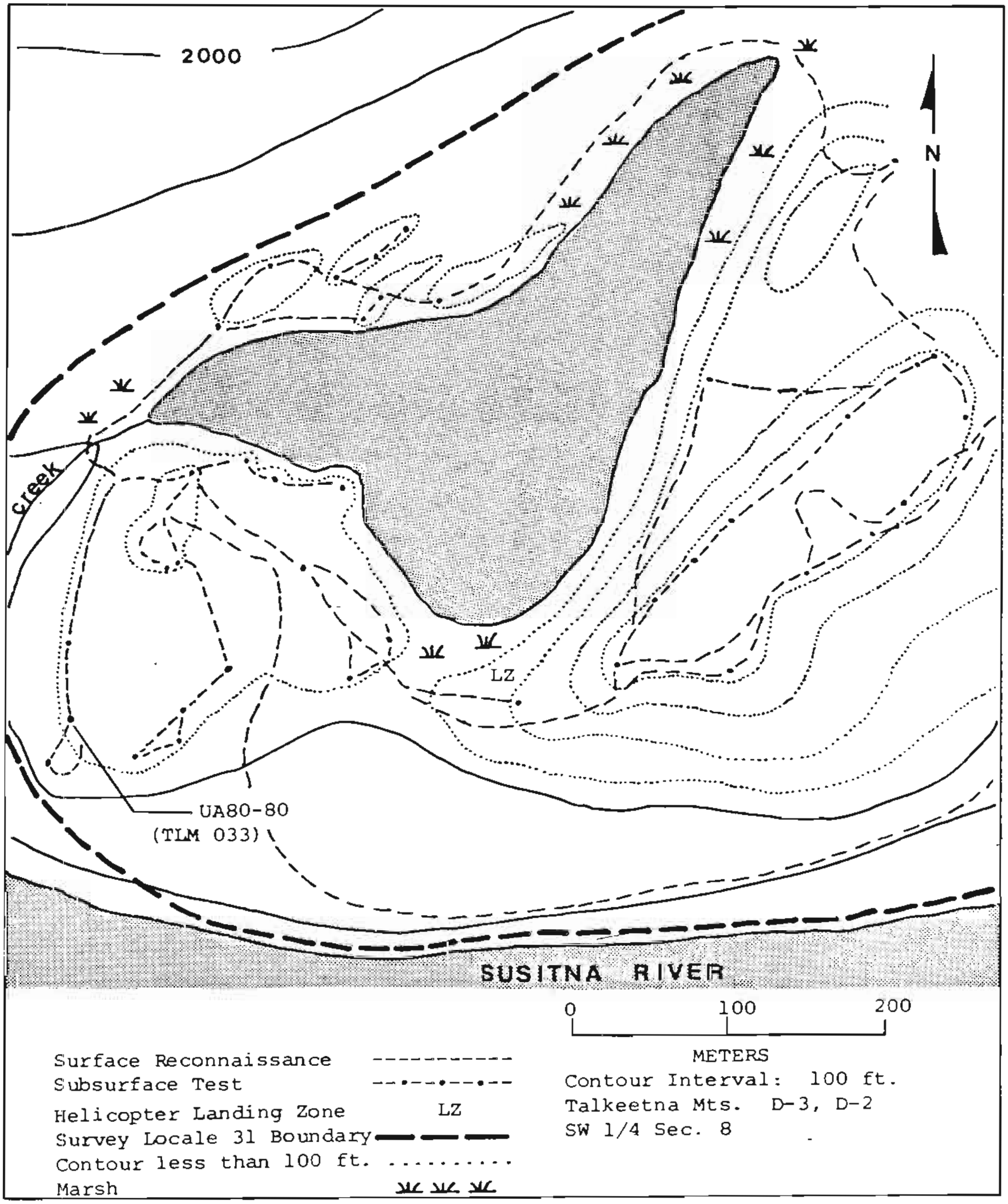


Figure 139.

Surface reconnaissance and subsurface testing in survey locale 31.

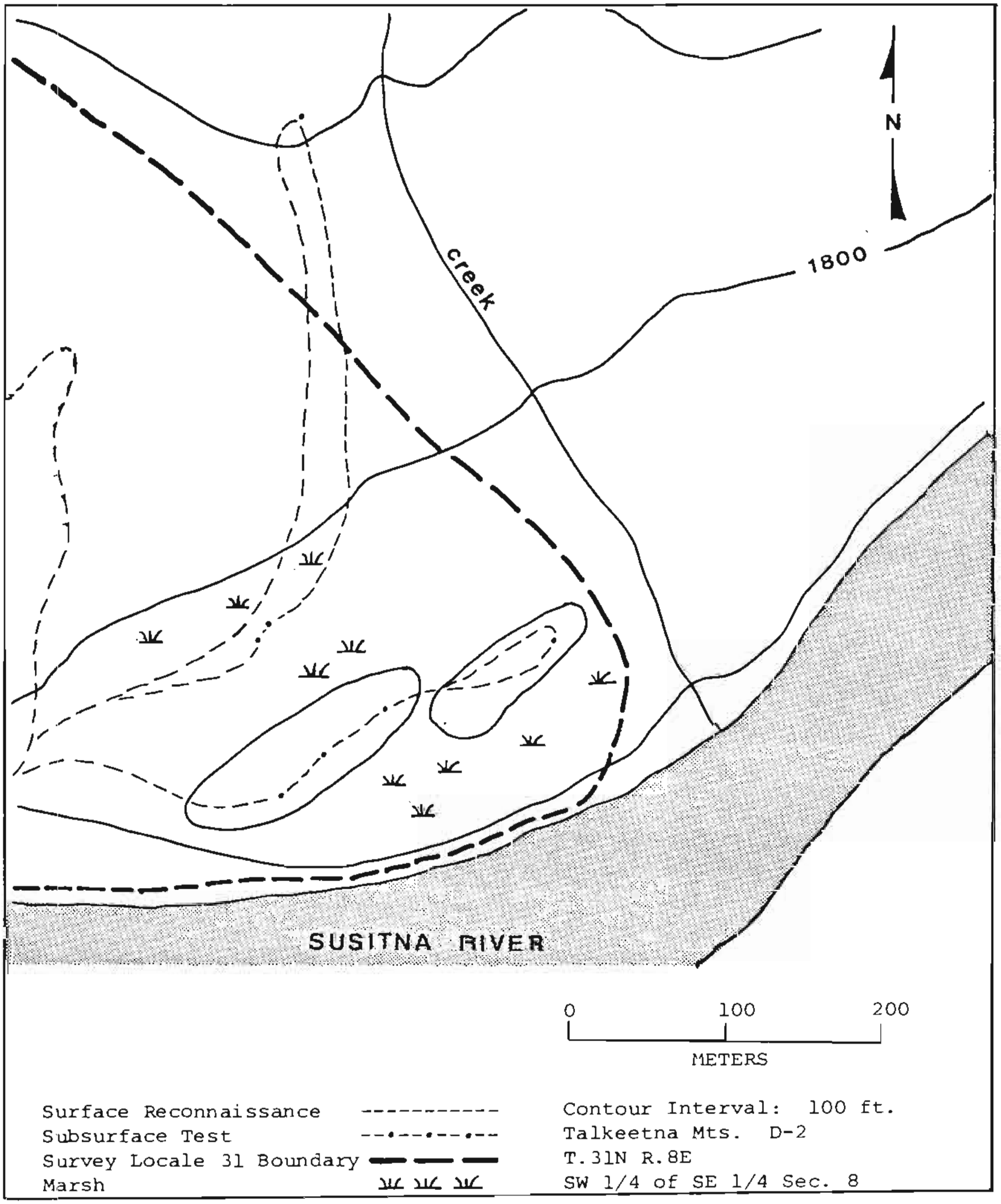
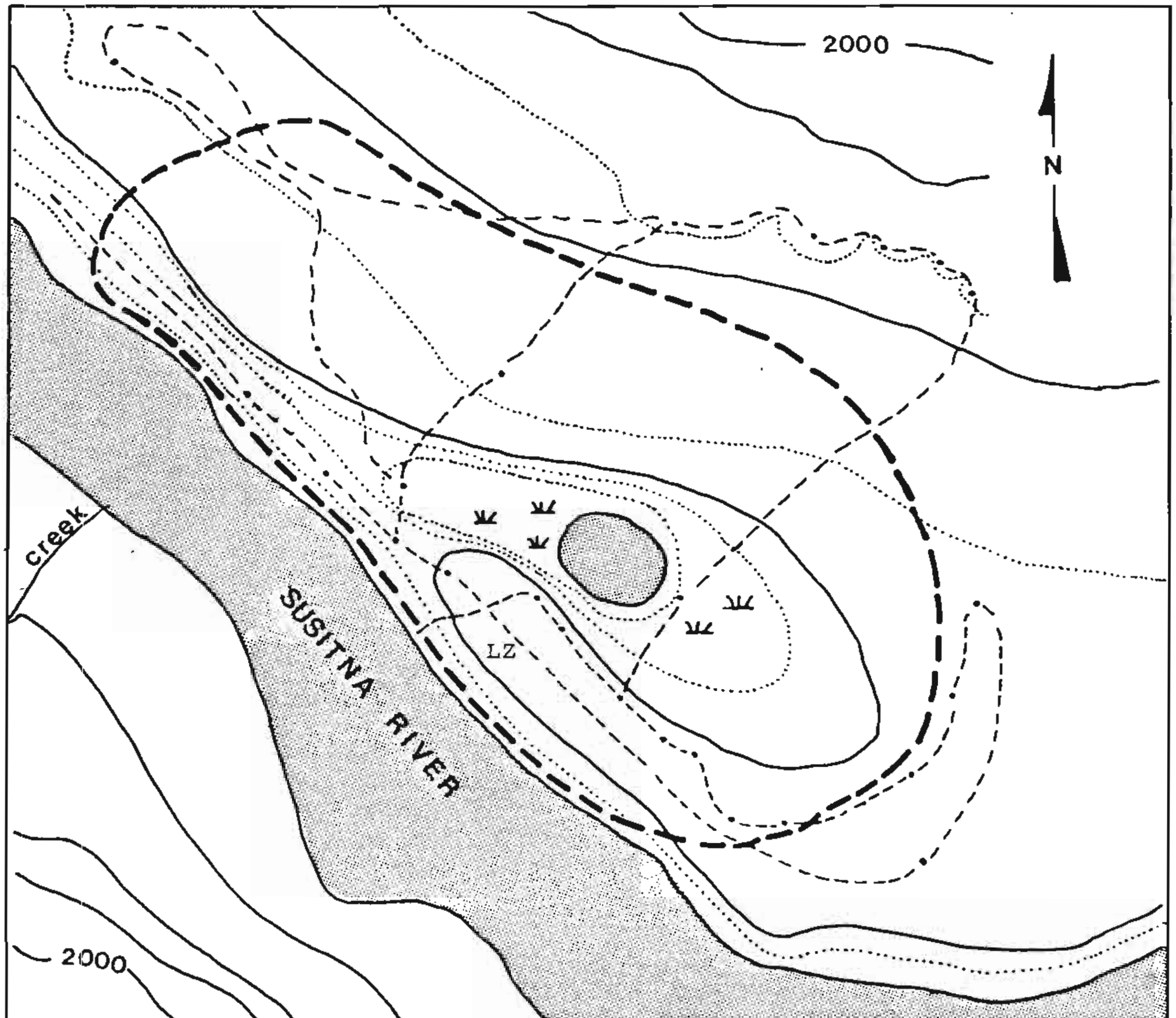


Figure 140.

Surface reconnaissance and subsurface testing in survey locale 31.



Surface Reconnaissance

Subsurface Test

Helicopter Landing Zone LZ

Survey Locale 31a Boundary

Contour less than 100 ft.

Marsh

0 100 200 300

METERS

Contour Interval: 100 ft.

Talkeetna Mts. D-3
T.31N R.7E
SE 1/4 Sec. 12

Figure 141.

Surface reconnaissance and subsurface testing in survey locale 31a.

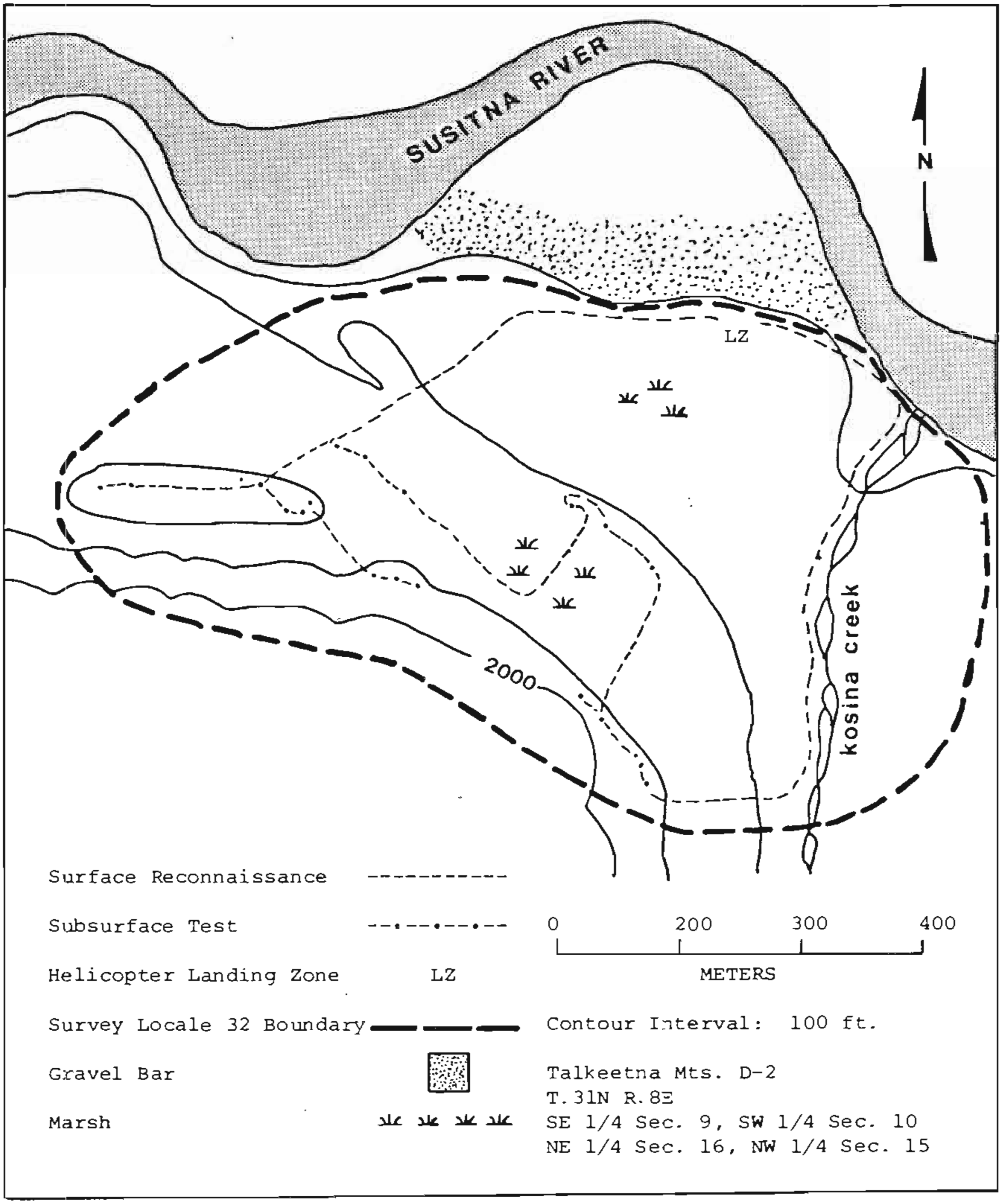


Figure 142.

Surface reconnaissance and subsurface testing in survey locale 32.

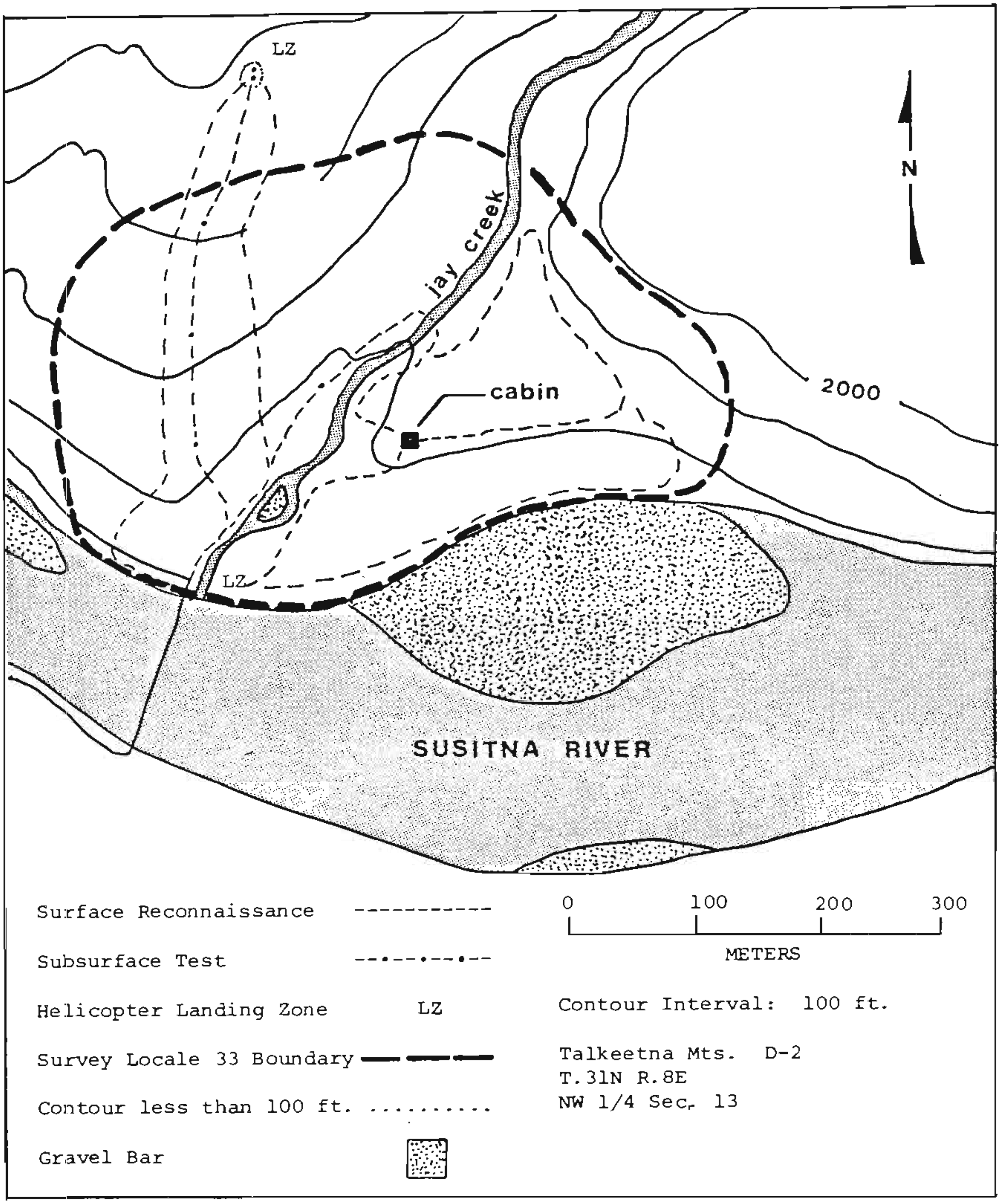


Figure 143.

Surface reconnaissance and subsurface testing in survey locale 33.

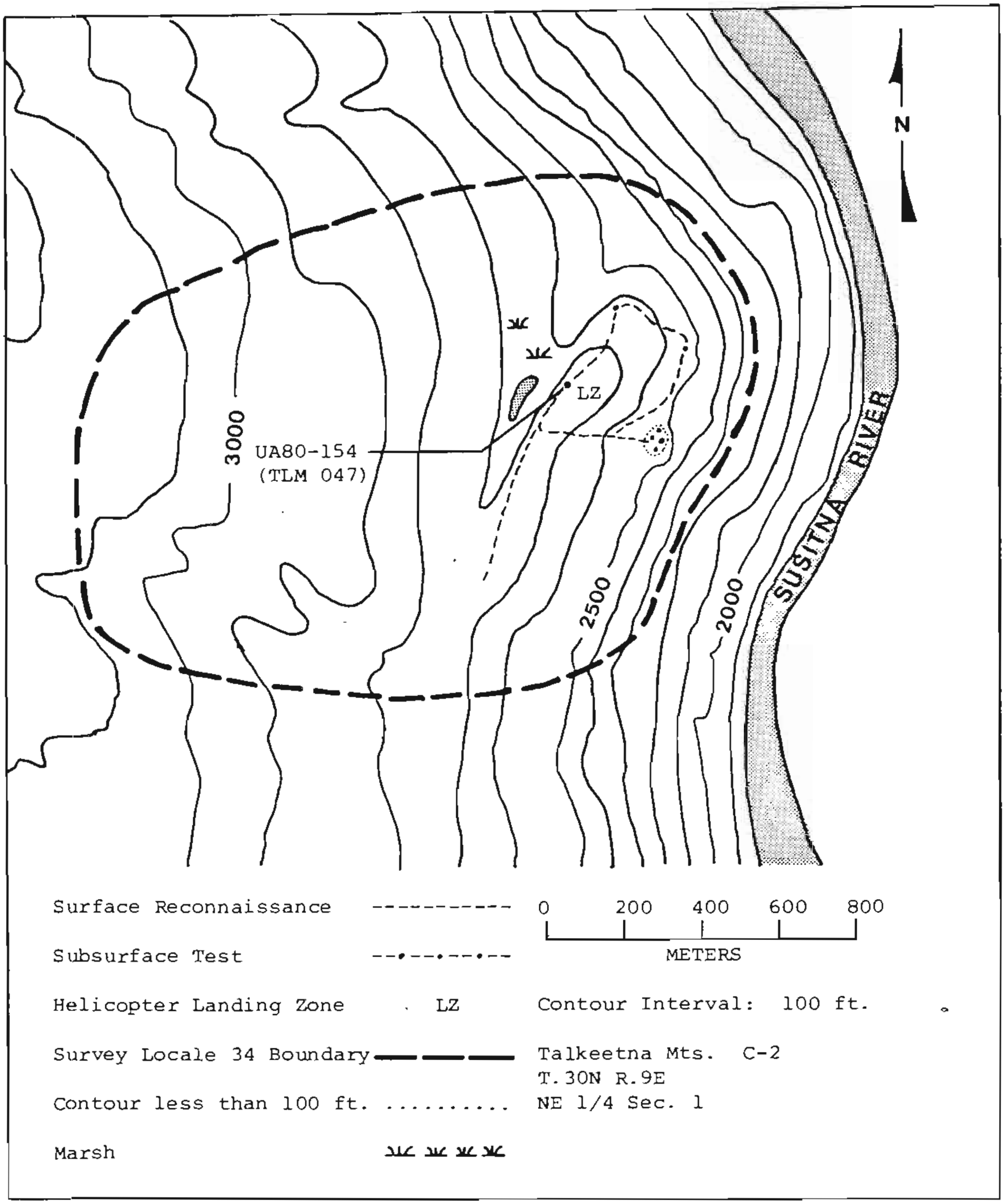


Figure 144.

Surface reconnaissance and subsurface testing in survey locale 34.

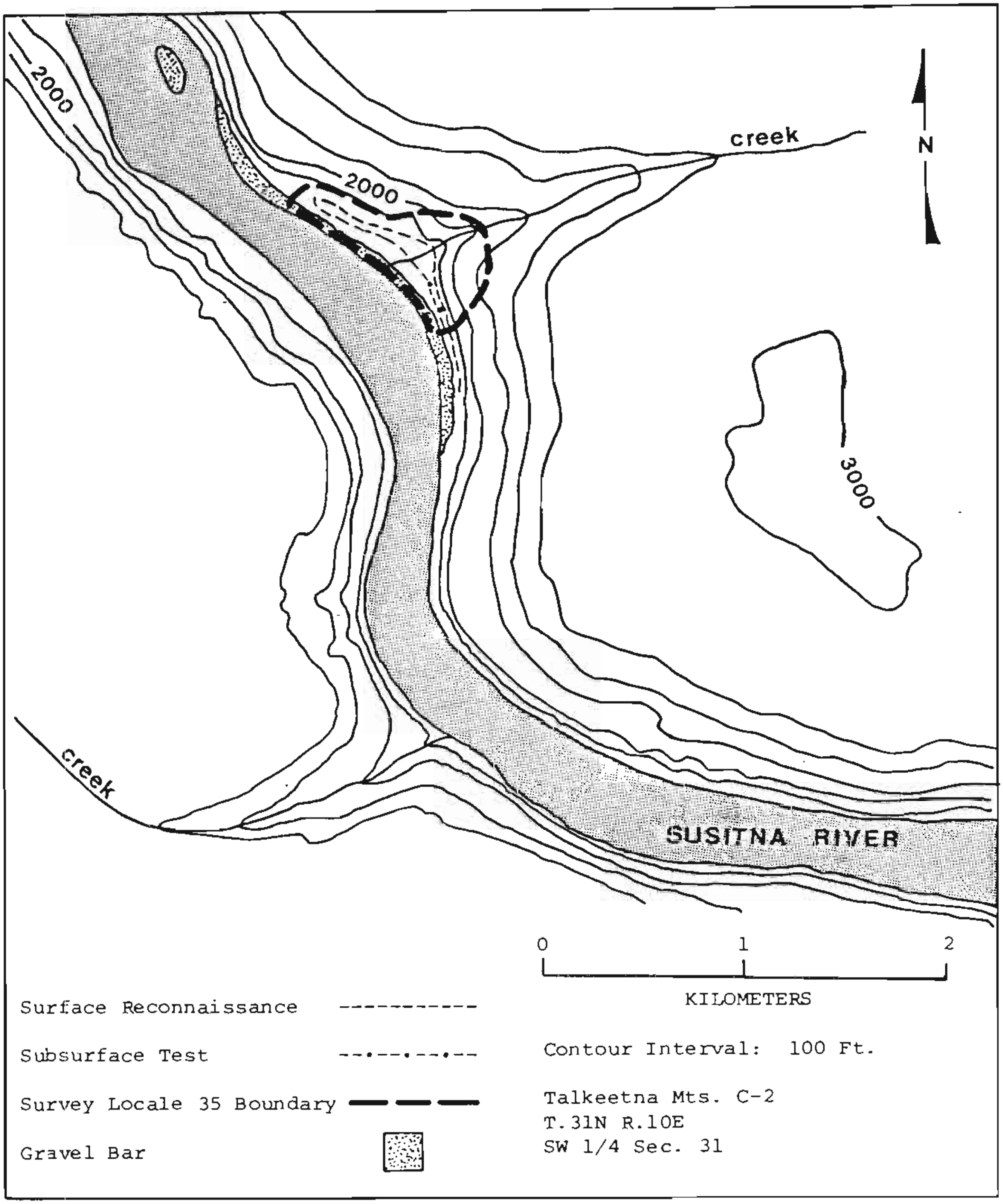


Figure 145.

Surface reconnaissance and subsurface testing in survey locale 35.

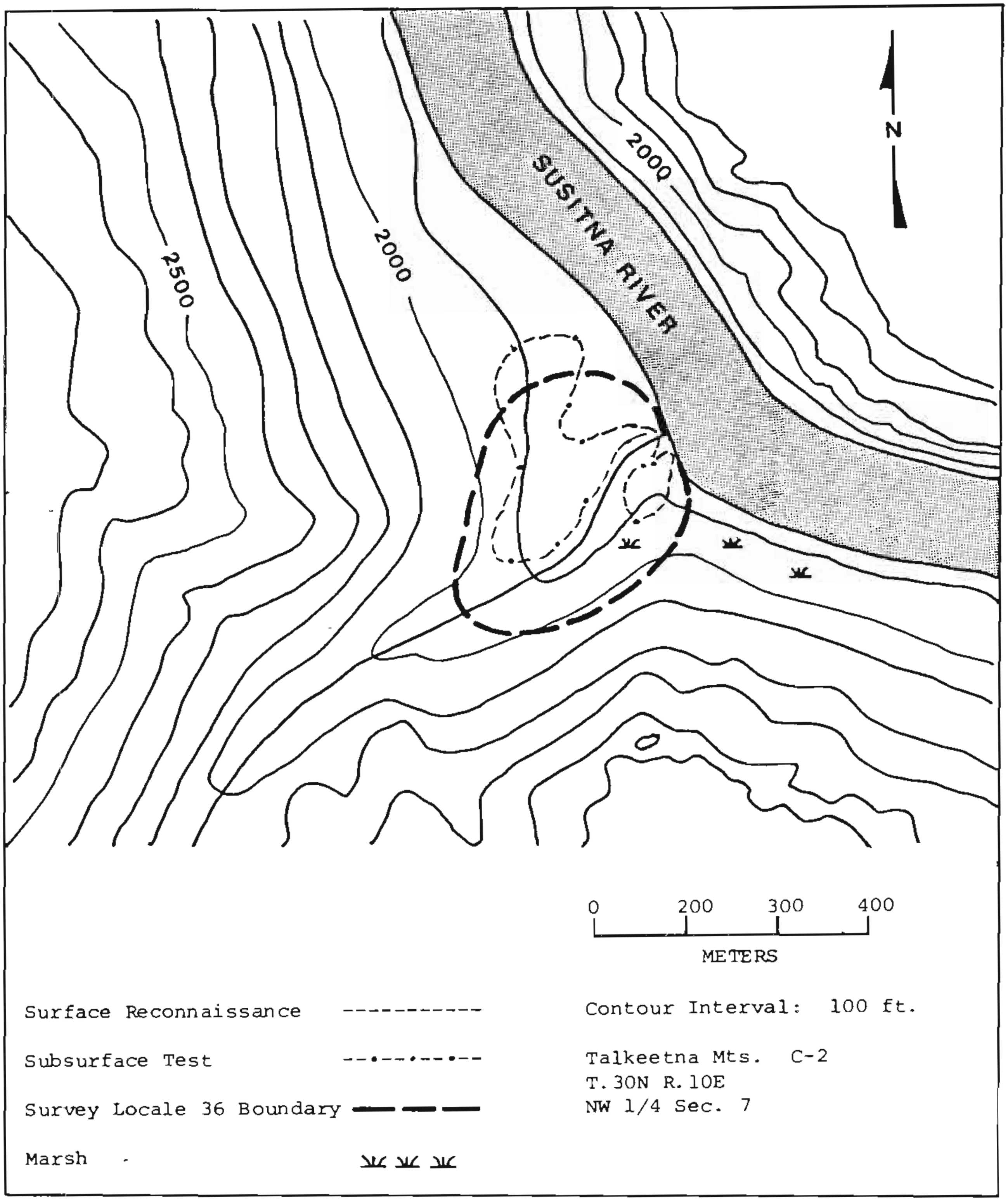


Figure 146.

Surface reconnaissance and subsurface testing in survey locale 36.

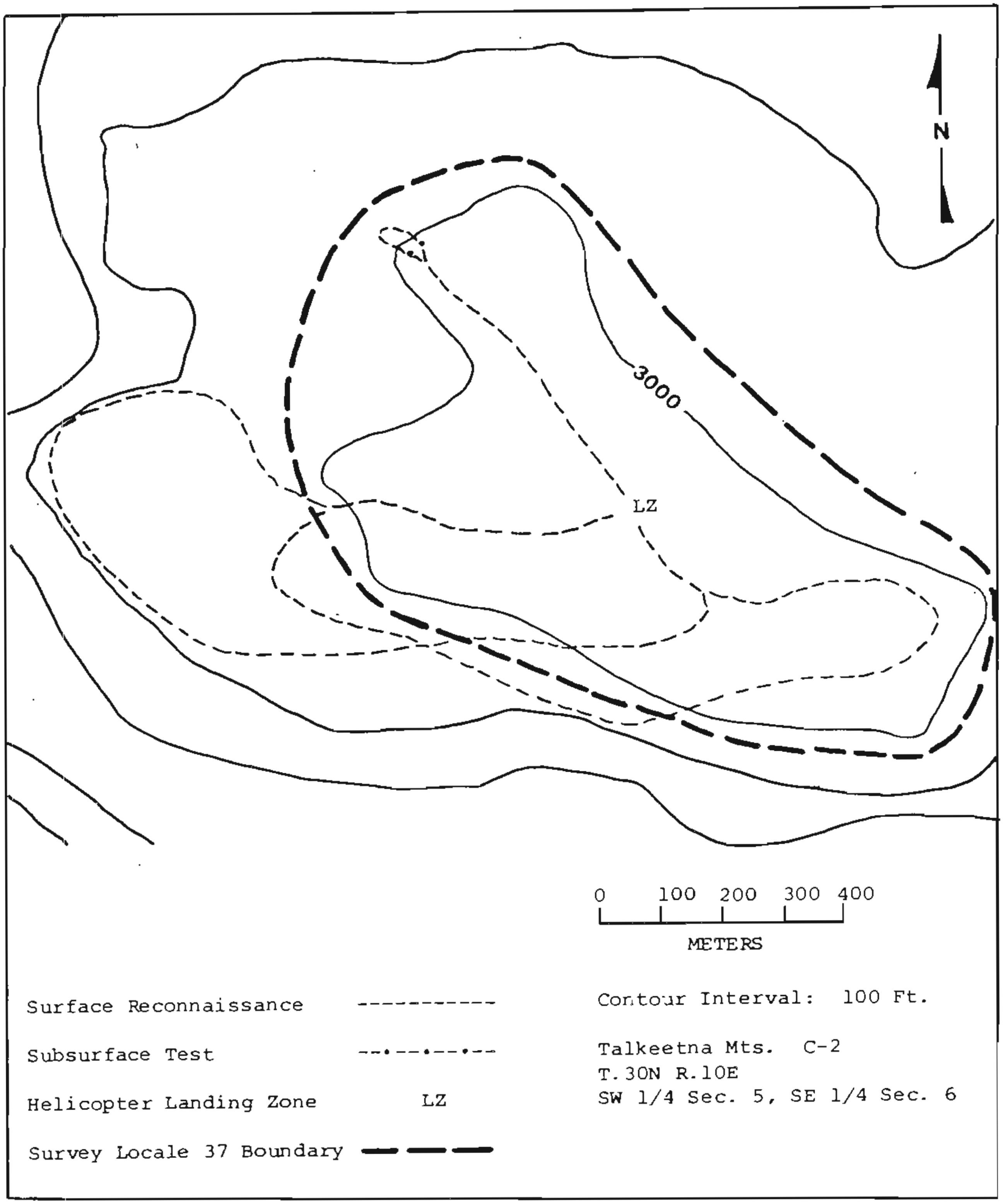


Figure 147.

Surface reconnaissance and subsurface testing in survey locale 37.

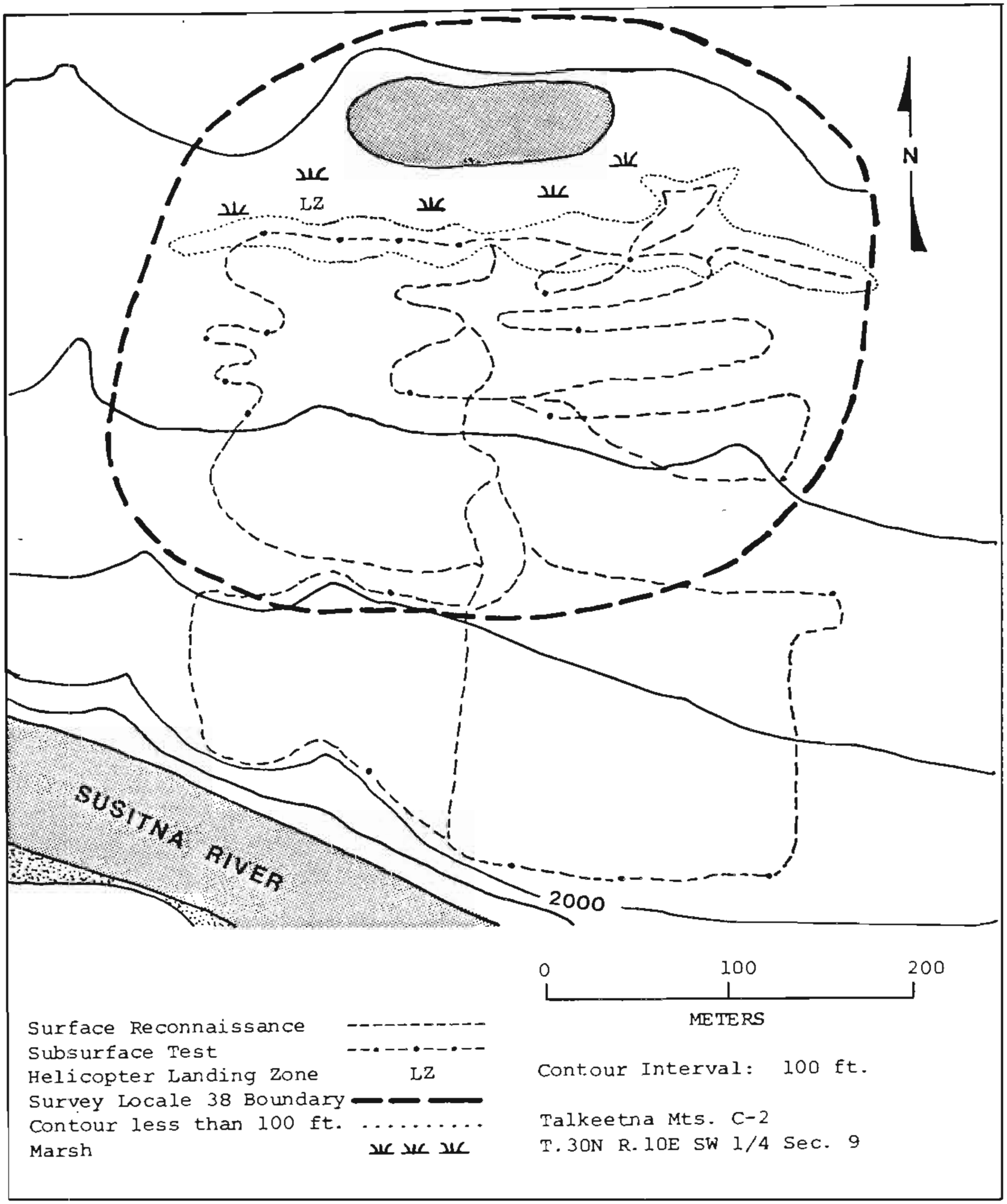


Figure 148.

Surface reconnaissance and subsurface testing in survey locale 38.

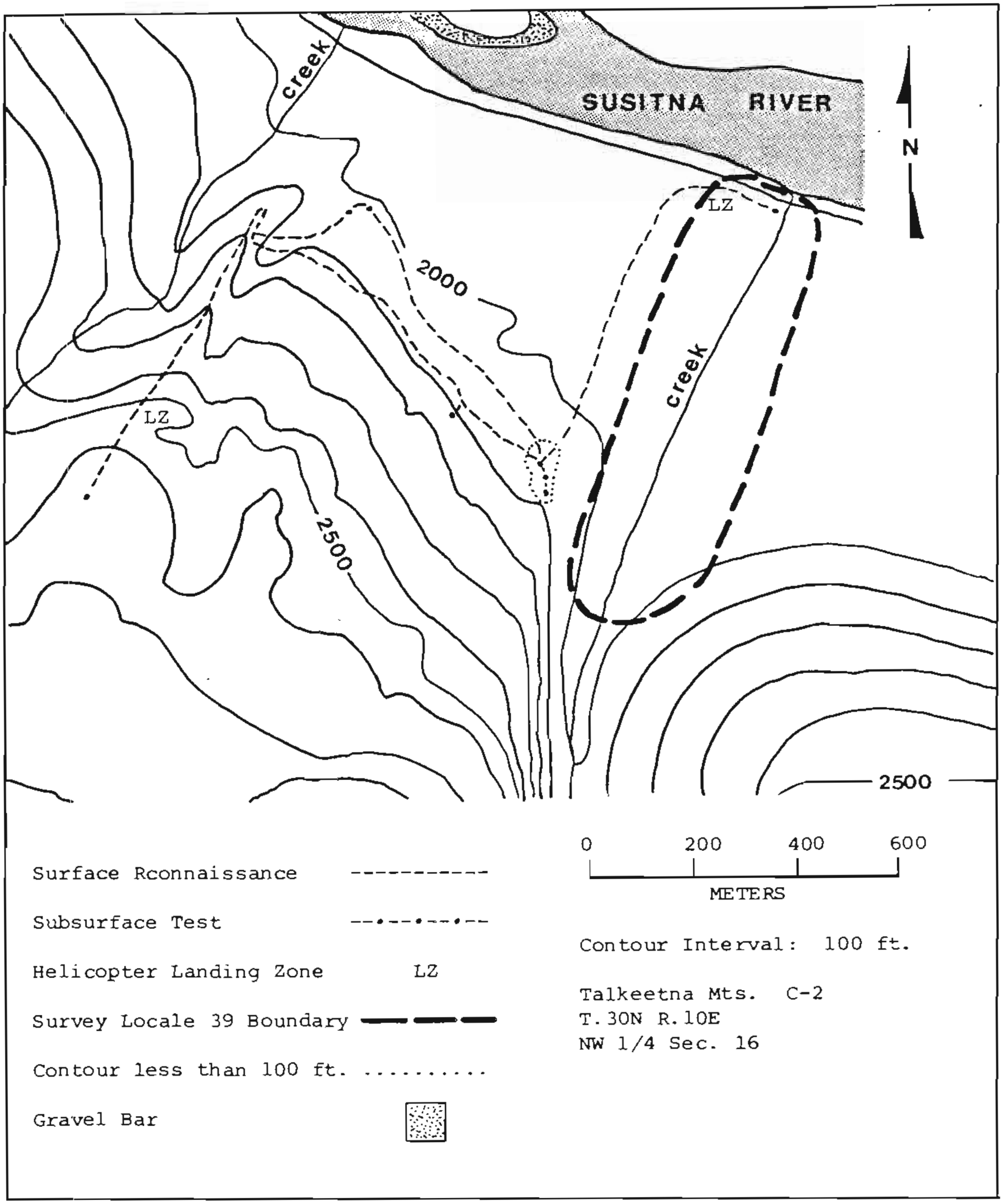


Figure 149.

Surface reconnaissance and subsurface testing in survey locale 39.

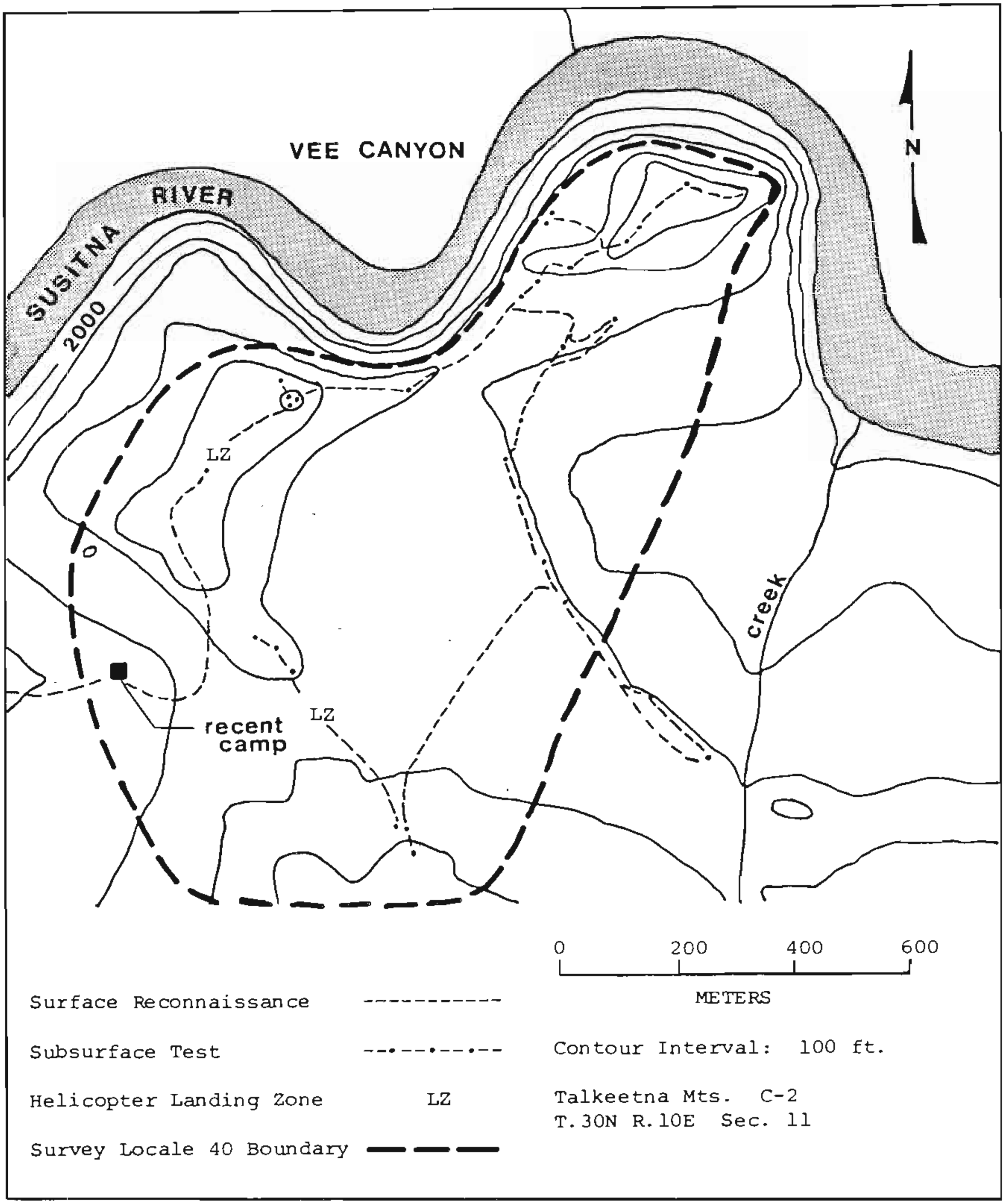


Figure 150.

Surface reconnaissance and subsurface testing in survey locale 40.

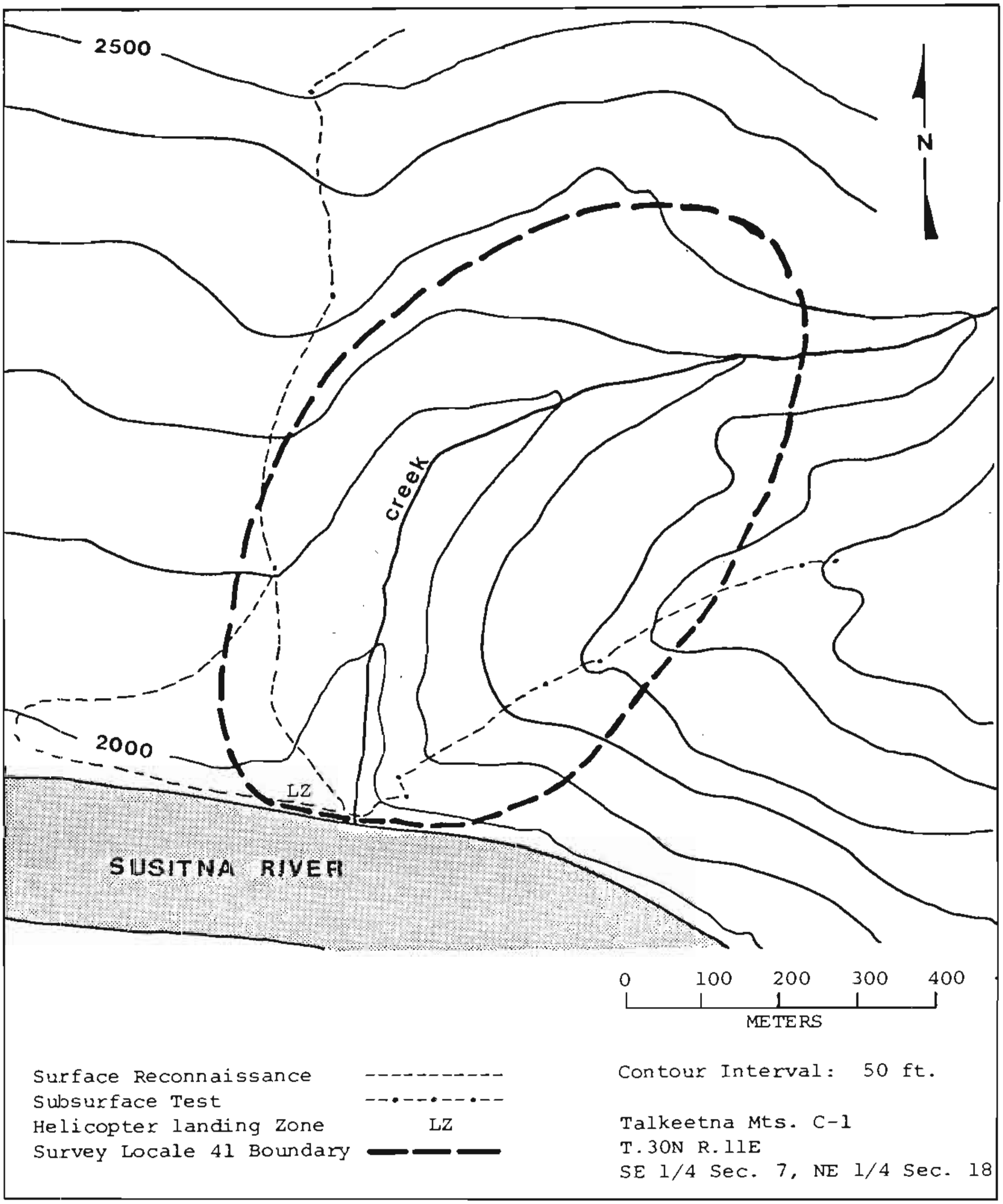
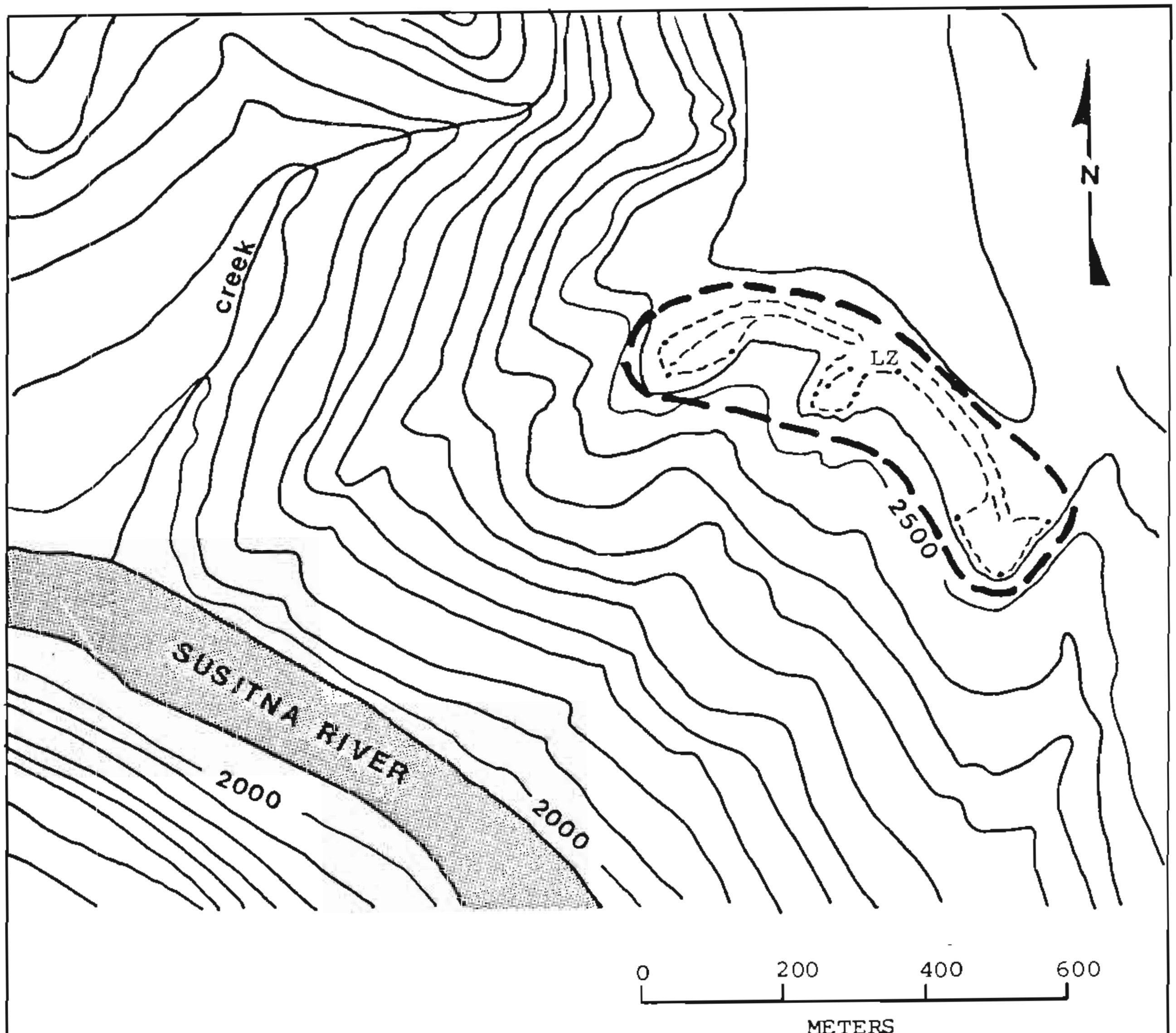


Figure 151.

Surface reconnaissance and subsurface testing in survey locale 41.



Surface Reconnaissance - - - - - - - - - - -

Subsurface Test - - • - - • - - • - -

Helicopter Landing Zone LZ

Survey Locale 41a Boundary ▬ ▬ ▬

Contour Interval: 50 ft.

Talkeetna Mts. C-1
T.30N R.11E
NE 1/4 of NW 1/4 Sec. 17

Figure 152.

Surface reconnaissance and subsurface testing in survey locale 41a.

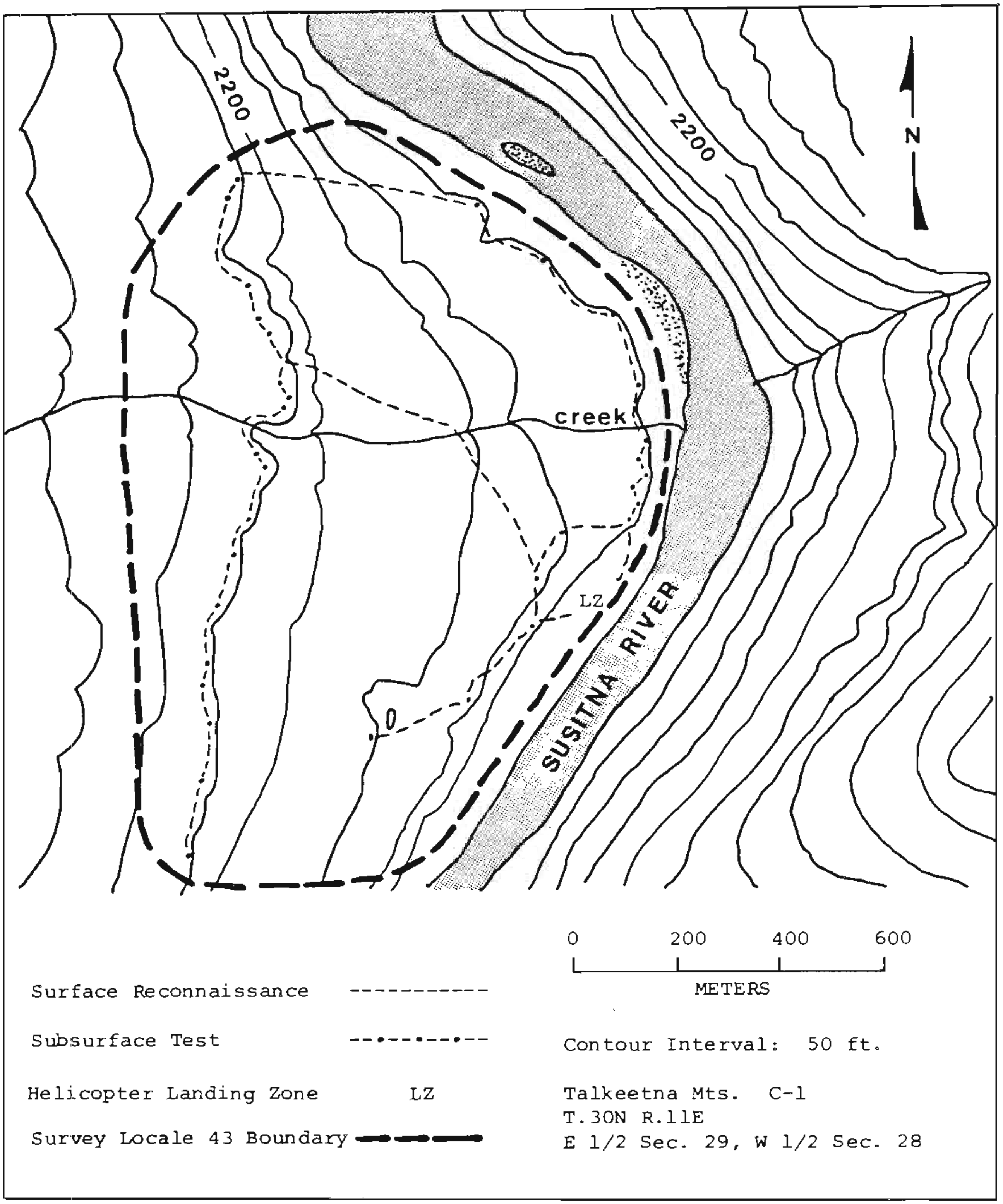


Figure 153.

Surface reconnaissance and subsurface testing for survey locale 43.

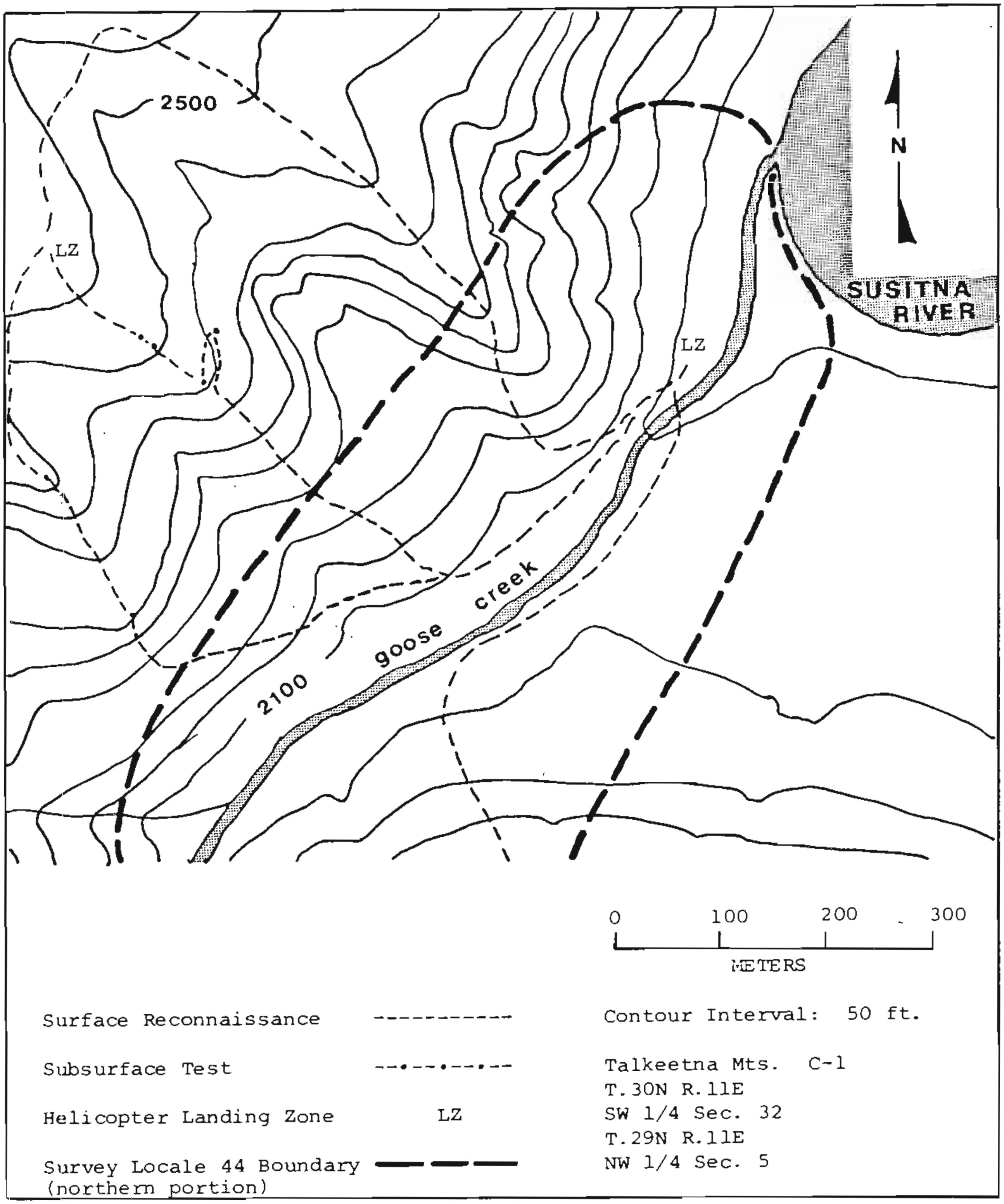


Figure 154.

Surface reconnaissance and subsurface testing for survey locale 44.

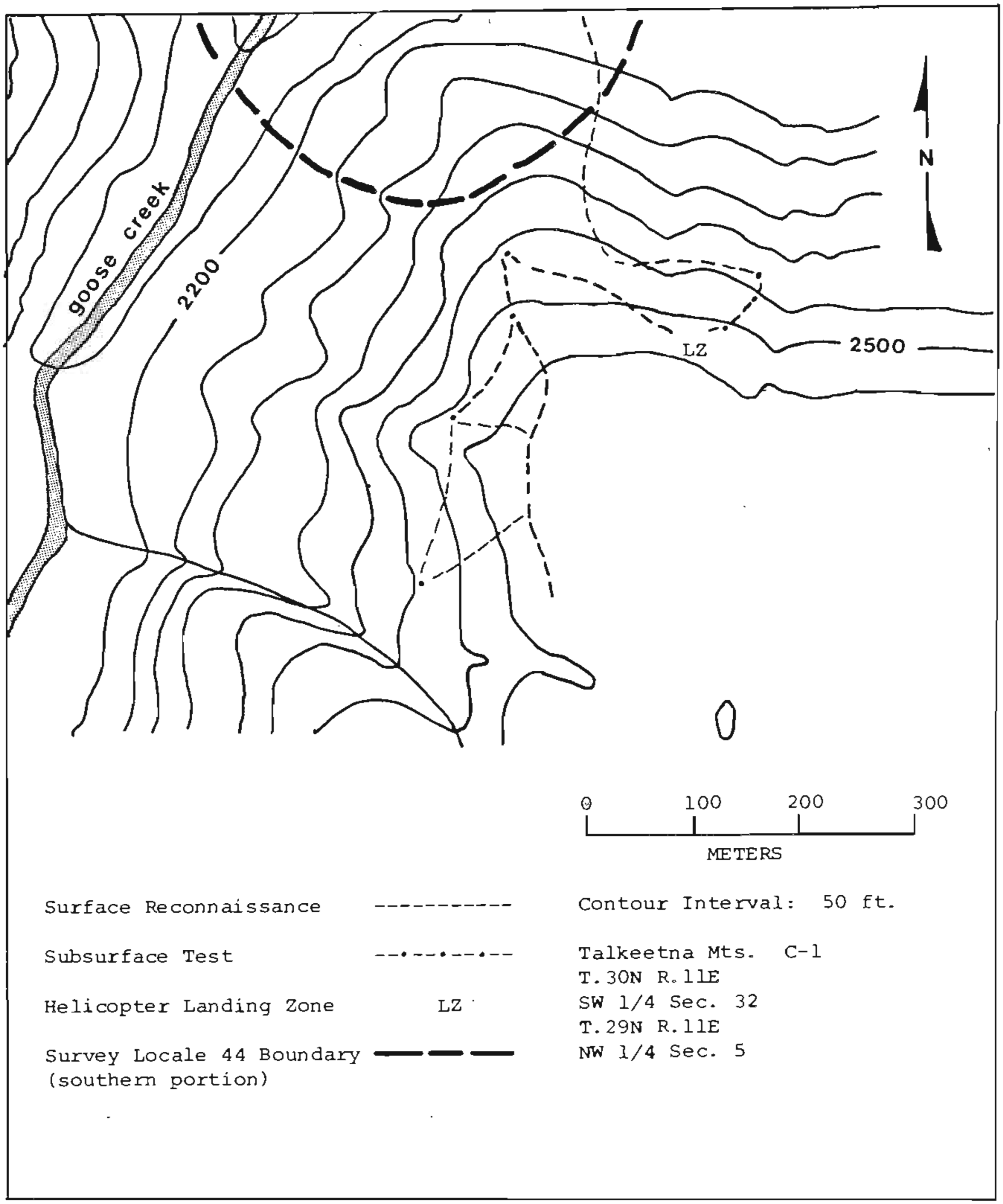


Figure 155.

Surface reconnaissance and subsurface testing in survey locale 44.

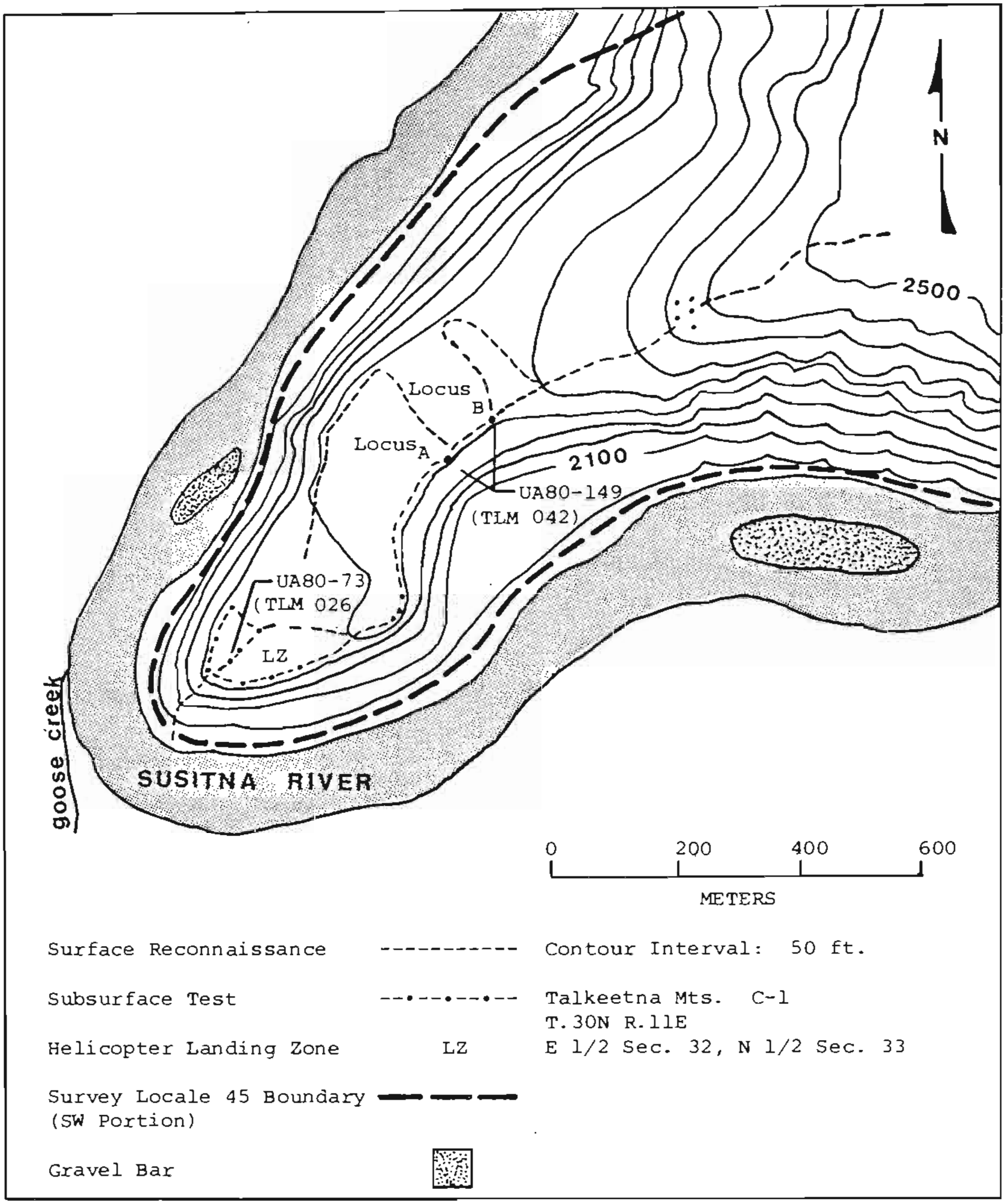


Figure 156.

Surface reconnaissance and subsurface testing in survey locale 45.

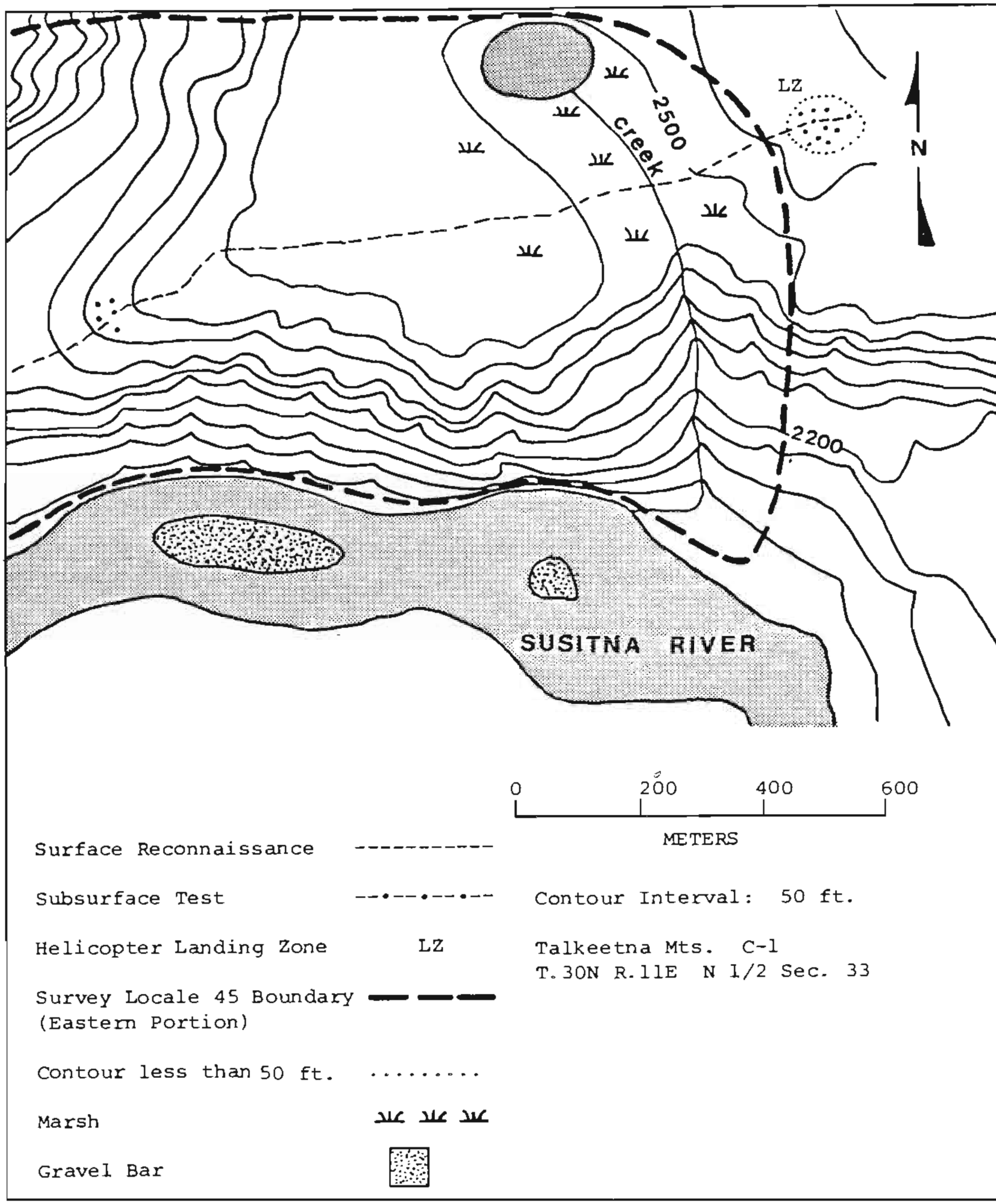


Figure 157.

Surface reconnaissance and subsurface testing in survey locale 45.

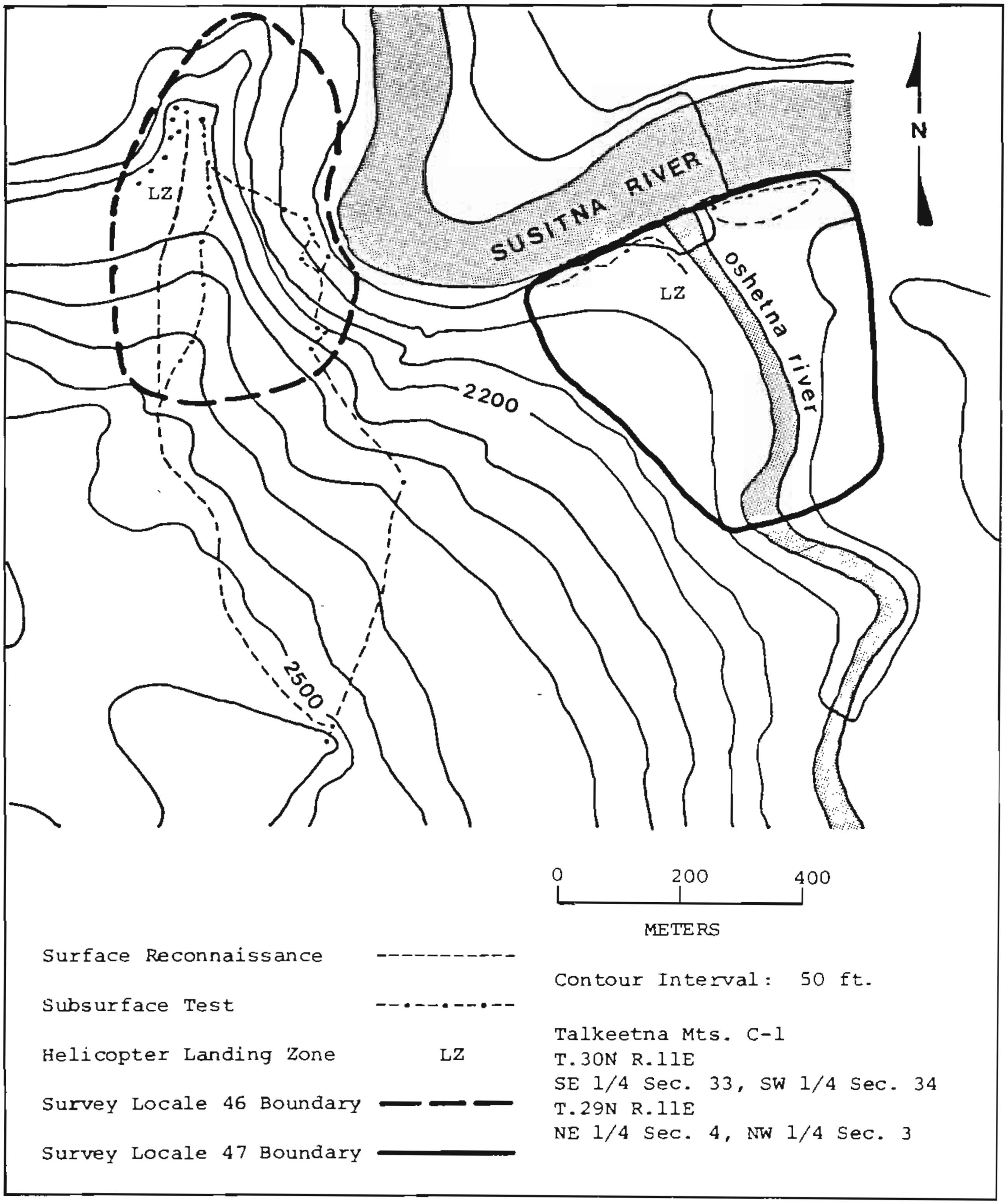


Figure 158.

Surface reconnaissance and subsurface testing in survey locales 46 and 47

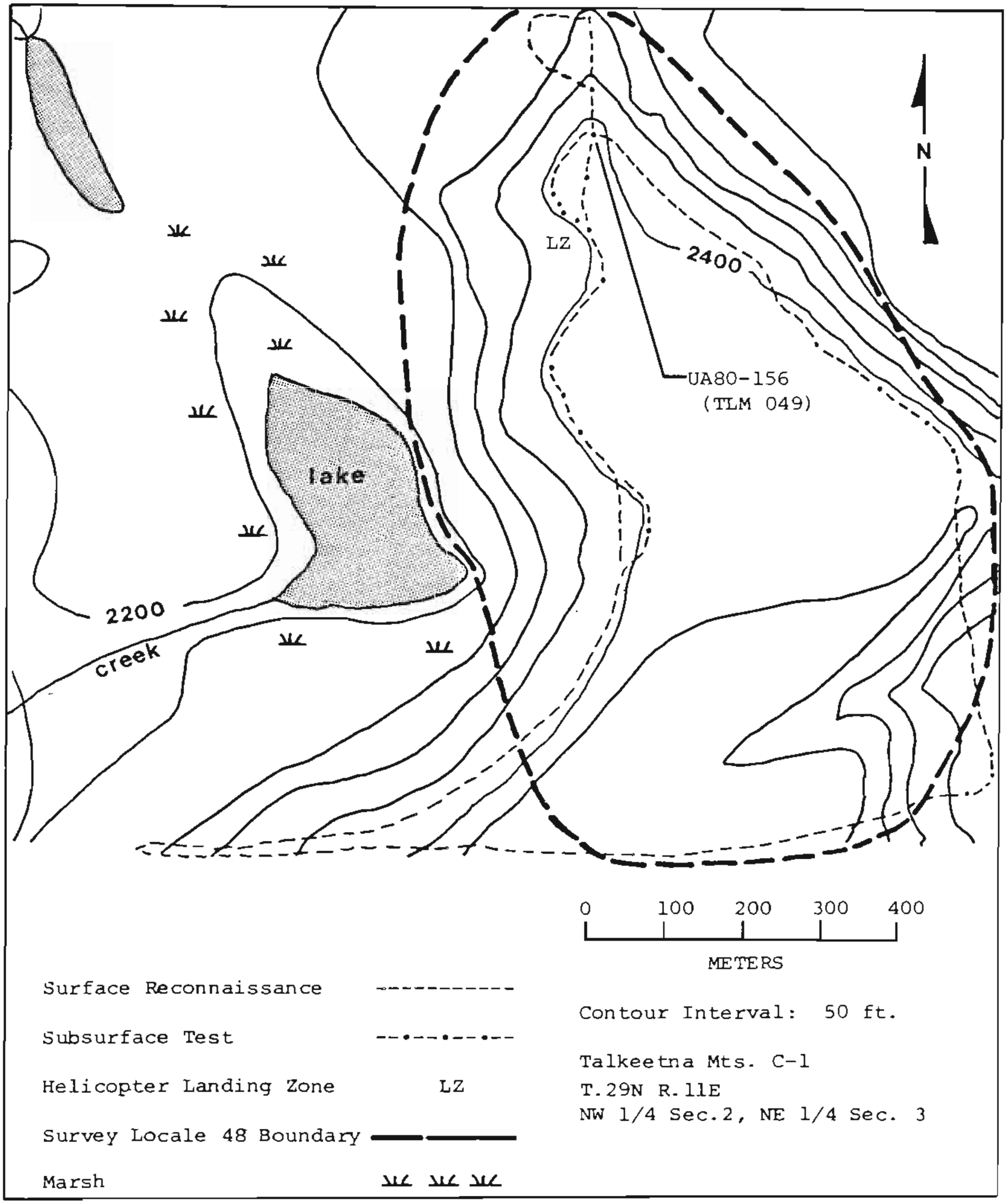


Figure 159.

Surface reconnaissance and subsurface testing in survey locale 48.

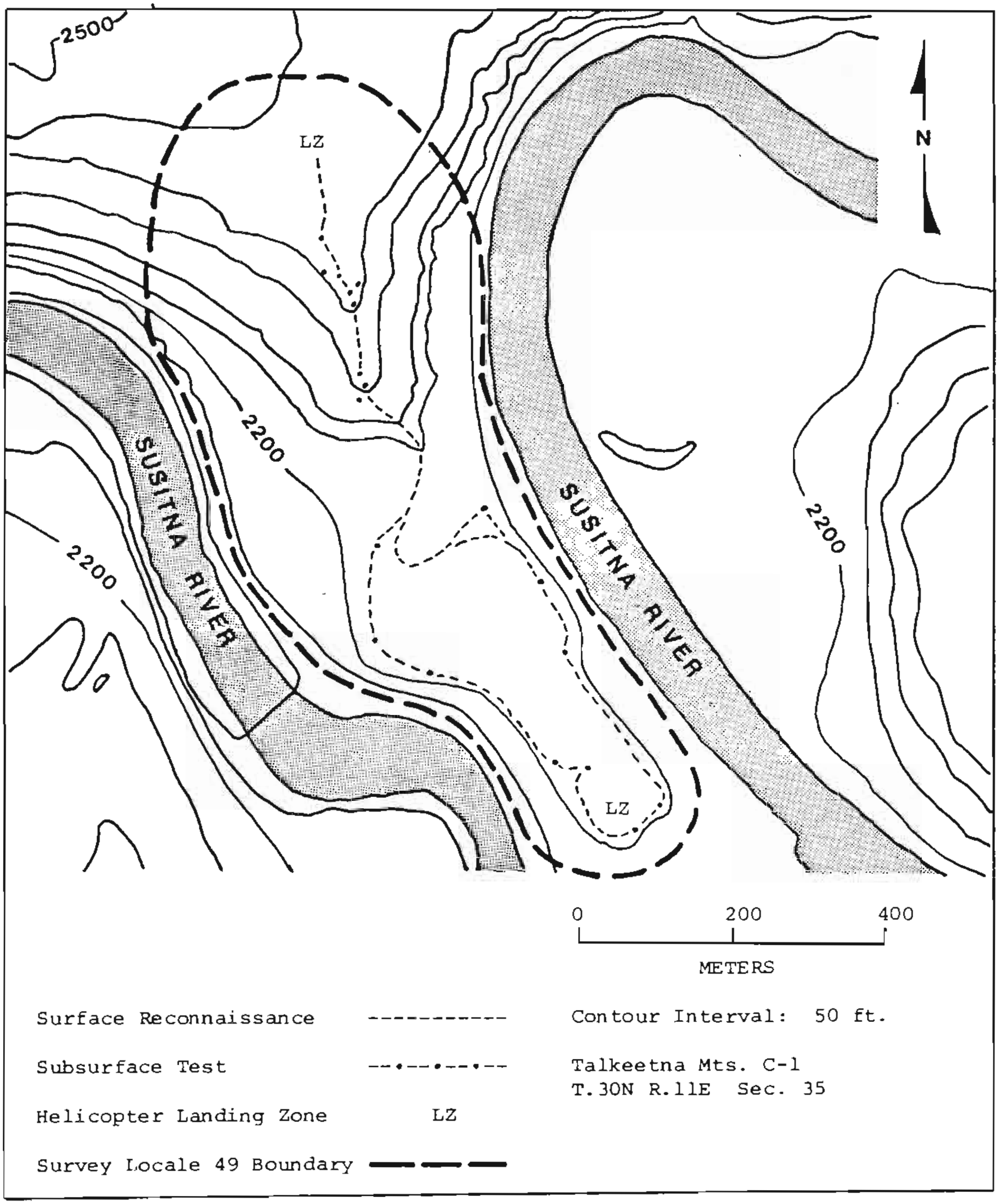


Figure 160.

Surface reconnaissance and subsurface testing in survey locale 49.

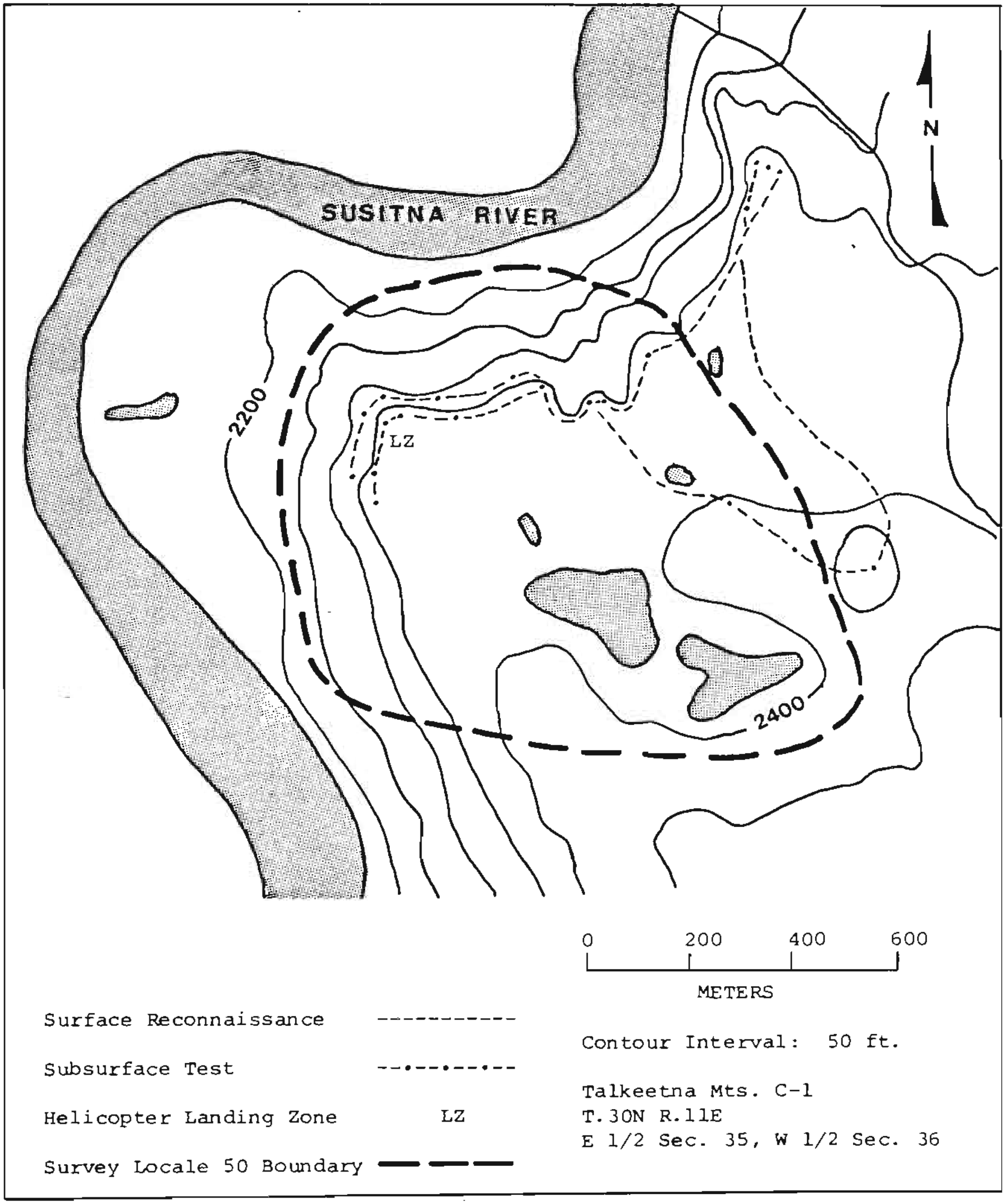


Figure 161.

Surface reconnaissance and subsurface testing in survey locale 50.

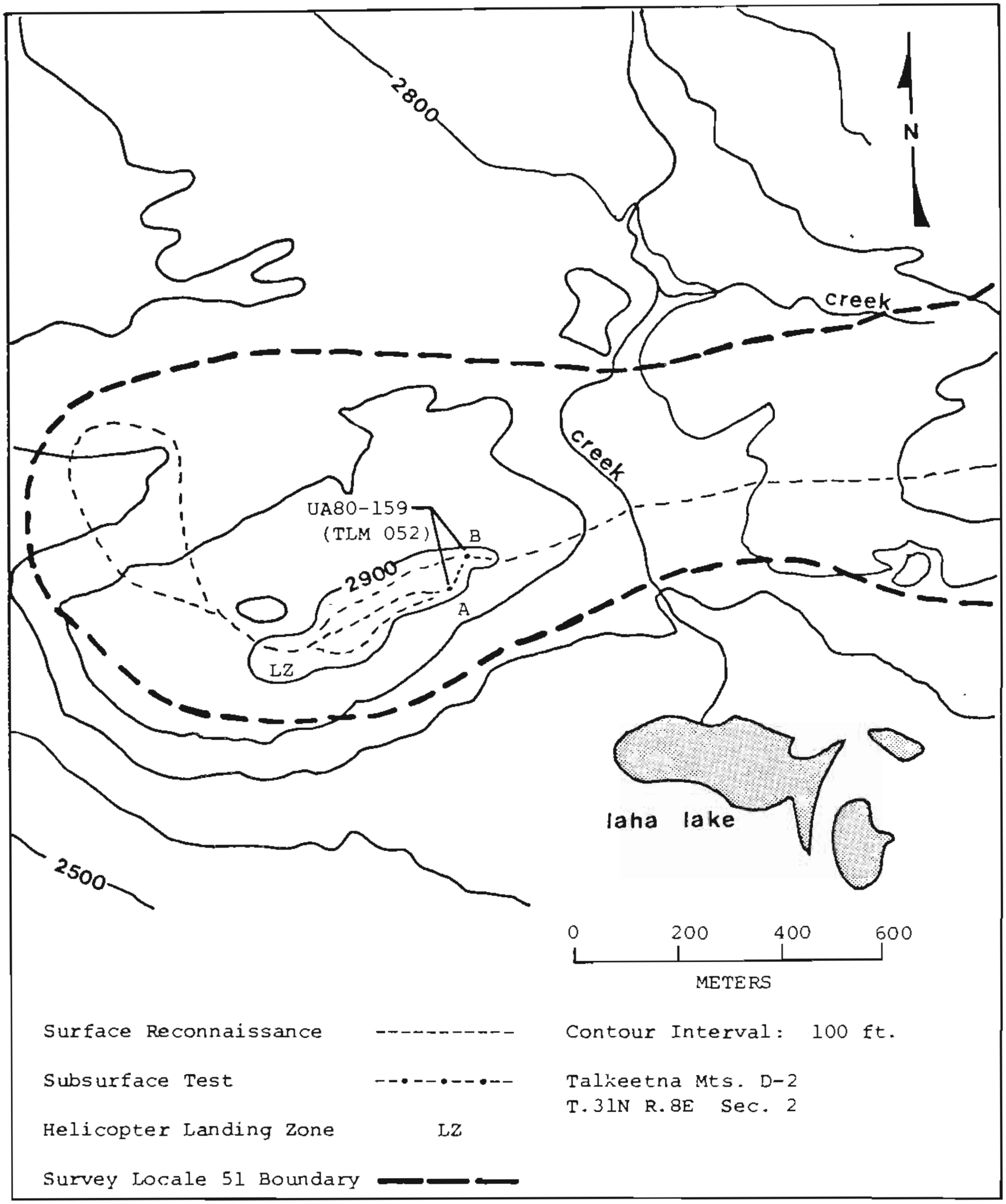


Figure 162.

Surface reconnaissance and subsurface testing in survey locale 51.

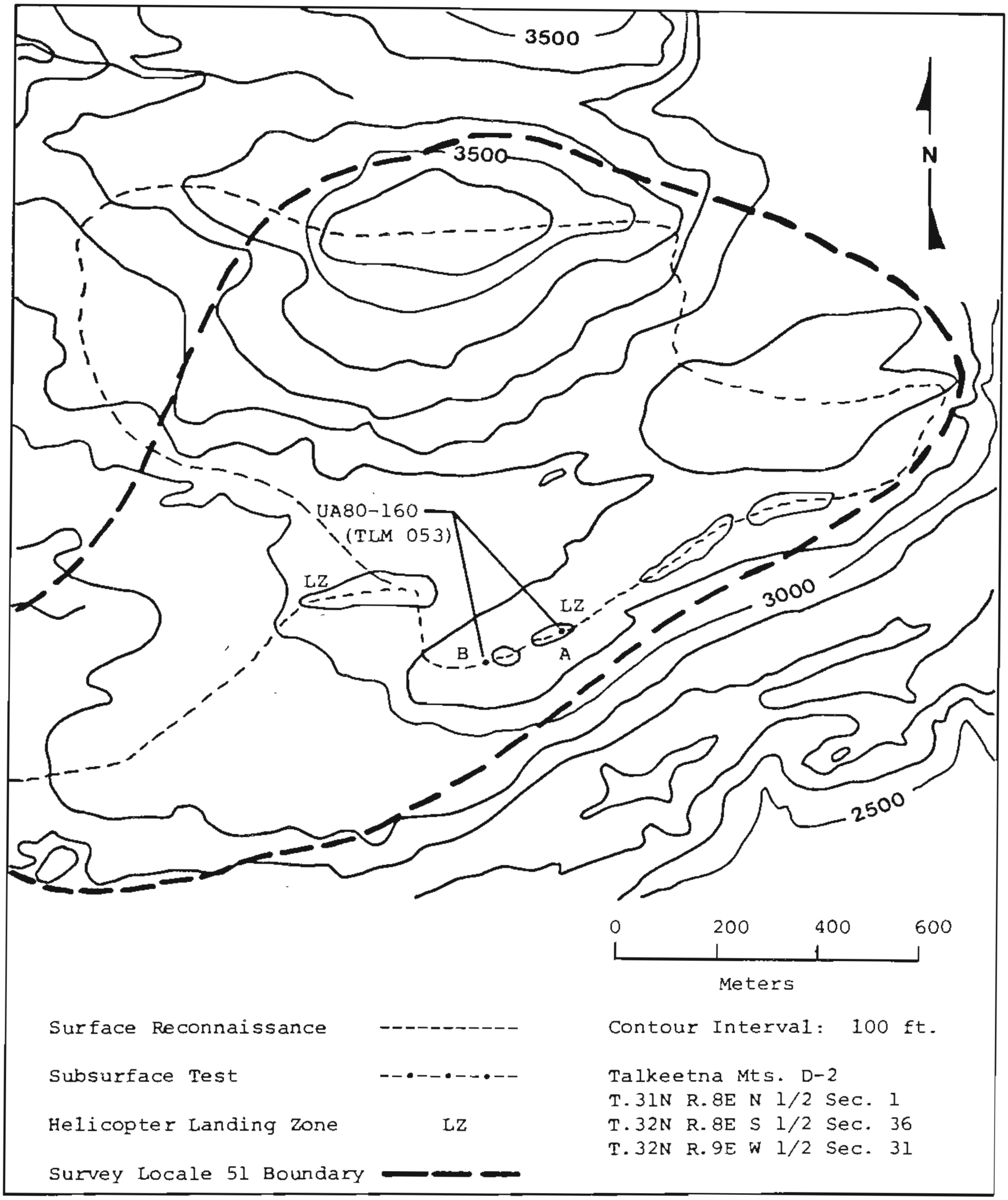


Figure 163.

Surface reconnaissance and subsurface testing in survey locale 51.

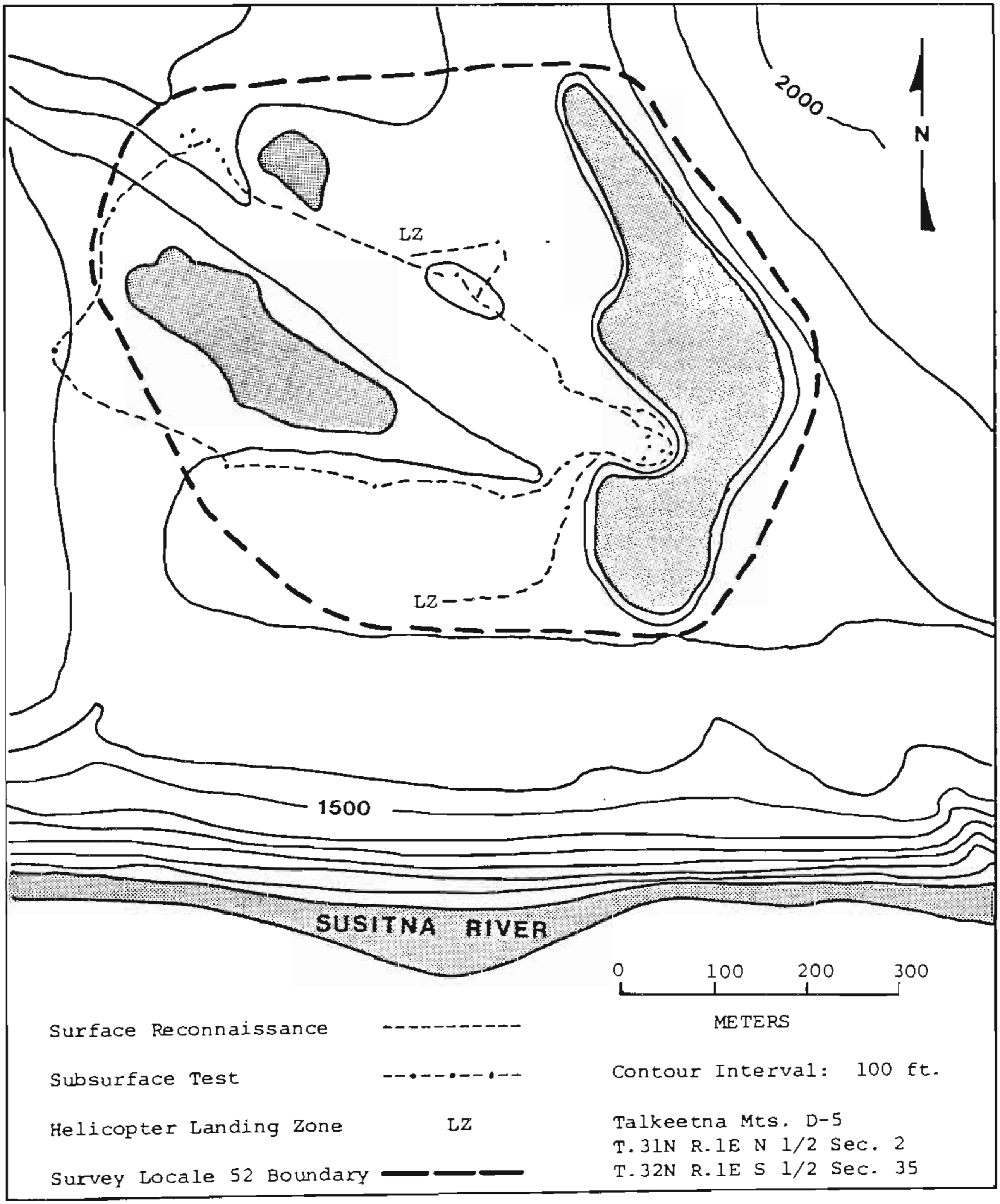
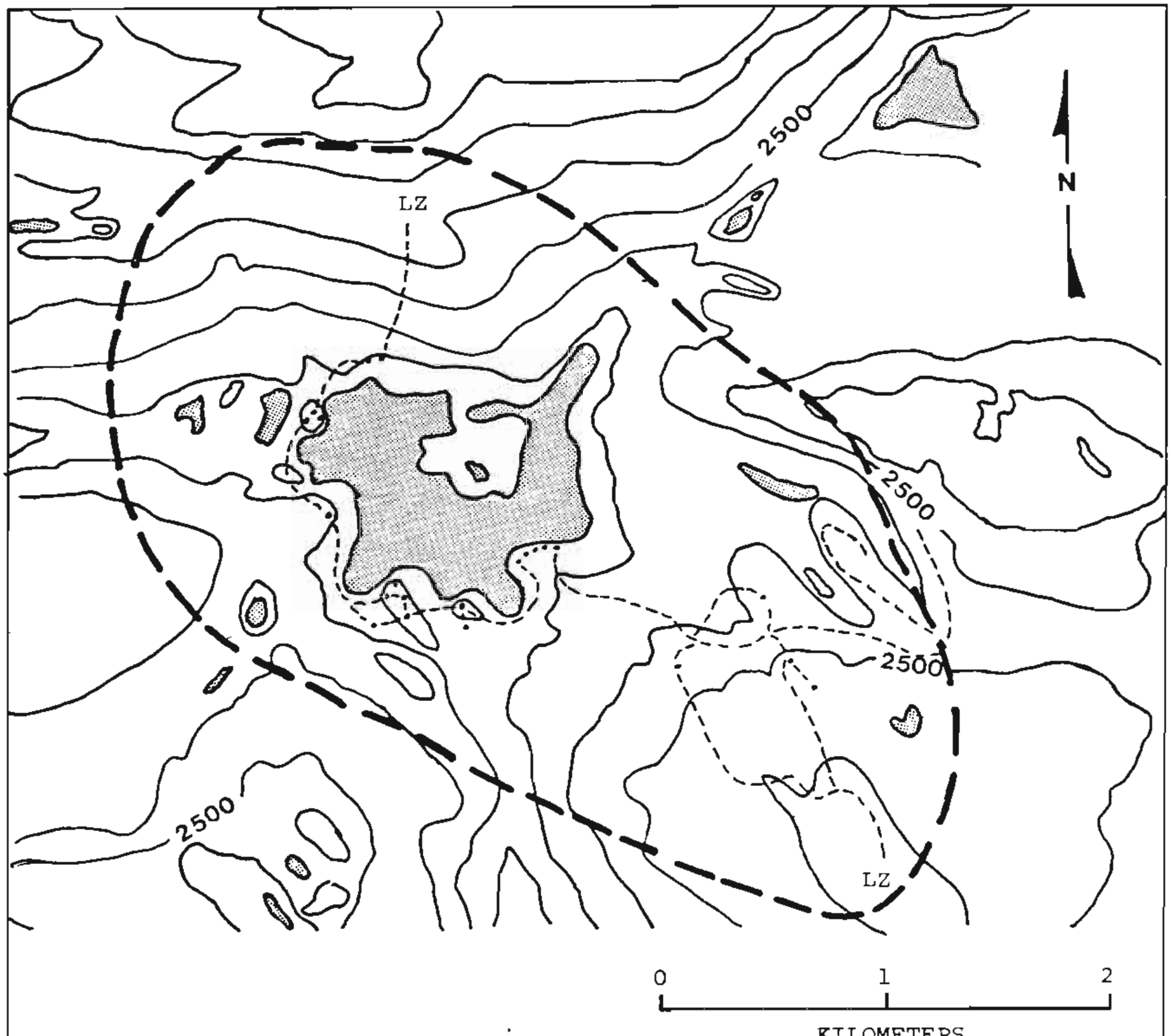


Figure 164.

Surface reconnaissance and subsurface testing in survey locale 52.



Surface Reconnaissance ------------

Subsurface Test --·--·--·--

Helicopter Landing Zone LZ

Survey Locale 53 Boundary — — —

Contour Interval: 100 ft.

Talkeetna Mts. D-5
T.32N R.1E Sec. 24, Sec. 25
T.32N R.2E Sec. 19, Sec. 30

Figure 165.

Surface reconnaissance and subsurface testing in survey locale 53.

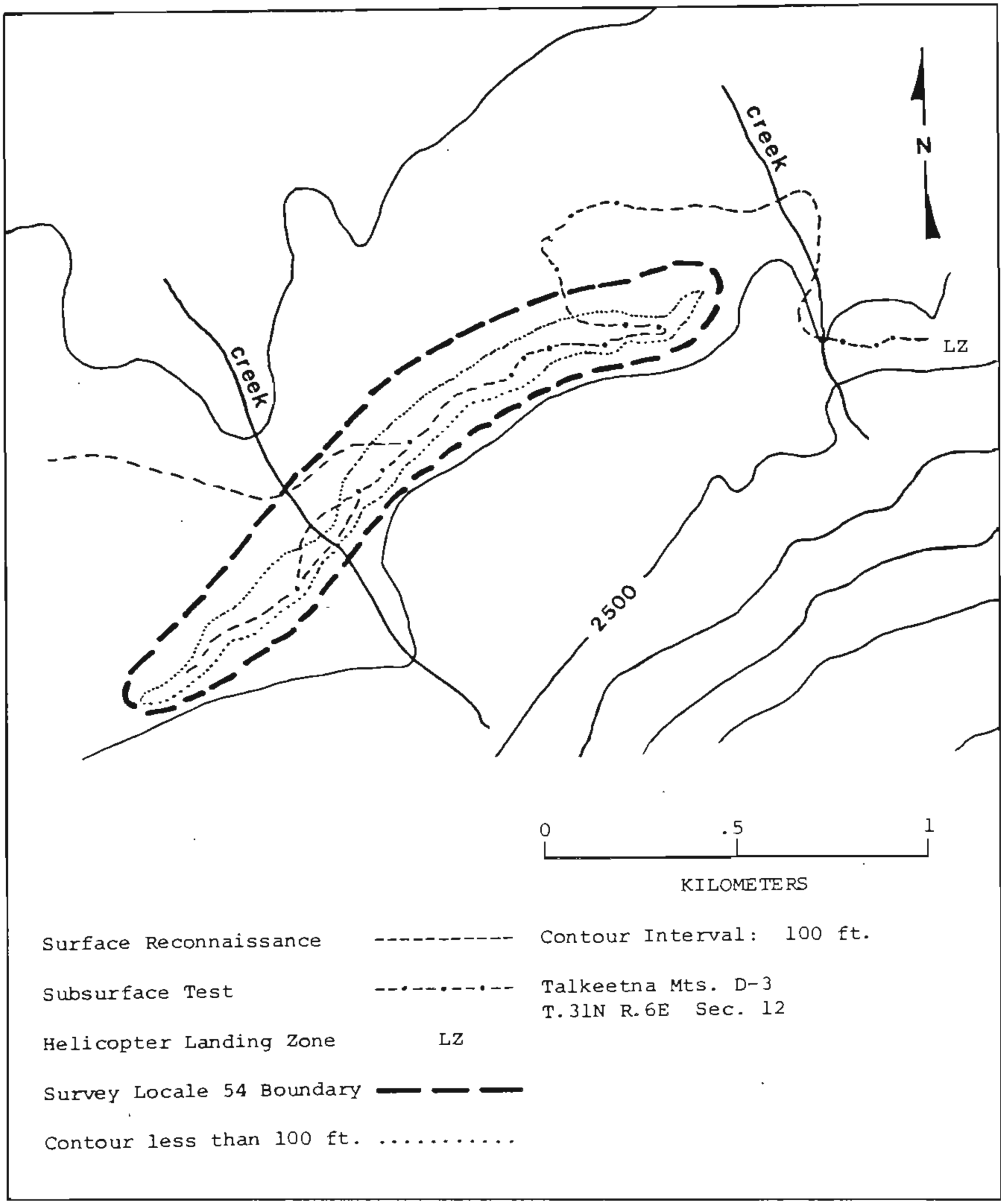


Figure 166.

Surface reconnaissance and subsurface testing in survey locale 54.

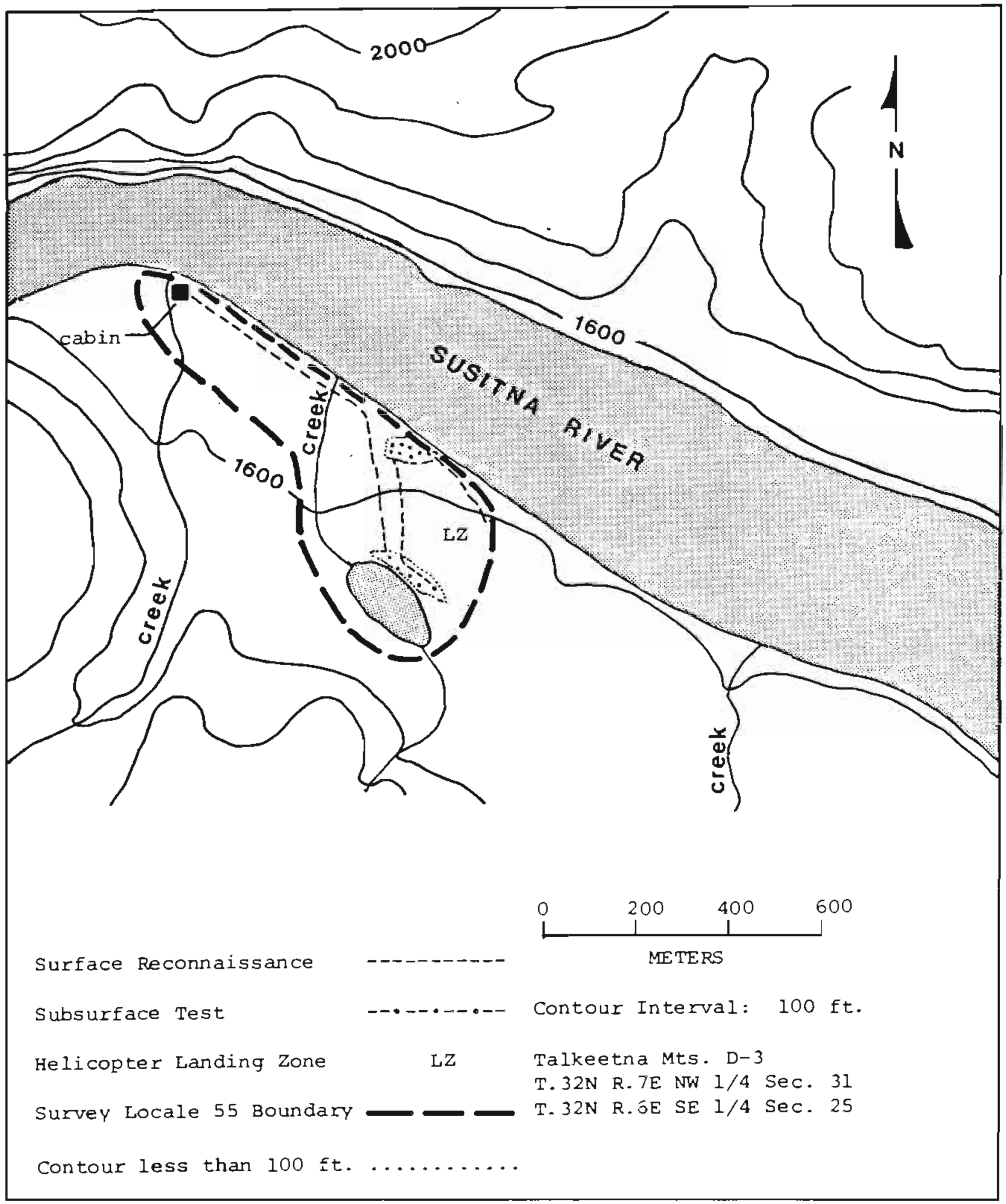


Figure 167.

Surface reconnaissance and subsurface testing of survey locale 55.

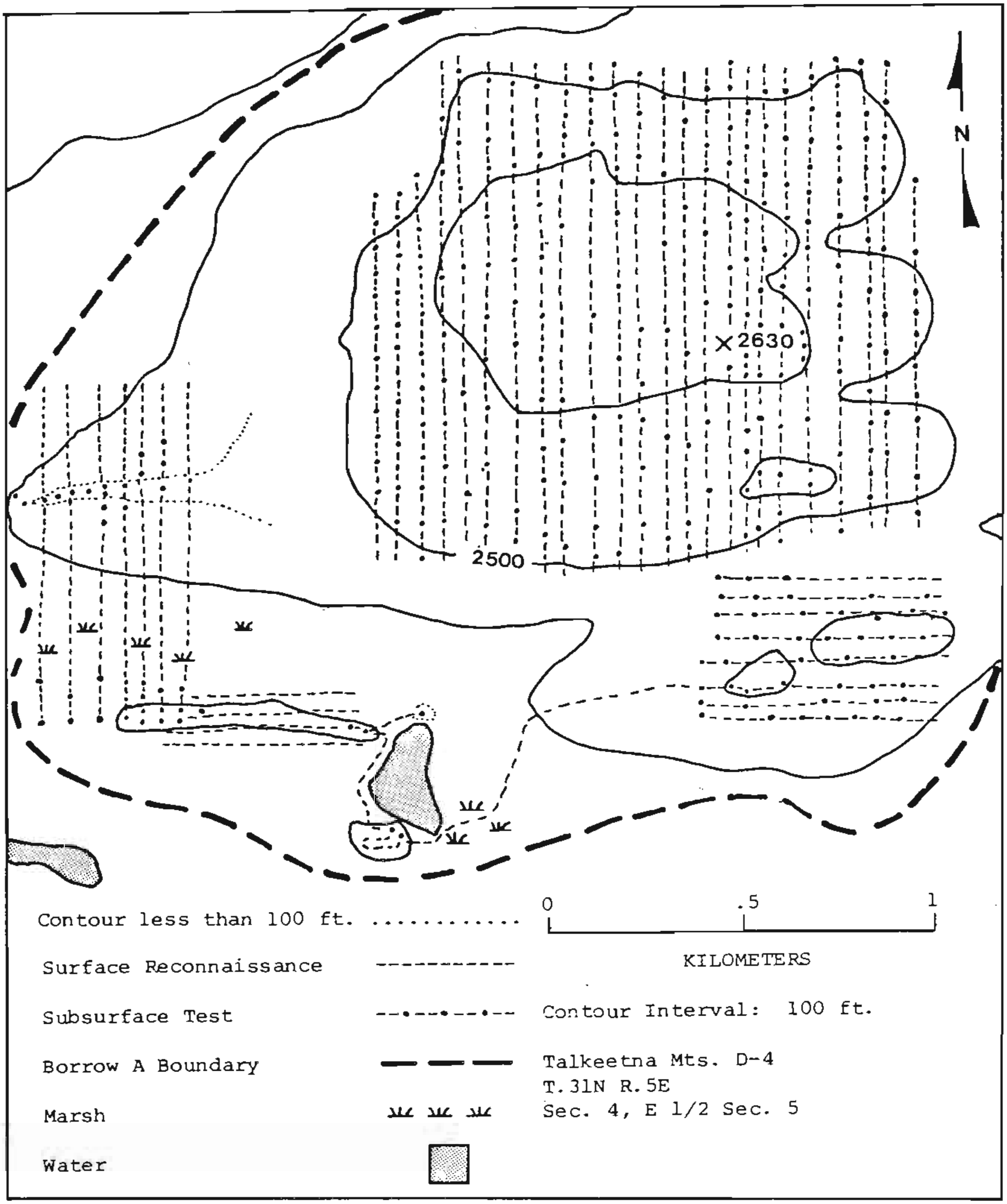


Figure 168.

Surface reconnaissance and subsurface testing in Borrow A.

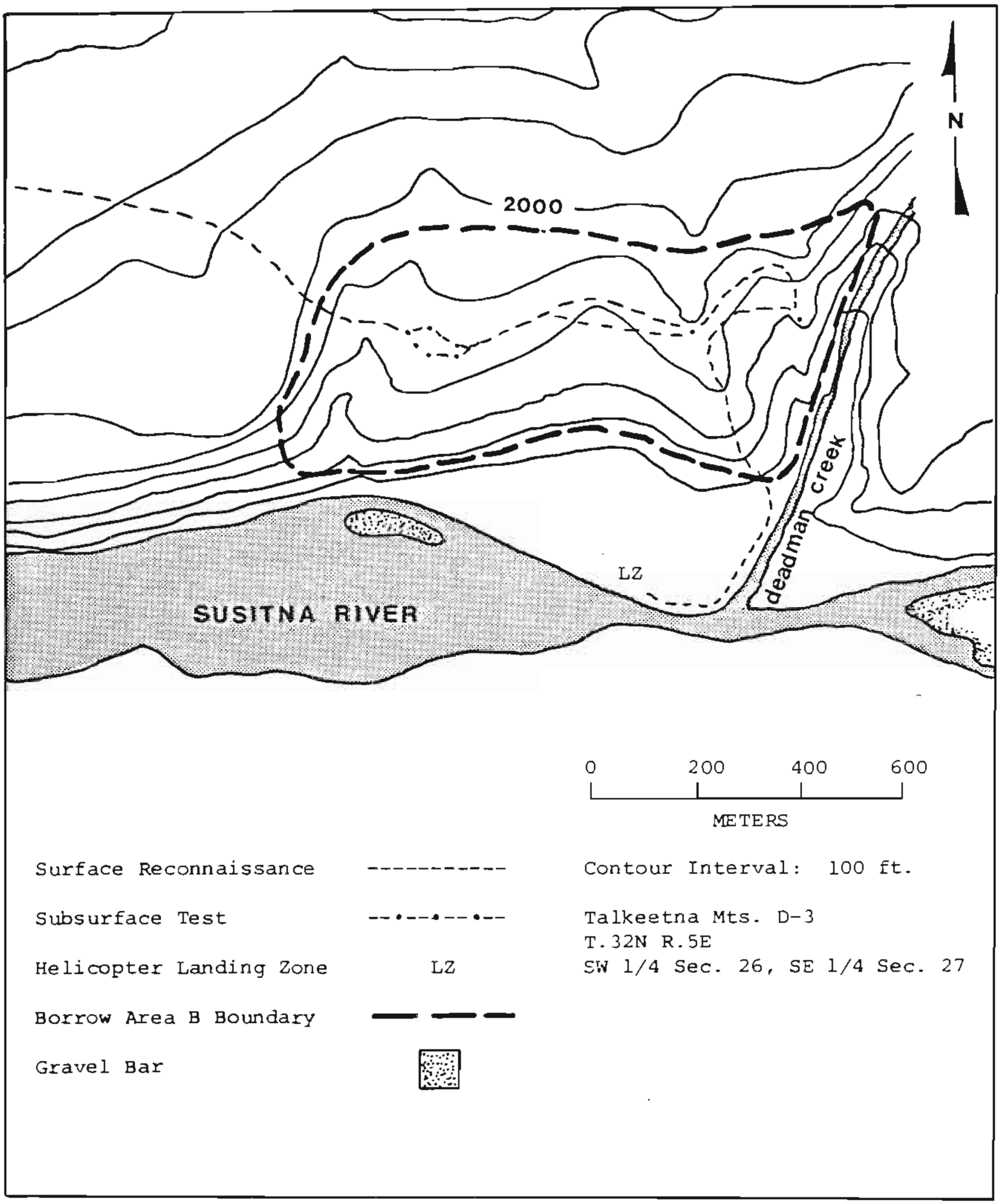


Figure 169.

Surface reconnaissance and subsurface testing in Borrow B.

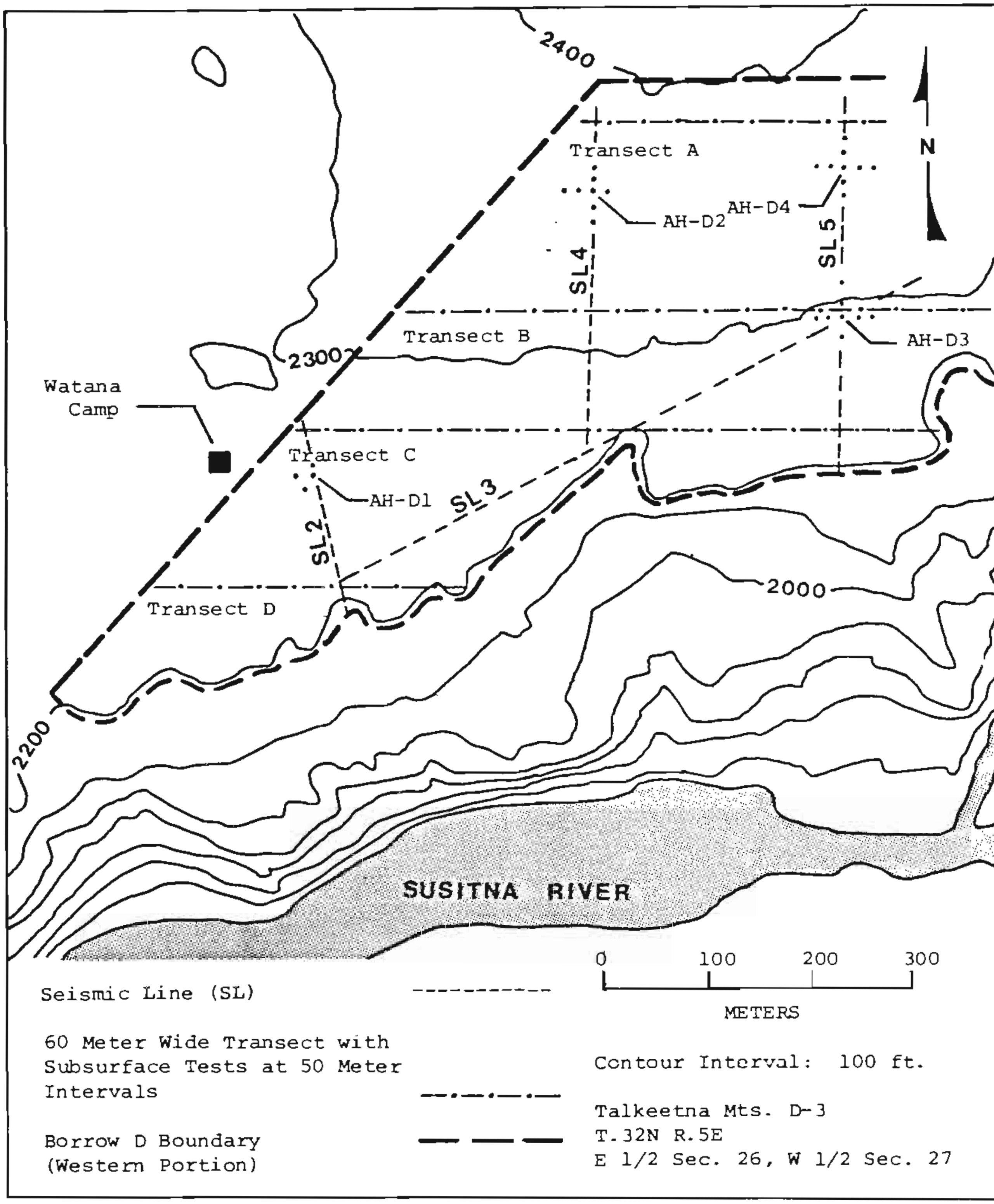


Figure 170.

Surface reconnaissance and subsurface testing in Borrow D.

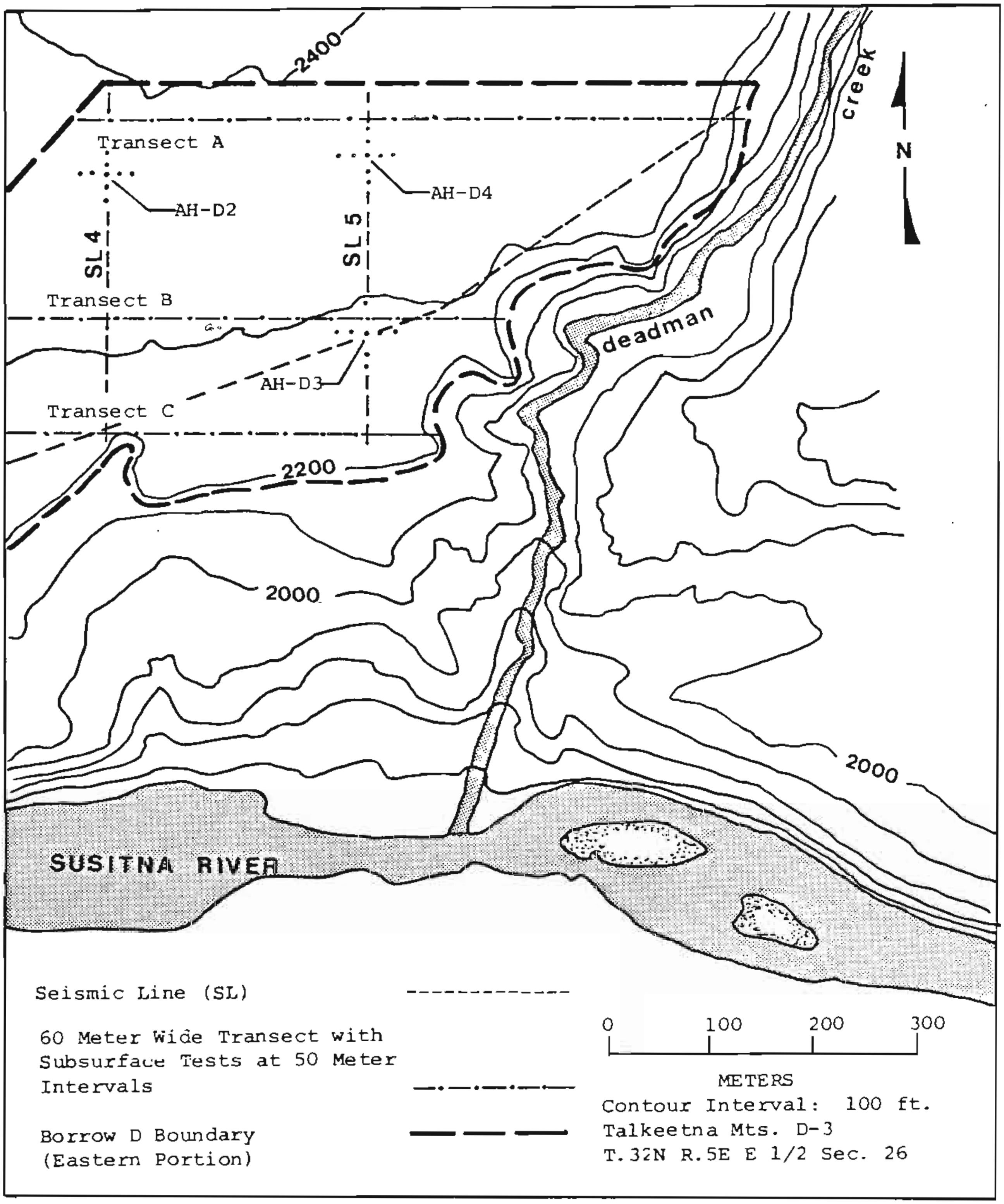


Figure 171.

Surface reconnaissance and subsurface testing in Borrow D.

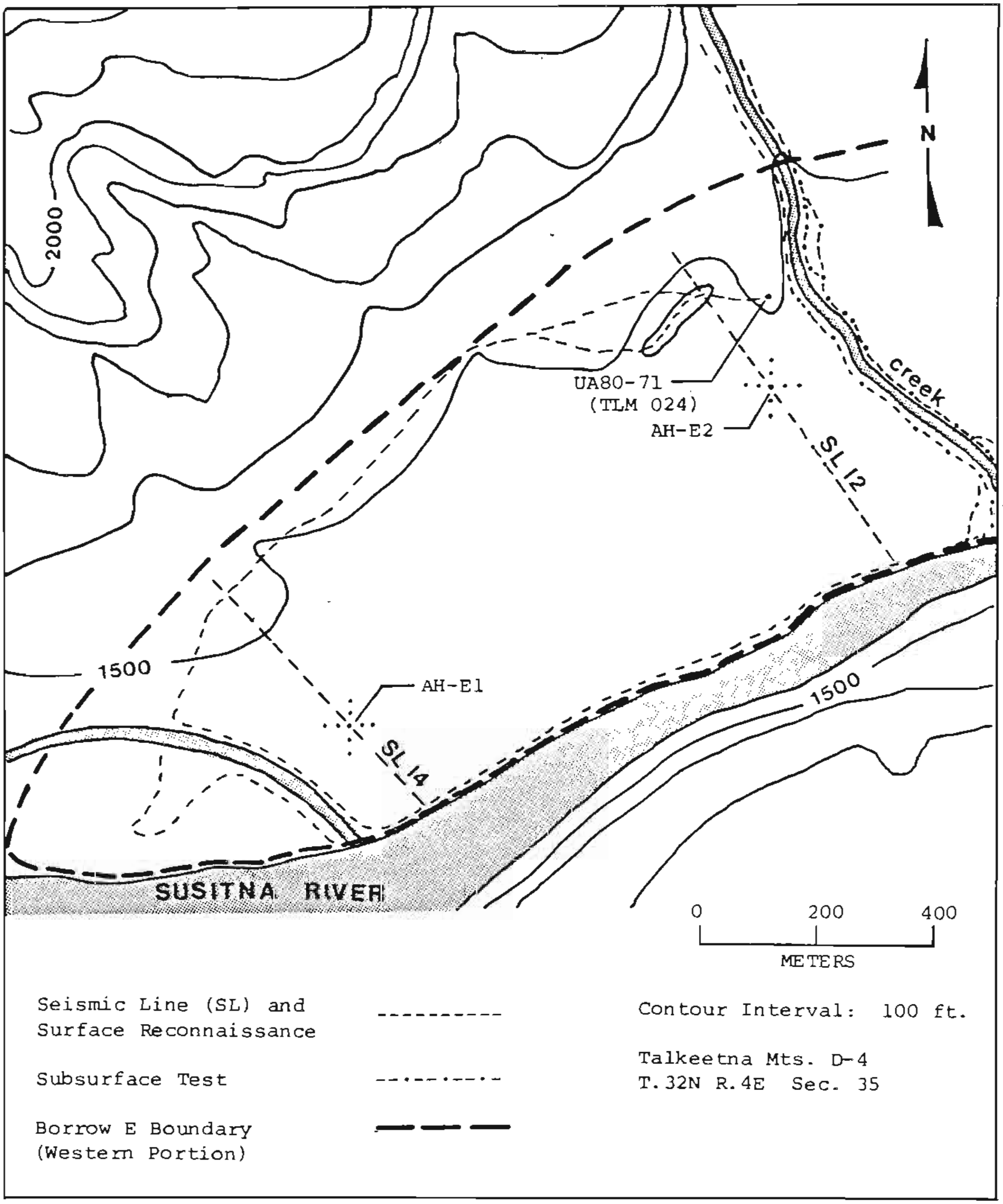


Figure 172.

Surface reconnaissance and subsurface testing in Borrow E.

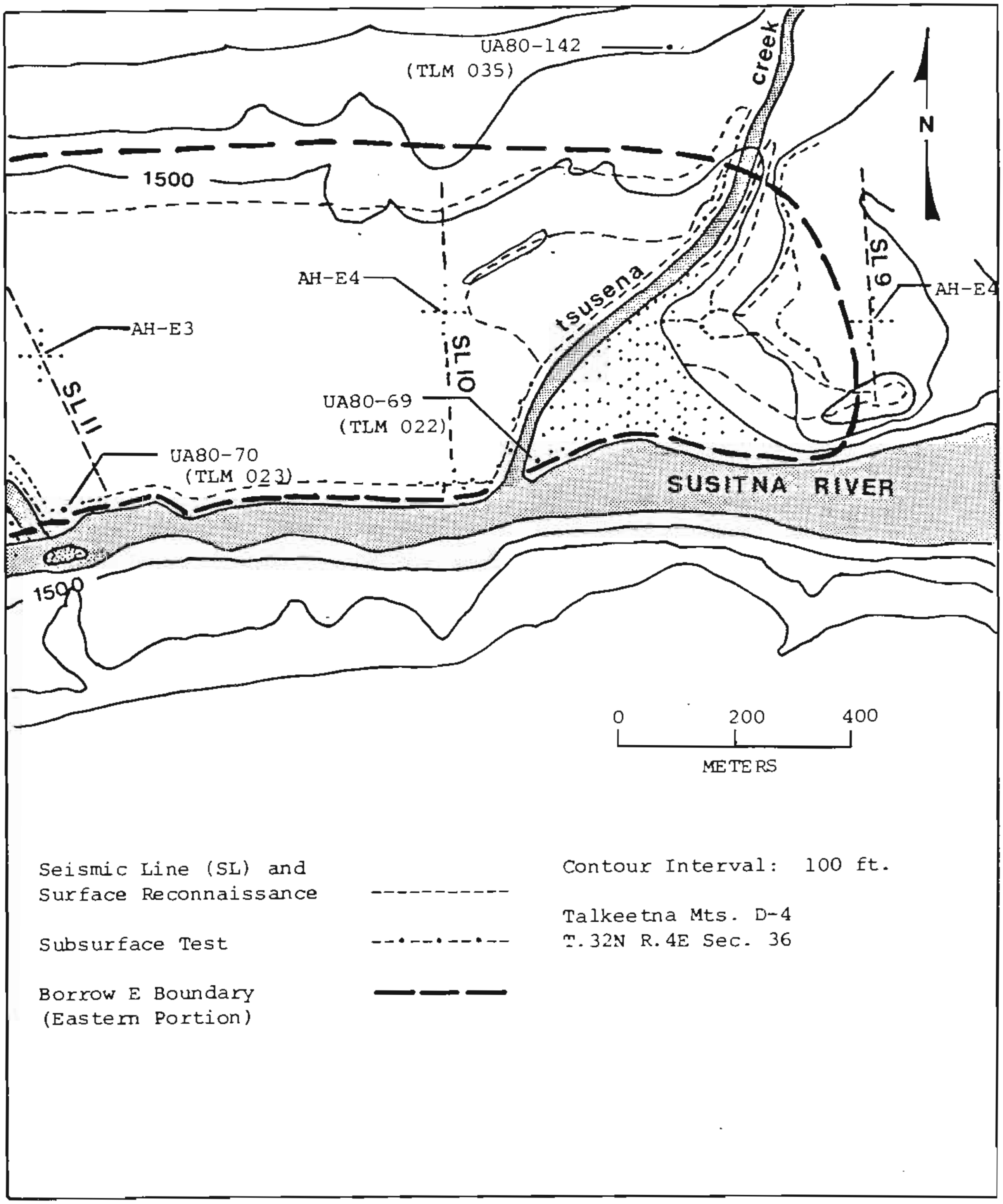
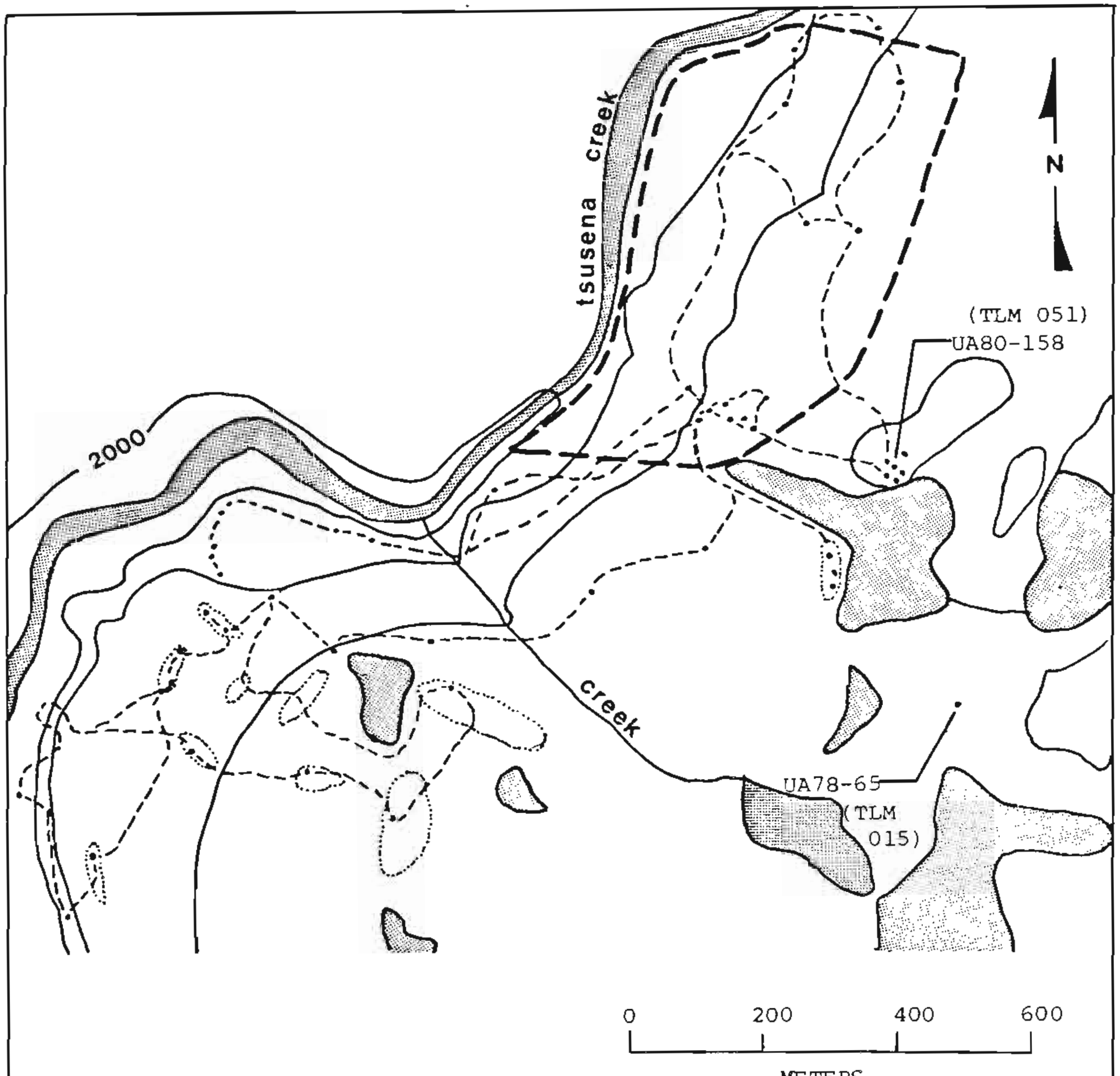


Figure 173.

Surface reconnaissance and subsurface testing in Borrow E.



Surface Reconnaissance - - - - - - - - -

Subsurface Test - - • - - • - - • -

Borrow F Boundary ▬ ▬ ▬

Contour less than 100 ft. . . . .

Contour Interval: 100 ft.

Talkeetna Mts. D-4
T.32N R.5E
SW 1/4 Sec. 15, SE 1/4 Sec. 16
NE 1/4 Sec. 21, NW 1/4 Sec. 22

Figure 174.

Surface reconnaissance and subsurface testing in Borrow F.

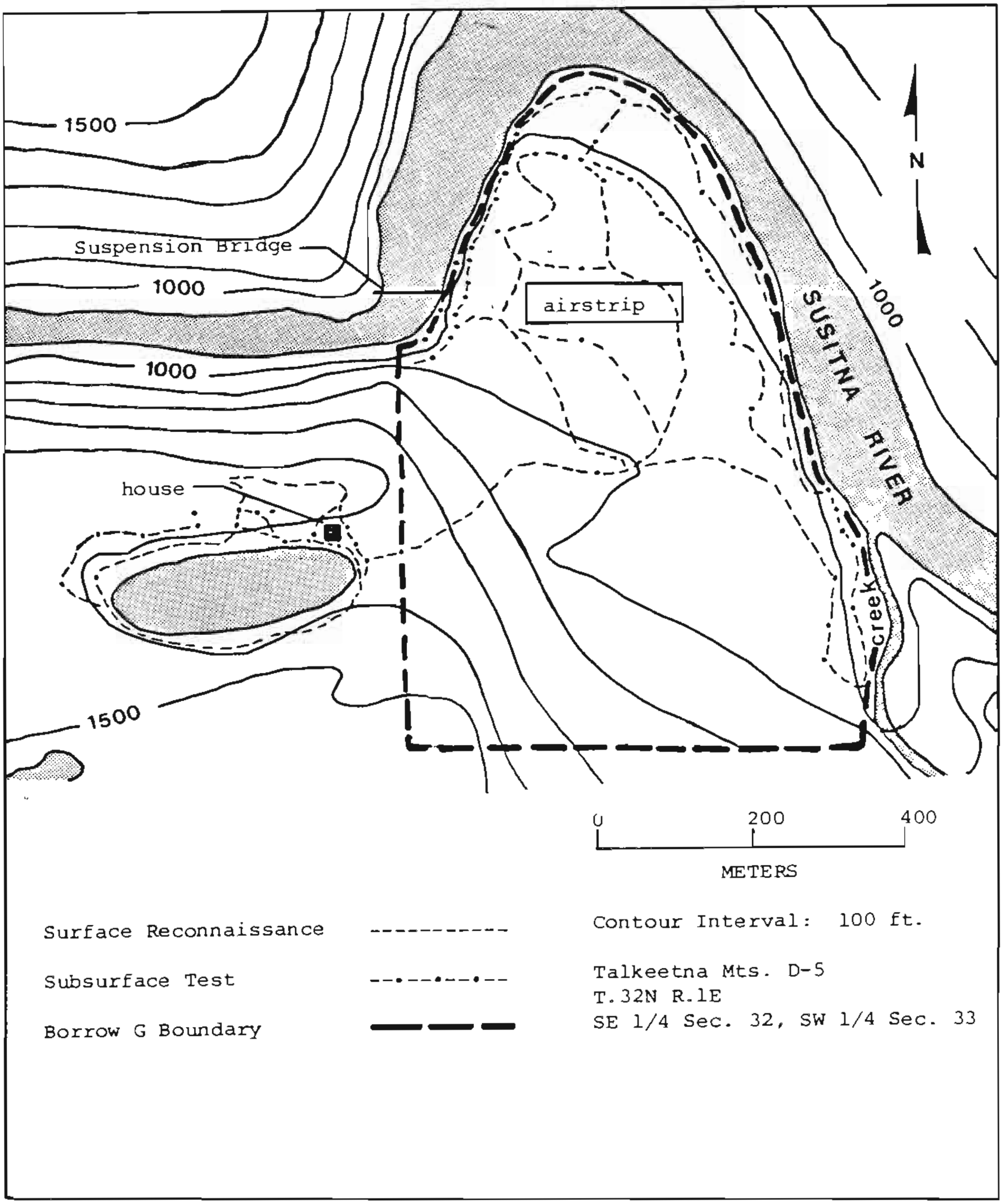


Figure 175.

Surface reconnaissance and subsurface testing in Borrow G.

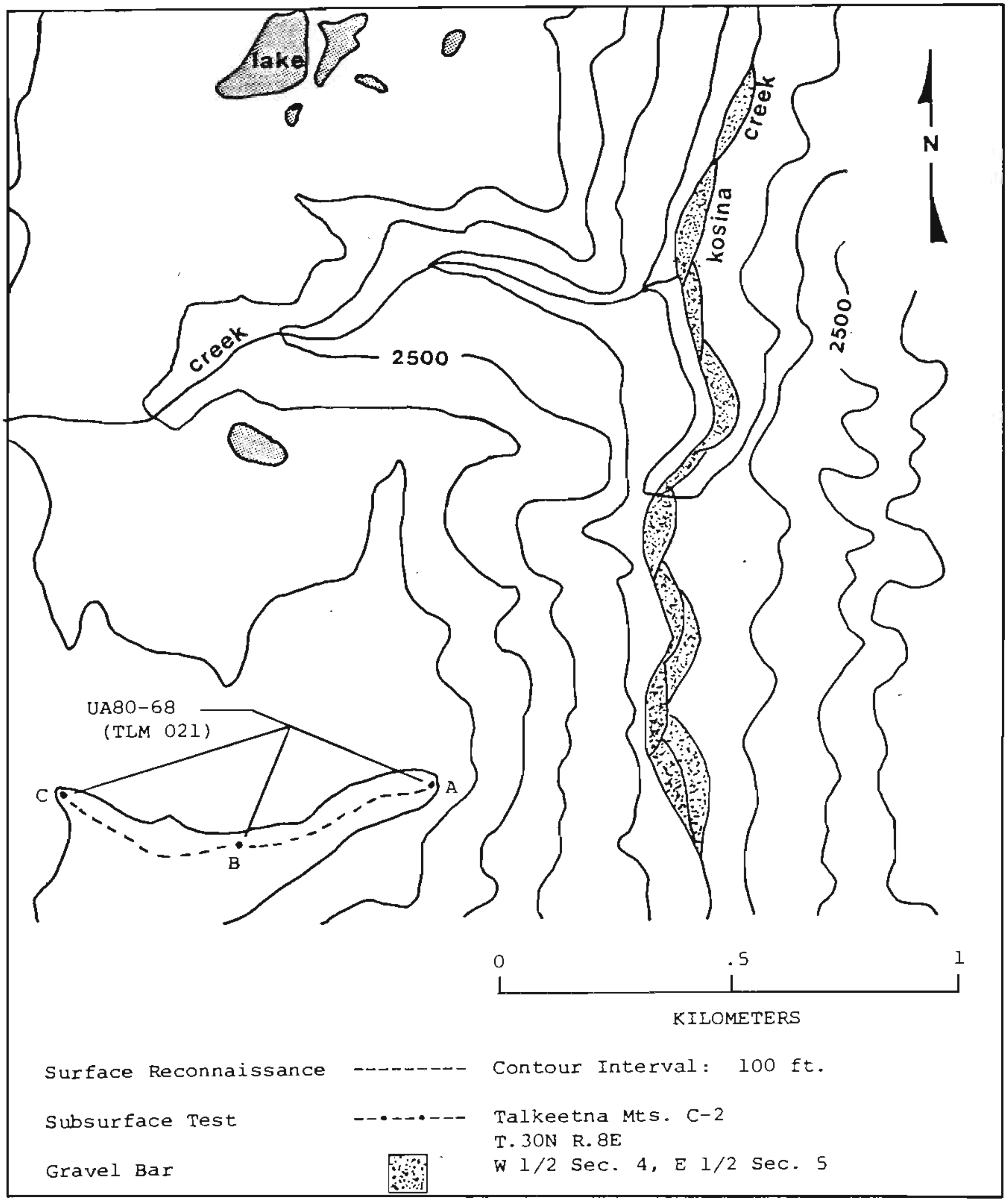


Figure 176.

Site UA80-68 (TLM 021).

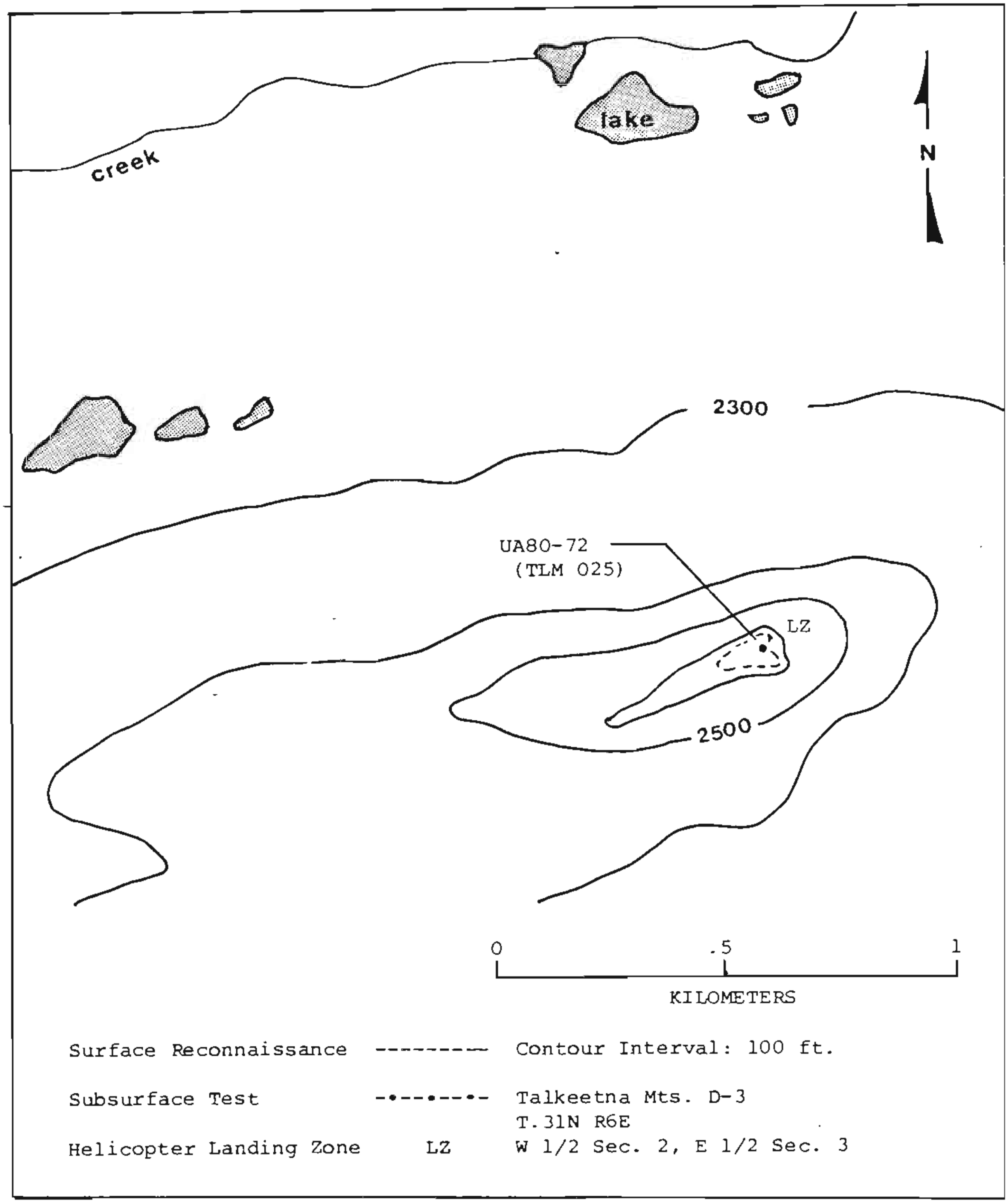


Figure 177.

Site UA80-72 (TLM 025)

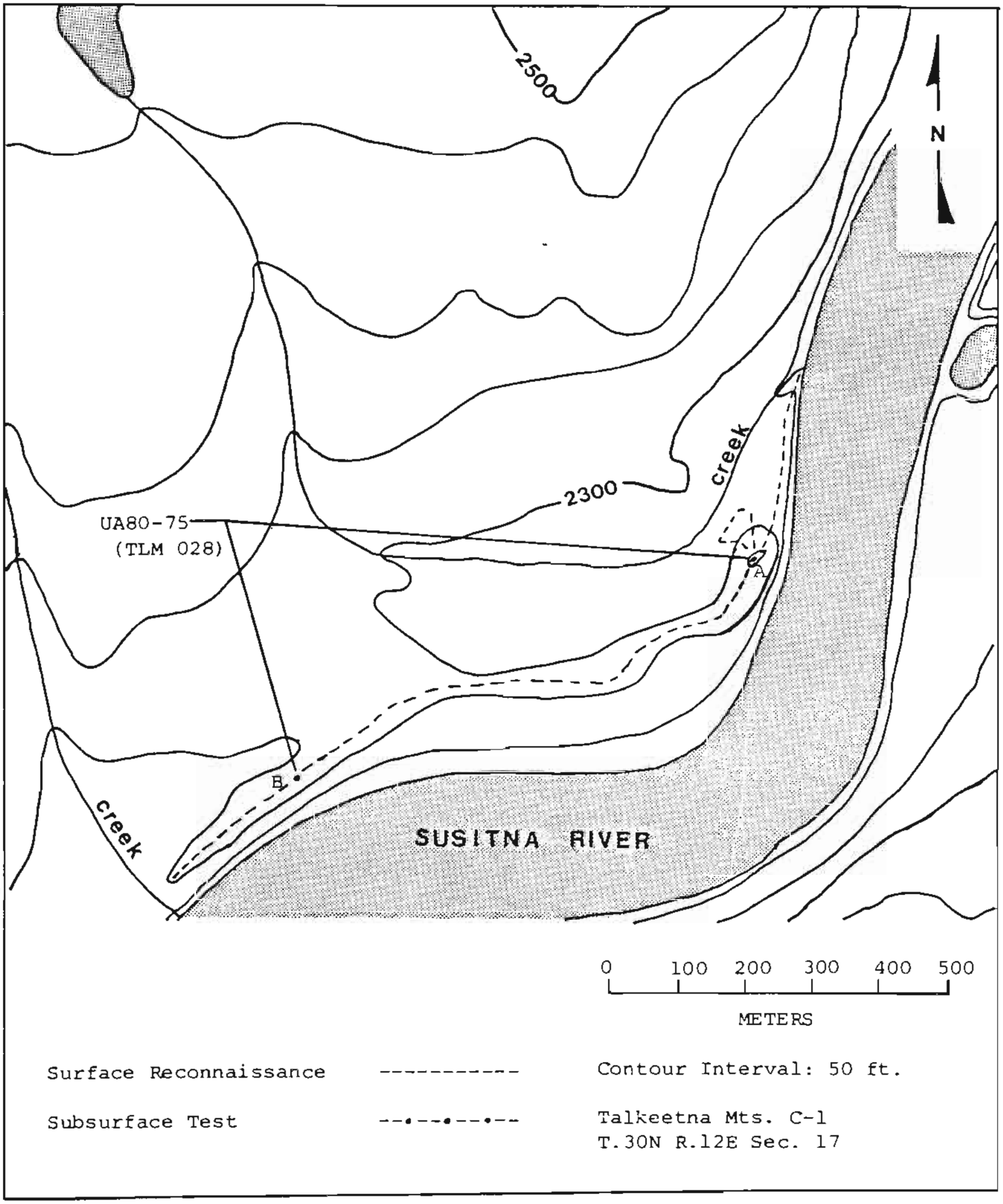


Figure 178.

Site UA80-75 (TLM 028)

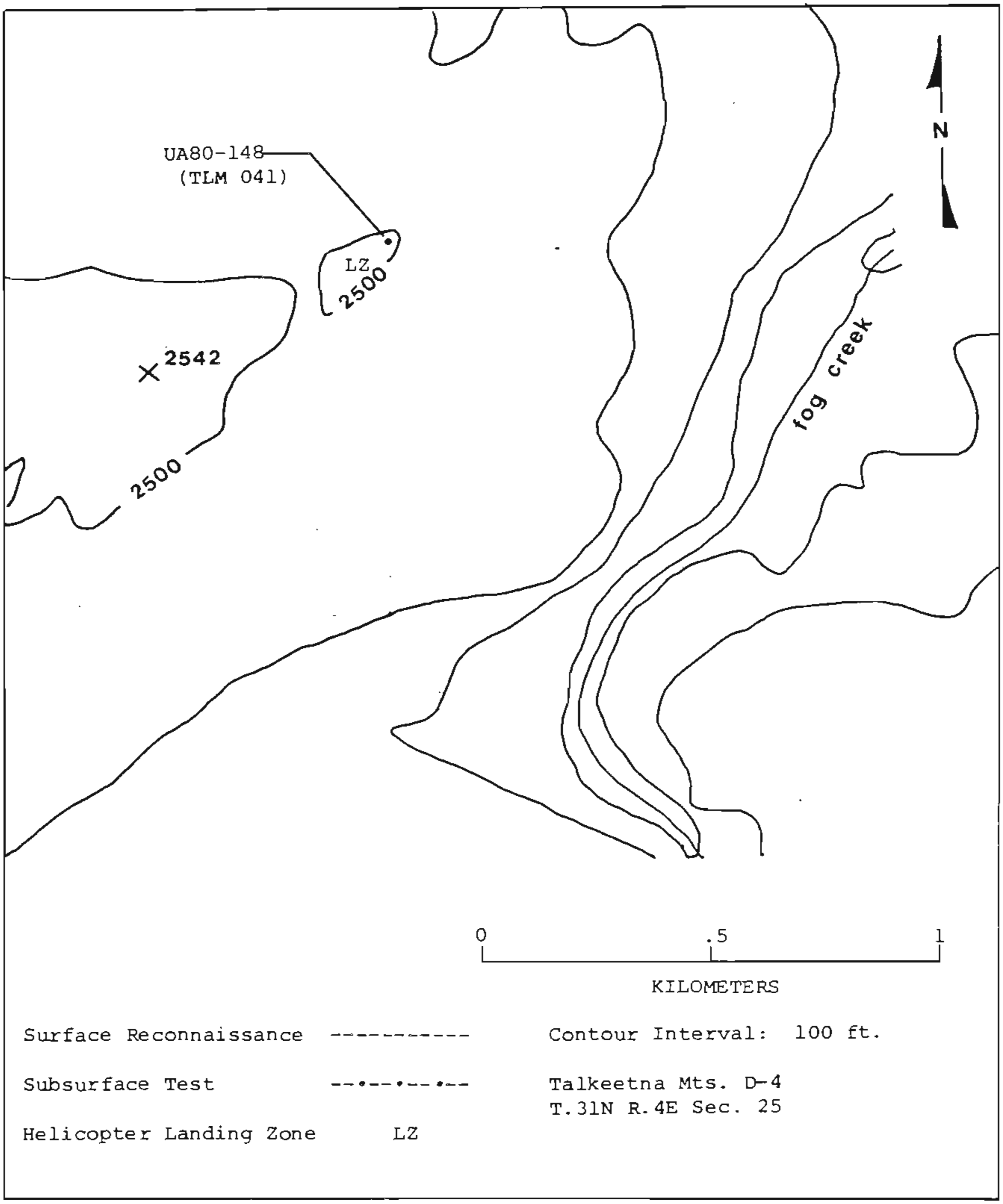


Figure 179.

Site UA80-148 (TLM 041)

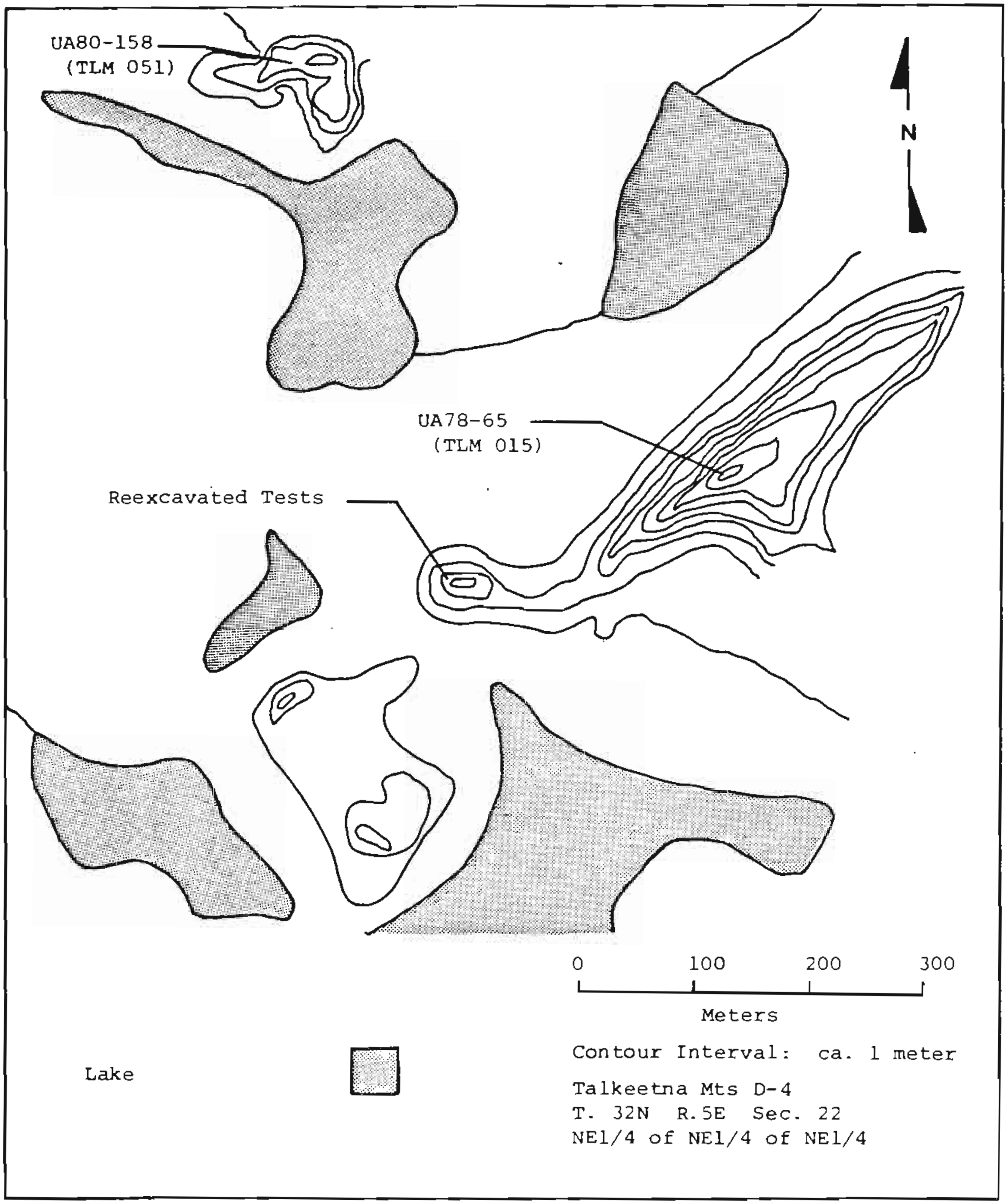


Figure 180.

Site UA78-65 (TLM 015)

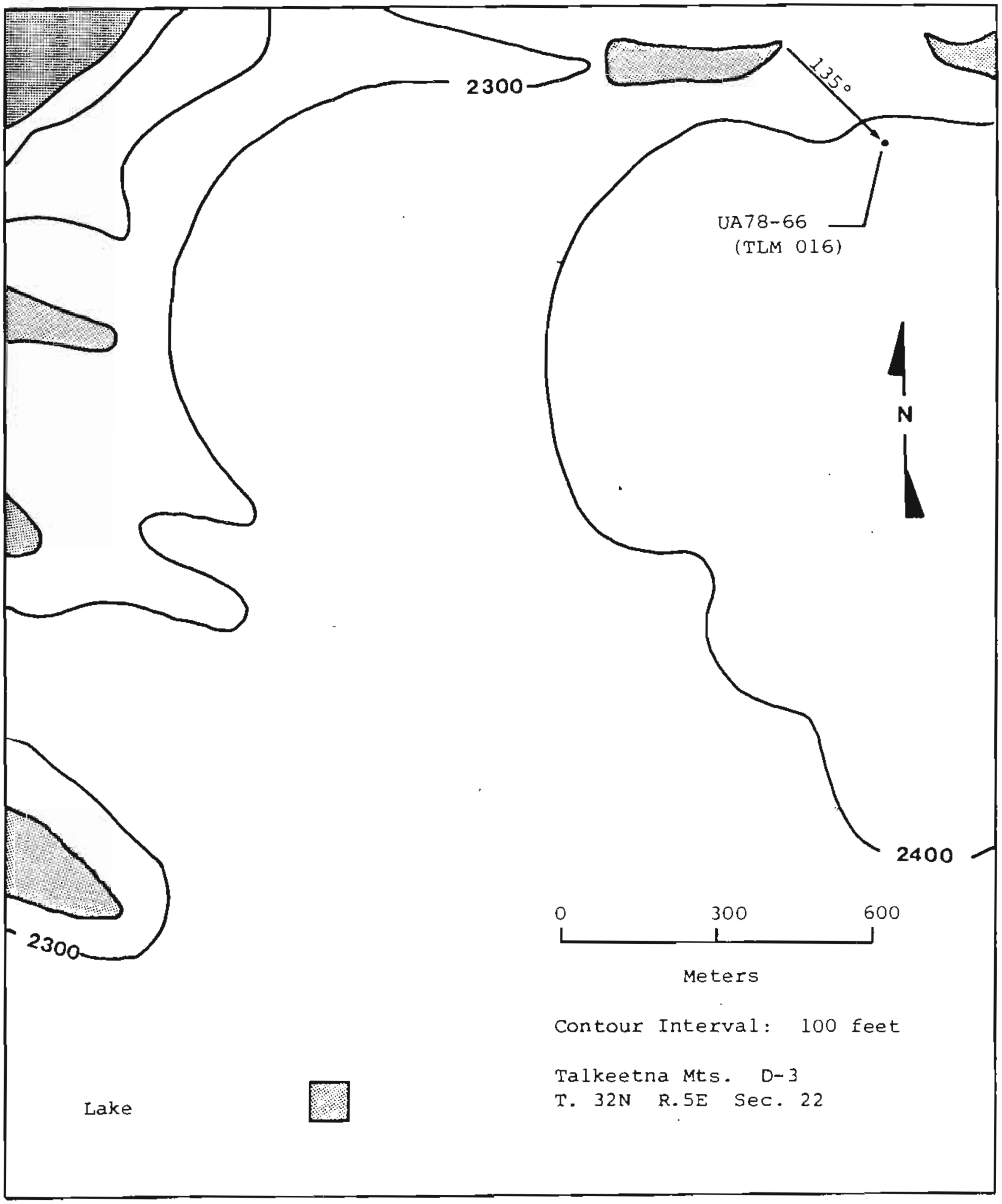


Figure 181.

Site UA78-66 (TLM 016)

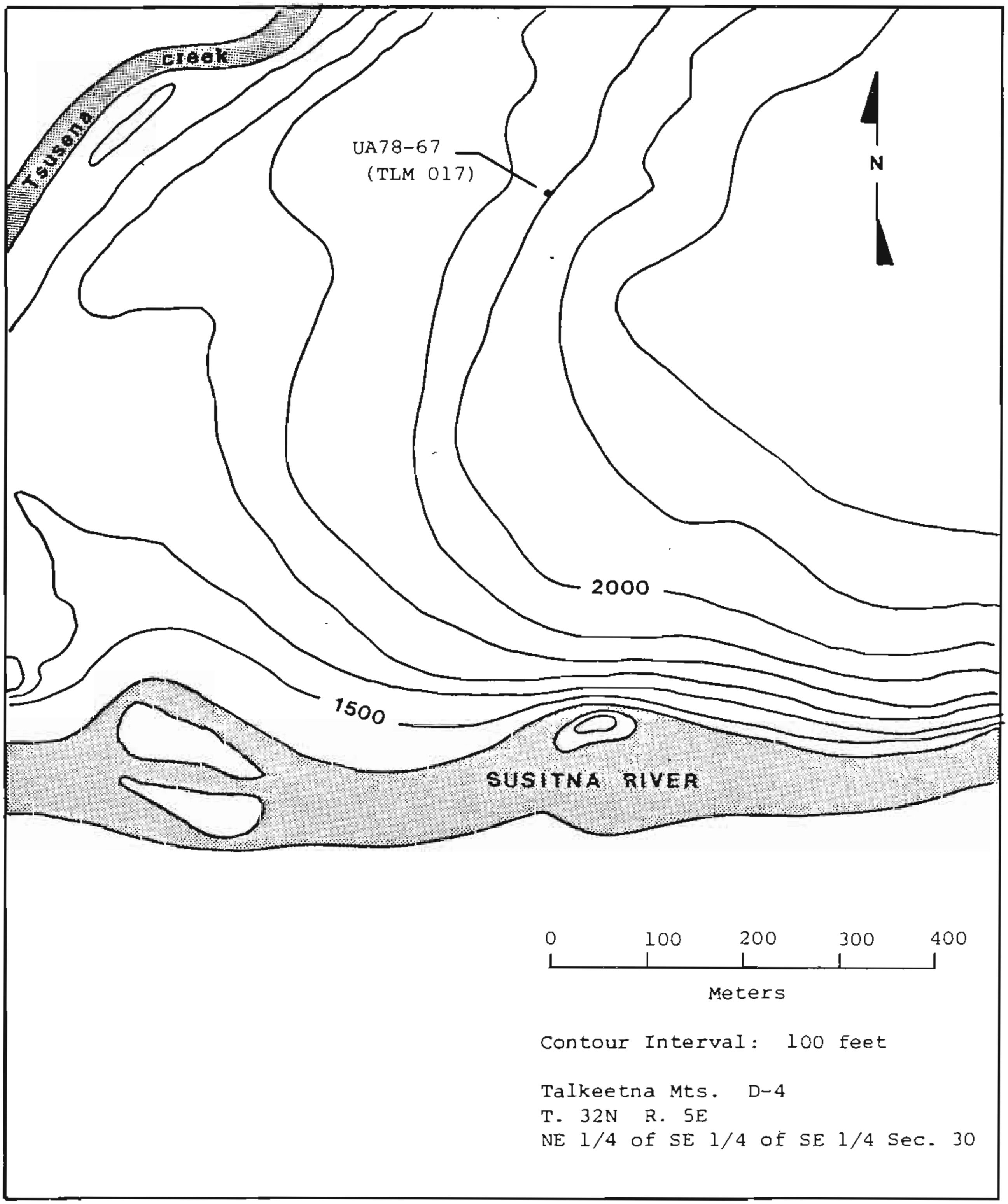


Figure 182.

Site UA78-67 (TLM 017)

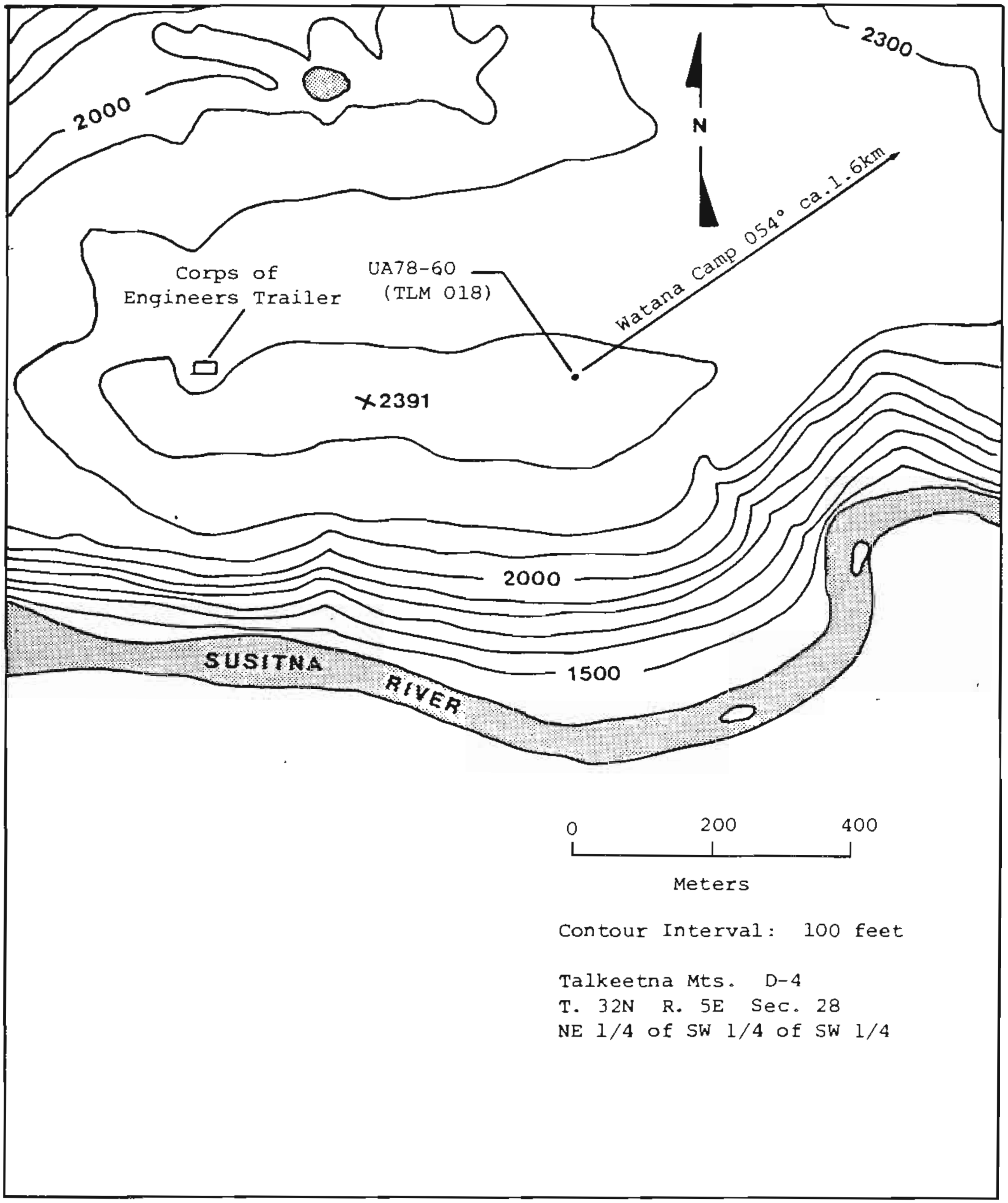


Figure 183.

Site UA78-60 (TLM 018)