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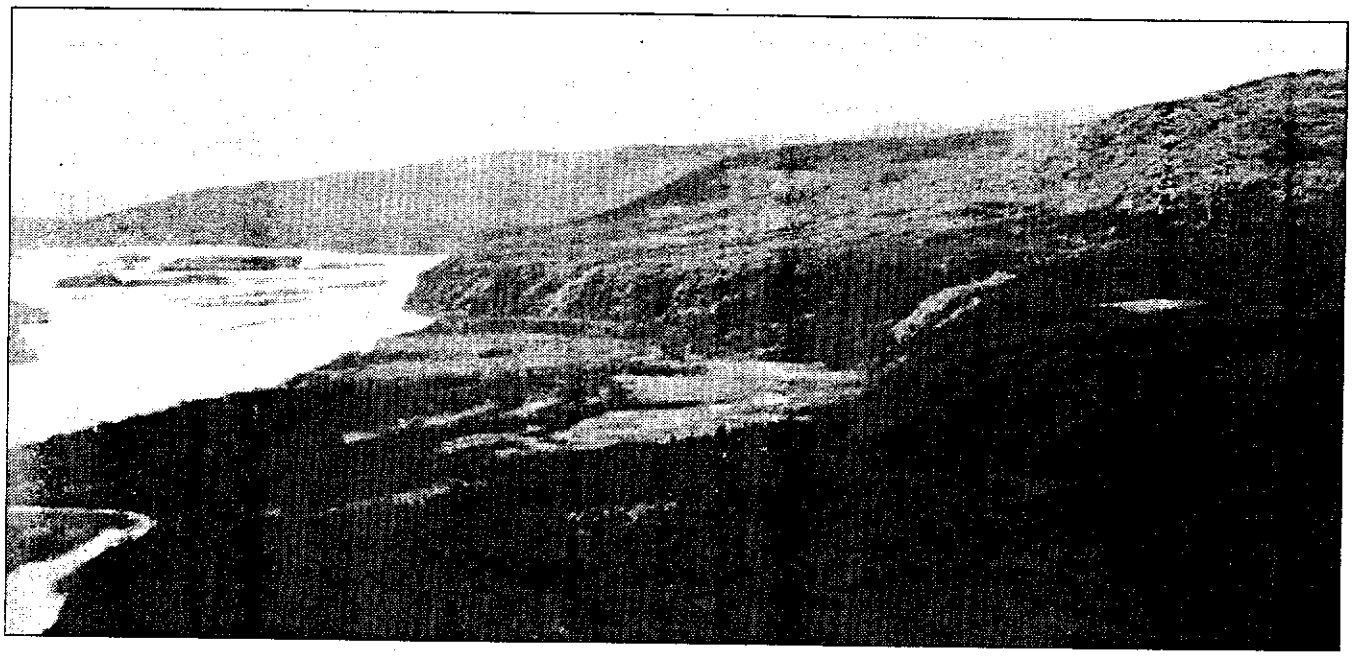
Surficial geology and sedimentology of Garner Creek, Ogilvie and Matson Creek map areas, western Yukon Territory

(115O/13, 115O/12, 115N/9 – east half)



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YUKON GEOLOGY PROGRAM

Yukon Economic Dev

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2000

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Cover photo. *View south along the Yukon River, approximately 6 km north of Indian River mouth. Note glaciofluvial terraces approximately 100 m above low-level alluvial plain, Section SM 96-21.*

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Surficial geology and sedimentology of Garner Creek, Ogilvie and Matson Creek map areas, western Yukon Territory

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INTRODUCTION

The central Yukon Territory has a number of favourable placer deposit settings (Table 1) due to its unique history of multiple glaciations, active stream sedimentation, in association with proglacial outwash settings and terrain which has remained unglaciated (Morison, 1989 a,b).

Placer gold was found along the Stewart River on point bars in 1884 prior to the discovery of gold in the Klondike area. This was the first indication that the Yukon Territory contained important economic concentrations of placer gold.

This study is concerned with the late Tertiary and Quaternary geology in the lower Stewart River and adjacent Yukon River above Dawson. Previous systematic surficial geological mapping and testing for placer gold on the high-level terraces along these rivers has been limited. This report describes the sedimentology and stratigraphy of key gravelly exposures in this area because similar high-level terraces in the Fortymile River drainage in Alaska had been mined for gold for many years. Work of this type also provides information on the physical characteristics of gravelly deposits (e.g. grain size distribution) which may assist regulatory decisions on placer mining in the lower Stewart and Yukon drainages.

Table 1. *Stratigraphy and general characteristics of placer gold deposits in Canada (from Morison, 1989b).*

	AGE				
	TERTIARY	QUATERNARY			
	PLIOCENE	PLEISTOCENE			HOLOCENE
Environment and geomorphic location of placers	Buried alluvial sediments in benches above valley floors	Preglacial or nonglacial buried alluvial sediments in benches above valley floors; valley fill alluvial sediments; alluvial terraces	Interglacial valley fill alluvial sediments; alluvial terraces	Glacial benches of proglacial and ice contact deposits; terminal valley moraines and alpine drift	Valley bottom alluvial plains and terraces, colluvium and slope deposits
General sediment characteristics	Mature sediments; well-sorted alluvium with a diverse assemblage of sediment types	Locally derived gravel lithology; moderately to well sorted alluvium which is crudely to distinctly stratified	Mixed gravel lithology; moderately to well sorted alluvium, crudely to distinctly stratified	Regionally derived gravel lithology; variable sorting and stratification depending upon type of glacial drift	Mixed gravel lithology; moderately to well sorted alluvium, crudely to distinctly stratified; poorly sorted, massive slope deposits
Gold distribution	Greater concentration with depth	Discrete concentration throughout to pay streaks at base of alluvium	Discrete concentrations throughout to pay streaks at base of alluvium	Dispersed throughout	Discrete concentrations throughout to pay streaks at base of alluvium; pay streaks follow slope morphology
Mining problems	Thick overburden	Thick overburden; variable grade	Variable grade	Low grade and larger volume of material	Variable grade and small volume of auriferous sediment
Examples	"White Channel Gravel" of the Klondike area, Yukon Territory	Preglacial fluvial gravel, Clear Creek drainage basin and unglaciated terrain and Sixty Mile River area, Yukon Territory	Interglacial stream gravels in Atlin, British Columbia	Glaciofluvial gravel in Clear Creek drainage basin, Yukon Territory	Valley bottom creek and gulch placers in Clear Creek drainage basin, Yukon Territory

Ted Fuller, formerly with the Canada-Yukon Geoscience Office, initiated the project and focussed upon high-level terraces in the lower Stewart River drainage in 1993 to 1995. A summary report is in preparation, although his measured sections are included as appendices to this report. The investigation was extended in 1996 and 1997 to include the Yukon River terraces downstream of the confluence of the Stewart River, and adjacent lower Sixtymile River drainage. Contracts were let to produce these maps (in pocket), including compilation and integration, where possible, of the field information collected by Fuller, as well as new measured stratigraphic sections and examination of pebble and heavy mineral samples.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. A. Duk-Rodkin, Geological Survey of Canada (GSC) for her insights and the sharing of information during the field season. Dr. M. Kunk, United States Geological Survey (USGS) and Dr. N. Naeser, (USGS) provided important published and unpublished strategic information and personal insights about the tephra which is found in White Channel Gravels on Quartz Creek. Mr. Forest Pearson compiled the field data collected by Fuller and provided superior technical assistance in the field and always made sure we were on track during field traverses. Shelly Jober also assisted with the collection of gravel samples for heavy mineral analysis. The fieldwork of Ted Fuller, with assistance from Farrell Anderson and Dianne Brent, provided important insights into the regional settings of gravel deposits in the Stewart River valley. Mougeot Geoanalysis completed the air photo interpretation and final editing for the surficial geology maps and Walton Geological Services (Lori Walton) extracted and studied the heavy mineral fractions from the gravel samples collected in the field.

The project was begun under the Canada-Yukon Mineral Resource Development Cooperation Agreement (1991-1996), a subsidiary agreement under the Canada-Yukon Economic Development Agreement. It was completed under the Yukon Geology Program, jointly sponsored by Exploration and Geological Services Division, Mineral Resources, Indian and Northern Affairs Canada and the Mineral Resources Branch, Department of Economic Development (Government of Yukon). The support personnel and facilities of the Geoscience Office and H.S. Bostock Core Library (Indian and Northern Affairs Canada) have been of critical importance. Special thanks are due to Forest Pearson and Will van Randen for digital cartography. An earlier draft of this manuscript was read by Charlie Roots and Grant Lowey, and their comments are appreciated.

Most important has been the placer miners of the area, who have almost without exception, welcomed us, discussed our ideas and showed us new paths to discovery. Their cooperation and support are sincerely appreciated.

Finally, the authors are grateful to Trevor Bremner and Rod Hill for initiating this project and Grant Abbott and Shirley Abercombie for supporting the completion of this project.

PREVIOUS WORK

Fuller (unpub.) prepared an excellent summary of the early work by Geological Survey of Canada and the original glacial limits mapping and surficial geological mapping work by Bostock (1966) and Hughes et al., (1969).

Yeend (1990) described the placer mining potential of high-level (about 180 m above valley bottom) and intermediate-level (about 50 m above valley bottom) terraces in the Forty Mile drainage basin in Alaska. Ager et al. (1994) reported auriferous, high-level fluvial terraces in east-central Alaska on the margins of the Yukon River valley (Fig. 1). These high-level terraces are interpreted to be Pliocene in age and have two major fluvial units which are disconformably related. The lower unit (below the unconformity) was deposited in a braided river environment with locally derived clast lithologies. The upper unit (above the unconformity) is interpreted as a late Pliocene gravel unit, because the larger clast sizes in the gravel are thought to be related to regional glaciation in the Yukon River drainage basin. Gravel deposits on these high-level terraces are covered with wind blown sand and silt which is interpreted to be mid-Pliocene to Quaternary (Westgate et al., 1990). These terraces are found up to 150 m above the present day Yukon River. Incision of these surfaces is the result of uplift in the upland areas and subsidence in the lower reaches of the Yukon River.

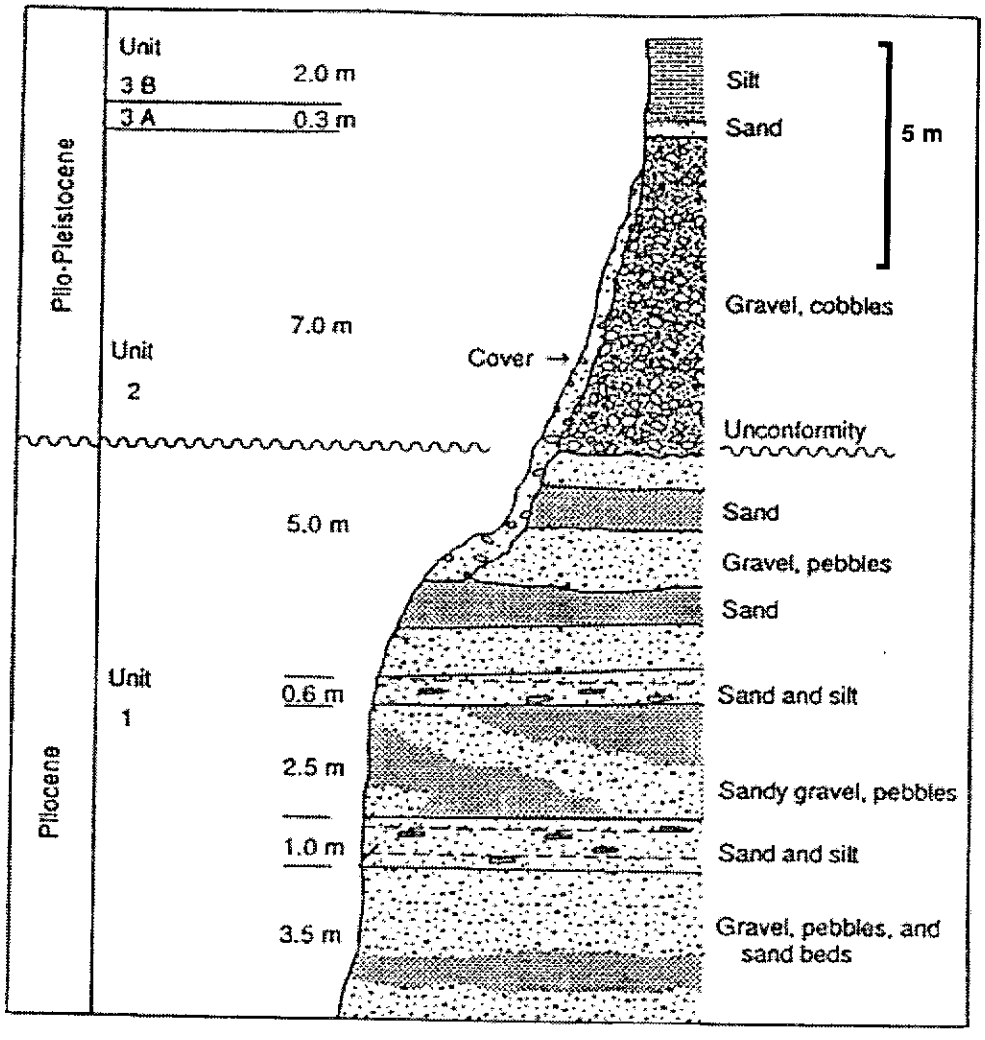

Figure 1. *Gravelly stratigraphy, east-central Alaska (Ager et al., 1994). Note the unconformity between the underlying non-glacial fluvial sand and gravel, and the overlying glacial-derived gravel.*

Fuller (unpub.; 1994 a; 1995a and Appendices 1,2,3) described the high-level terraces along the Yukon River and Sixty Mile River areas as Pliocene surfaces that contain gravel deposits capped with loess. The older Pliocene age is based on paleosol development and the elevations of these surfaces which varies from 43 to 88 m above present day river level. Fuller (1995a) further indicated that the paleoflow direction was northerly for these surfaces. The elevation of the high-level terraces increases in a northerly direction which is the result of uplift in the Dawson area (Fuller, 1995a). Placer gold occurrences were documented at many sites, particularly in high-level terraces in the Yukon River valley and downstream from the Sixty Mile River drainage basin. The exposures measured by Fuller are included in this report (Appendices 1, 2 and 3). Fuller (1994a) also suggested there may be three pre-Reid terrace levels including: 1) an all-time highest glacial level; 2) an intermediate advance or retreat level; and 3) a lower outwash level. Fuller (1993a,b) also documented high-level glaciofluvial terraces at the mouth of Black Hills Creek.

Morison (1989a,b) and Levson and Morison (1995) described the late Cenozoic stratigraphy and sedimentology of gravelly placer deposits in central and southern Yukon. Five regional settings are described ranging from later Pliocene to Holocene in age.

Froese and Hein (1996) completed a sedimentological study of an intermediate-level gravelly terrace near Dawson City which supported significant placer mining activity over five years. The gravelly deposits on this terrace are interpreted to represent a combination of an interglacial, wandering gravel bed river system and a glacially related proximal braided river system. They summarized the following factors as being important for the concentration and preservation of placer gold: 1) a period of fluvial sedimentation during an interglacial time period where local bedrock sources can be incorporated into a concentrating stream environment which, in this case, was defined as a laterally accreted gravel bed system; 2) the preservation of these underlying auriferous gravels by the deposition of proglacial gravelly sediments; and 3) preservation of the terrace system. They conclude that there is significant potential for the discovery of similar interglacial gravel deposits on terrace systems in the Stewart River valley and Fortymile River valley areas.

Bond (1996) documented the Quaternary history of the Stewart River drainage basin in the McQuesten map area in central Yukon. This map area has examples of four regional Cordilleran glaciations, and two interglacial periods that correspond to the pre-Reid, Reid and McConnell glacial advances. He further indicates that favourable placer deposit settings are found in unglaciated areas, in areas where glacial drift is thin and discontinous, and in high relief areas. There are also examples of reworked placer gold in glaciofluvial deposits.

Tempelman-Kluit (1980) and Duk-Rodkin (1997) have suggested that the diversion of the Yukon River drainage basin from a southerly flowing system through the St. Elias range, to the current northward flow, is the result of pre-Reid glaciation that closed off the southerly direction of stream flow. Evidence for southerly flowing stream systems is largely based on inventories of pebbles found on high-level terraces at the confluence of the Fifteenmile River and the Yukon River. The pebbles have a provenance north of these high-level terraces.

Duk-Rodkin and Barrendregt (1997) described a series of glacial and interglacial environments of late Gauss to late Matuyama age in the Fifteenmile and Rock Creek areas. This data supports White et al. (1997), confirming a cooling climate in the late Pliocene with the onset of glaciation.

FIELD AND LABORATORY METHODS

The work carried out by T. Fuller between 1993 and 1995 involved:

- Air photo interpretation of terrace features, prior to fieldwork and again after the field season, for parts of ten 1:50,000 scale map areas in the Stewart River study area.
- Measuring terrace levels along the Stewart River valley. The lower reaches of major streams entering the Stewart River were mapped and sampled.
- Field visits to active and abandoned placer mines to document gravel stratigraphy and sedimentology.
- Field sampling and stratigraphic descriptions at terrace sites from both hand-dug soil pits and deeper pits excavated by a helicopter-transportable excavator (Kubota model 007).
- Determining the presence of placer gold by panning samples and by sluicing larger samples (20 to 23 litres) in a portable field sluice box.

During the 1996 field season, preliminary air photo interpretation was conducted for map sheets Garner Creek (115 O/13) and Matson Creek (115 O/12; 115 N/9-E1/2) which were used to produce draft Quaternary geology maps. These draft field base maps were field checked by ground traverses across typical terrain units and by spot checks via helicopter. The sedimentology and stratigraphy of key gravelly exposures in the study area was described using standard field forms. Exposures were measured on a facies by facies basis to assess gravelly stratigraphy and to ensure that sampling was representative. This level of detail is also important for paleo-environmental reconstruction. Samples were collected to confirm the physcial characteristics of facies (e.g. grain size) and to document the distribution of placer gold. The presence of placer gold was determined by field panning. Finally, a series of gravel samples for determining heavy mineral content were also taken at key stratigraphic sections as well as at representative creeks in the study area. The results from the heavy mineral analyses are discussed later in this report.

BEDROCK GEOLOGY

This part of the Stewart River valley is mostly underlain by the Yukon-Tanana Terrane. The bedrock maps were published by McConnell (1905), Bostock (1942), Debicki (1984, 1985) and Mortensen (1990). The 17 rock units recognized by Mortensen (1990) are metamorphic equivalents of the Klondike Schist, Nasina Series and Pelly Gneiss. The dominant rock type in the Klondike area is schist and gneiss with folioform quartz boudins and quartz veins which crosscut metamorphic fabric. Discrete bodies of Eocene quartz-feldspar porphyry, and clastic rocks such as sandstone and conglomerates, are found in the Hunker Creek drainage basin.

MINERAL OCCURRENCES

There are a total of 162 mineral occurrences (Yukon Minfile,1997) on the Stewart River map sheets (115N and 115O). Only 17 mineral occurrences and showings on the Garner Creek, Oglivie and Matson Creek map areas are known (Table 2).

In comparison with the surrounding regions, both Garner Creek and Matson Creek map areas have fewer mineral occurrences.

Table 2. *Mineral occurrences in bedrock listed in Yukon Minfile (1997).*

Yukon Minfile	Name	Metal (if known)
97	Thirteen	
35	Tenmile	gold
84	Cruikshank	coal
51	Burmeister-Lucky Joe	copper
156	Stockade	
50	Rudolf	
49	Wood	copper
110	Flume	
152	Sixty Mile	coal
157	Tyr	
105	Hector	
48	Bishop	
47	Indian	asbestos
124	Hobbs	limestone
95	Gleeson	tungsten
46	Pickering	gold
45	Monte Christo	

GLACIATION

Bostock (1966), Hughes et al (1969) and Hughes (1987, 1989) identified four regional Cordilleran glaciations, with each successive glaciation being less extensive than the previous one. They include pre-Reid, Reid and McConnell (youngest) (Fig. 5). More than two pre-Reid glacial advances are interpreted from sedimentary (Bond, 1996) and paleomagnetic stratigraphy (Jackson et al., 1990). Paleosol stratigraphy by Foscolos et al. (1977); Tarnocai et al. (1985); Smith et al. (1986); Tarnocai (1987); Tarnocai and Smith (1989) and Tarnocai and Schweger (1991) have shown three distinct paleosols termed Stewart (Recent), Diversion Creek (late Pleistocene) and Wounded Moose (early Pleistocene).

The McConnell glaciation was a late Wisconsinan advance with a maximum date of 38.1 to 35.4 Ka based on radiocarbon dates of interglacial sediments on the Stewart River downstream of Mayo (Giles, 1993). The Reid glaciation advanced to the McQuesten River area west of Reid Lakes and has a minimum date of 200 Ka (see Bond, 1996).

An uncorrelated glacial limit lies 13 km downstream from the mouth of Lake Creek, and the pre-Reid limit is mapped near the confluence of the Stewart and Yukon rivers (Fig. 3).

Glacial deposits in the Stewart River valley include diamicton (e.g. moraine, mass flows), proglacial outwash sediments, glaciolacustrine sediments and wind blown sand and silt (loess). The surficial geology maps accompanying this report show that glacial deposits in this region are primarily glaciofluvial terraces.

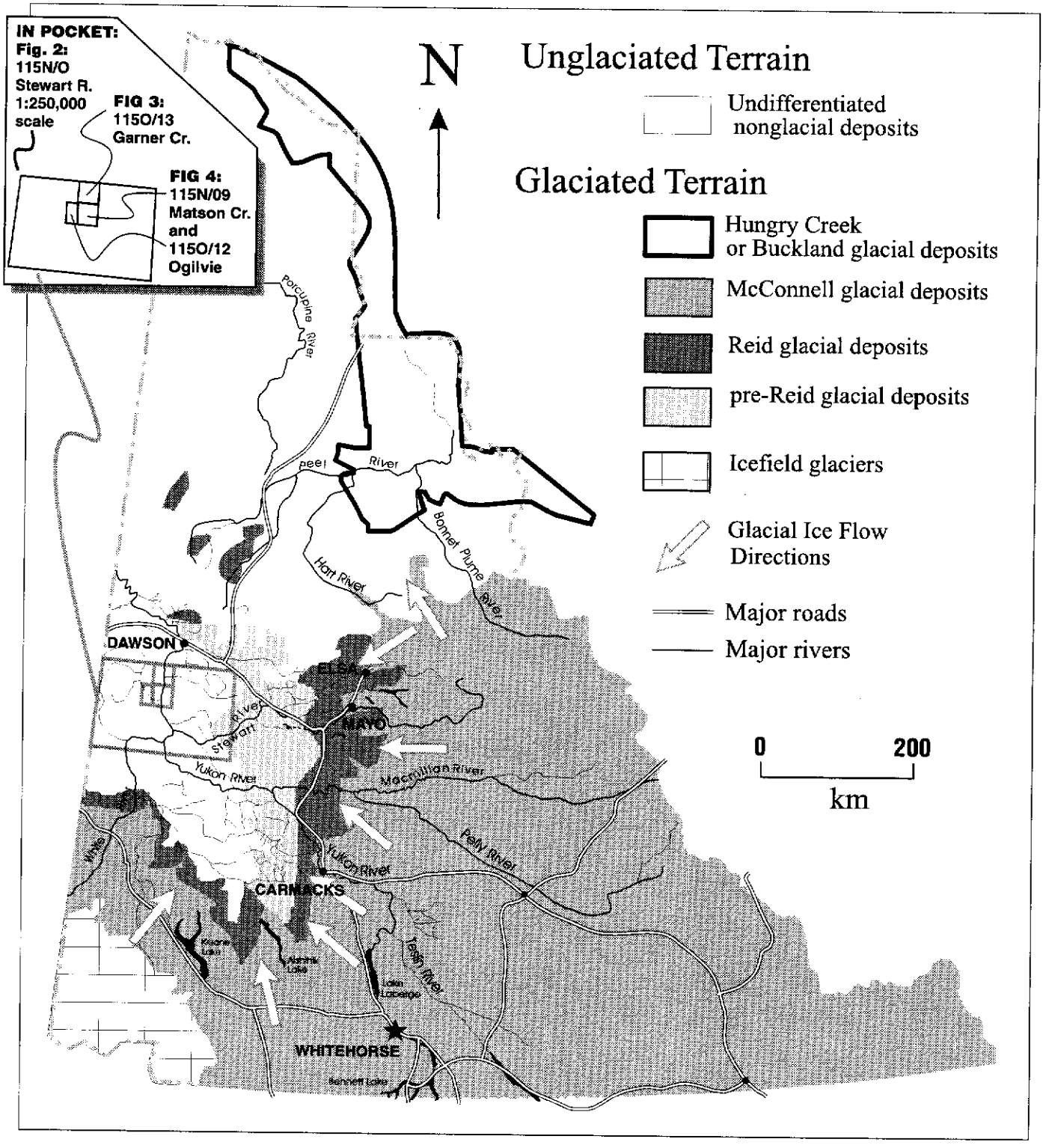

Figure 5. *Extent of Cordilleran glacial deposits in the Yukon (from LeBarge, 1997). Inset shows Stewart River map area (115N/O) with 1:50,000 map areas included in this report.*

PHYSIOGRAPHIC SETTING

Most of the Stewart River map area lies within the unglaciated portion of the Klondike Plateau, which is a physiographic subdivision of the Yukon Plateau. This plateau surface is an uplifted erosional surface of Tertiary age which typically is rolling terrain of accordant ridges which are dissected by incised tributary stream systems (Morison, 1985). This subdued, mature landscape is the result of extensive subaerial erosion which ended around the Miocene (Templeman-Kluit, 1980). Drainage patterns during this time were dominantly toward the southwest (Duk-Rodkin, 1997). Differential uplift, and thus initiation of terrain rejuvenation and incision began in Pliocene time (Templeman-Kluit, 1980) and continued into the Pleistocene (Hughes et al., 1972). White Channel sedimentation was initiated during a period of tectonic stability (Milner 1976; Templeman-Kluit, 1980) and must have continued during differential uplift of the plateau surface. It is likely that uplift in the Swede Dome area (Milner, 1976; Hughes et al., 1972) accelerated the aggradational phase of the White Channel deposit through a rise in local base levels (Morison, 1985). White Channel aggradation ended in the late Pliocene to early Pleistocene with the onset of pre-Reid glaciation and the deposition of glaciofluvial gravel. Tephra dates from White Channel gravel have yielded a variety of dates which range from 3.01 Ma (Kunk, 1995) to 0.8+ 0.4 Ma (Naeser, pers. comm., 1998, Table 3). The wide range of these dates is believed to be related to the relatively young age of the tephra, the tephra mineralogy and the low spontaneous track density in the detrital zircons (Naeser, pers. comm., 1988).

Table 3. *Zircon fission-track age of Quartz Creek tephra, Yukon Territory (from Naeser, pers. comm.).*

Sample no.	No. of grains counted	P_s x 10^4 tr/cm²	P_i x 10^6 tr/cm²	P_d ① x 10^5 tr/cm²	P(χ^2) ② (%)	Age ③ (Ma ± σ)
K-91-6-29C	11	5.78 (4) ④	4.11 (142) ④	1.91 (4171) ④	37	0.80±0.40

Analyst: Nancy D. Naeser.

P_s spontaneous track density

P_i induced track density (reported induced track density = 2 x measured volume).

① P_d track density in muscovite detector covering National Institutes of Standards and Technology (NIST) standard glass SRM 962 (Carpenter and Reimer, 1974); listed value was calculated by interpolation between values determined for standards placed at the top and bottom of the irradiation tube.

② Measure of probability that all individual grains counted in a sample are from a single age population; values of P(χ^2)<5% are generally taken as an indication of a real spread in single grain ages (Galbraith, 1981; Green and others, 1989).

③ Calculated from the fission-track age equation of Hurford and Green (1982, 1983), using the sums of the spontaneous and induced track counts obtained for all grains counted in the sample, and the following values $\lambda_D = 1.551 \times 10^{-10}$/yr, g=0.5, zeta=298.21 (zircon) (SRM 962). Standard deviation calculated by combining Poisson errors on spontaneous and induced counts and on counts in detector covering glass standard NIST SRM 962 (McGee and others, 1985).

④ Number in parenthesis is number of tracks counted.

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SECTION DESCRIPTIONS AND INTEPRETATIONS

Twelve stratigraphic sections are illustrated here. Their locations are on Figure 2 (in pocket). From these sections, the pebble fraction of 17 samples were sorted lithologically to complile Figure 6.

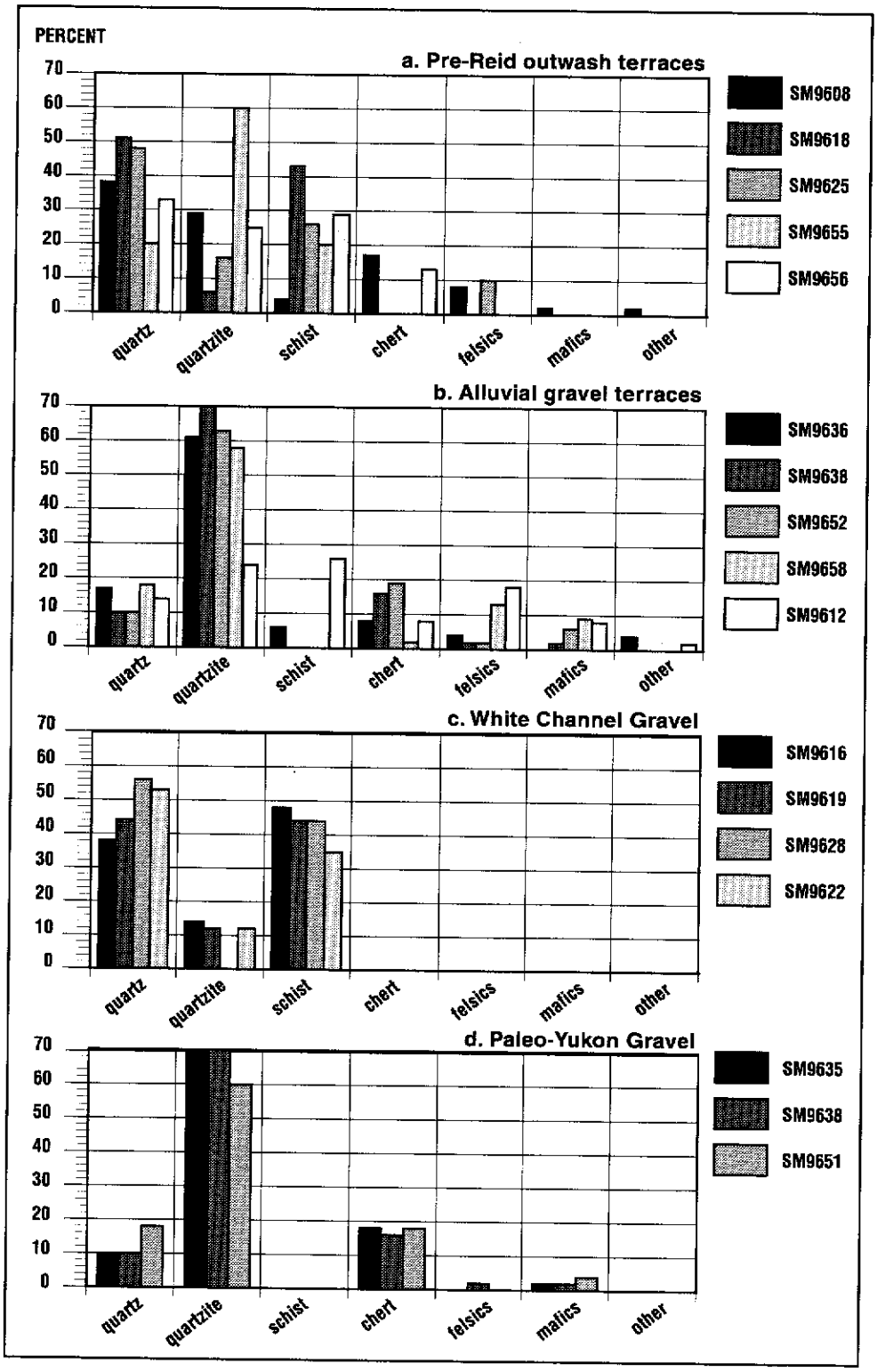


Figure 6, a-d. *Classification by lithology of pebbles in samples of four gravel types. Sample locations are shown in the schematic sections which follow.*

SECTION SM96-05

Section SM96-05 is found in the lower reaches of the Indian River drainage basin in a high-level, pre-Reid glaciofluvial terrace. This exposure contains distal pre-Reid glaciofluvial gravel and a tributary stream setting where proximal gravelly facies are interbedded in the glaciofluvial gravel (Photo 1).

Units 1, 2, 3, 5 and 6 are clast supported, matrix-filled, massive and crudely to distinctly planar stratified gravel (Fig. 7). These facies are interpreted to be distal pre-Reid glaciofluvial gravel. Pebble lithologies found in unit 1 (SM9655) at the base of the exposure include 20% quartz, 60% quartzite and 20% schist; those in unit 5 (SM9656) include approximately 32% quartz, 23% quartzite, 28% schist, 12% chert and less than 5% felsic volcanics (Fig. 6a). Note that in deposits which are clearly White Channel Gravel, it is common to have in excess of 40% schist clasts due to the erosion of the local bedrock, specifically Klondike Schist. These clast lithologies show reduced percentages of schist and elevated amounts of

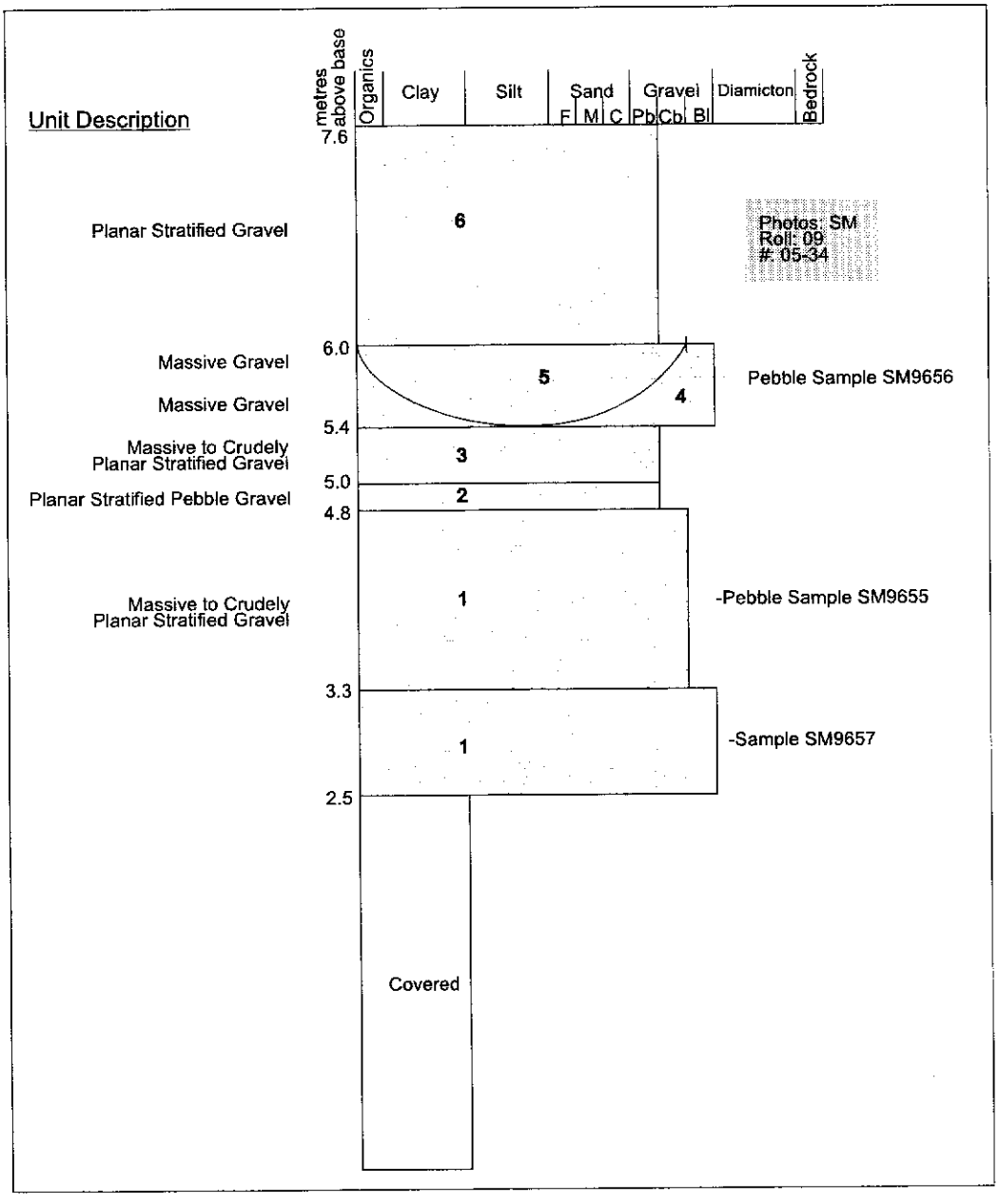


Figure 7. *Section SM96-05.*

quartzite and other regionally derived clasts (e.g. chert). Although the gravel in units 1-3 at this exposure resembles White Channel Gravel in appearance, the above range in clast lithology, in combination with the terrain setting (e.g. Pre-Reid terrace), supports a glacial origin for these gravelly facies at this exposure. Unit 4 is a poorly sorted and disorganized gravel which has subangular bouldery clasts that range up to .35 m in length (Photo 2). Unit 4 is interpreted to be a proximal gravel deposited from a local tributary stream system during aggradation of pre-Reid gravel on this terrace surface.

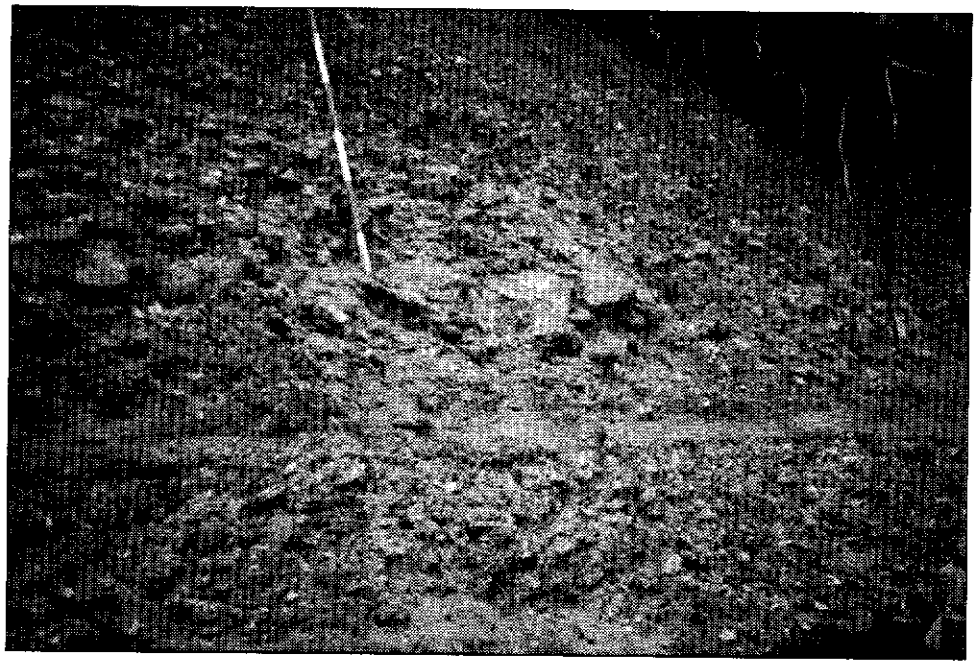


Photo 1. *Pre-Reid glaciofluvial gravel, Section SM96-05.*

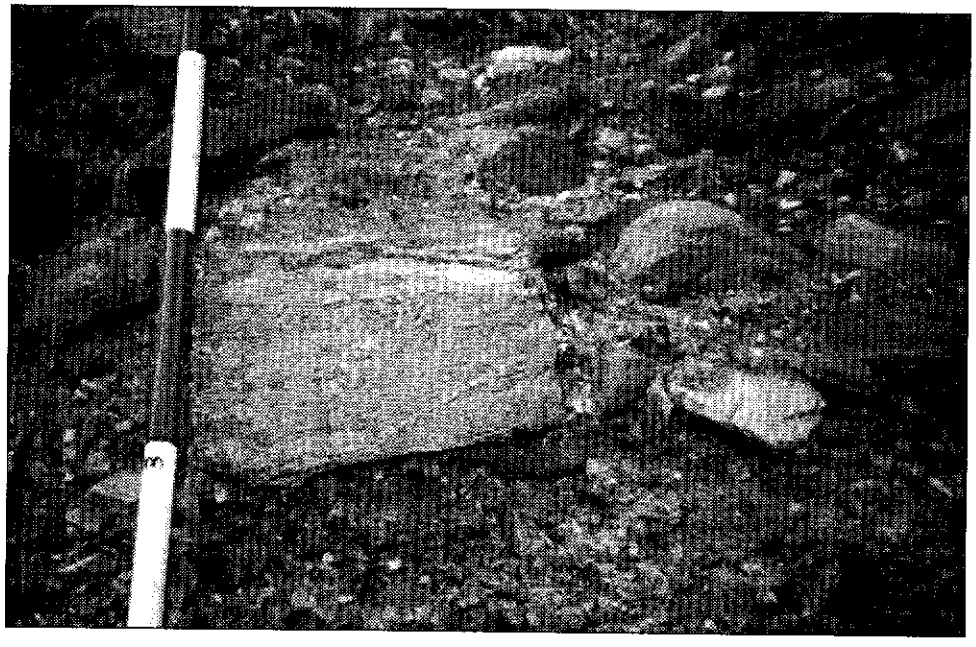


Photo 2. *Boulders in poorly sorted gravel of unit 4, Section SM96-05.*

SECTION SM96-06

Site SM96-06 (Fig. 8) is located in the lower reaches of the Stewart River on the north side just downstream from Rosebud Creek (Fig. 2). This exposure is a sequence of mid- to late Pleistocene loess (unit 1), colluvium (units 2 and 4) and alluvial sands (unit 3) which unconformably overlie a sequence pre-Reid proglacial outwash (units 5 to 17). This is an important exposure in terms of regional glacial limits as the lower basal lag unit (unit 17) confirms the presence of pre-Reid glacial ice in the lower reaches of the Stewart River drainage basin. The following is a summary of the major units with interpretations:

Unit 1: Silty cap which is interpreted as McConnell Loess.

Units 2 and 4: Diamicton which are interpreted as both slope or colluvial deposits (Photo 3).

Unit 4: A volcanic tephra which has been incorporated in the diamicton.

Unit 3: Ripple cross-laminated sand with discrete gravelly intrabeds with scoured bases (Photo 4). This is interpreted to be a disconformable alluvial environment which deposited

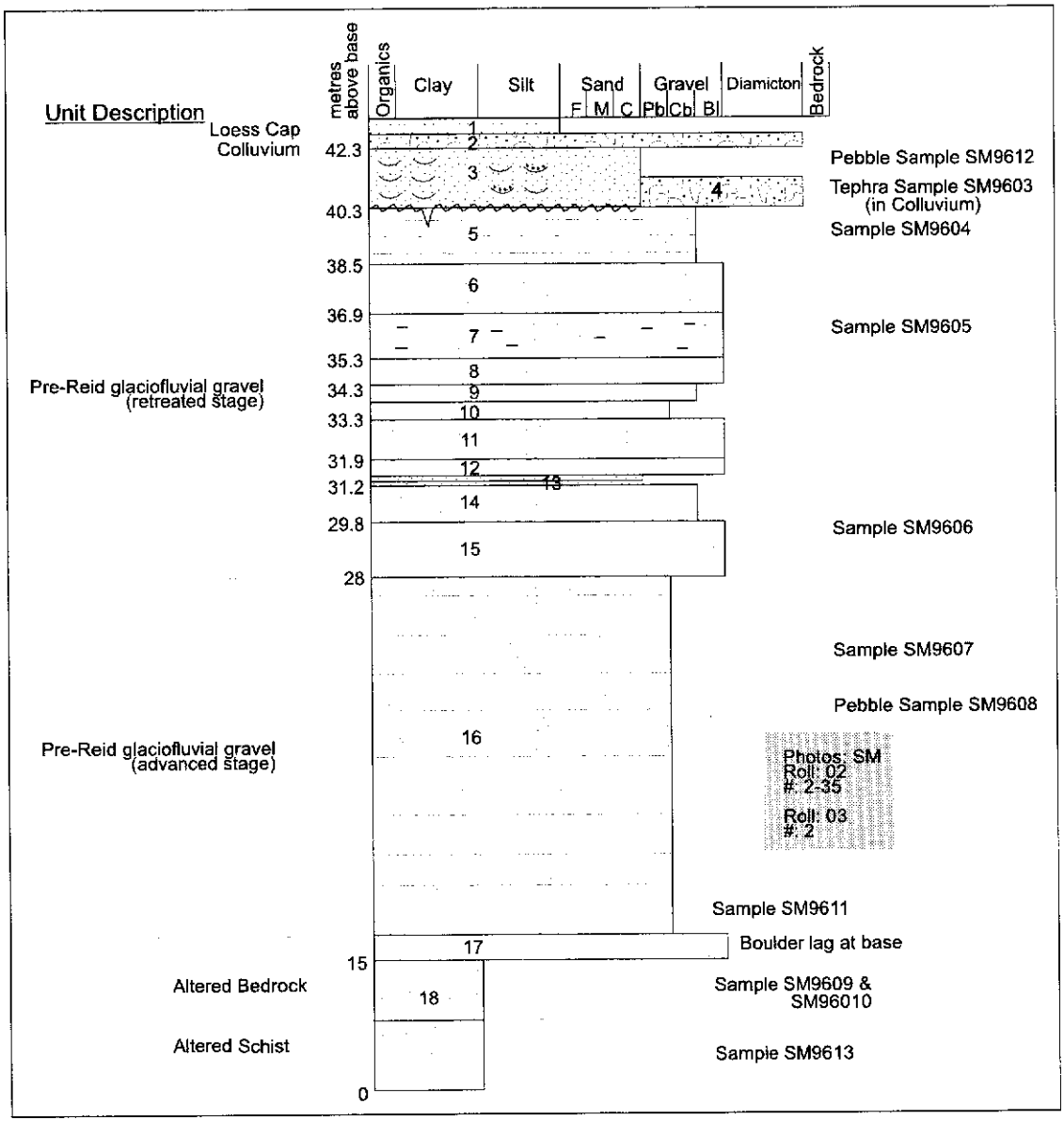


Figure 8. *Section SM96-06.*

sandy facies in a channel setting, with gravelly crevasse splay-type sedimentation during high stage events. A pebble count was conducted for the gravelly intrabeds (SM9612); it shows approximately 14% quartz, 24% quartzite, 27% schist, 8% chert, 18% felsic volcanics and 8% mafic rocks (Fig. 6b). The wide range in pebble clast lithogies supports the alluvial interpretation for this unit in terms of incorporation of both glacially reworked sediment and local bedrock sources during stream erosion and downcutting. These alluvial sands were probably deposited in a mid-Pleistocene local tributary valley setting. The presence of an ice wedge pseudomorph in unit 3 indicates also that this is a former erosional surface which was present during the aggradation of these alluvial sands.

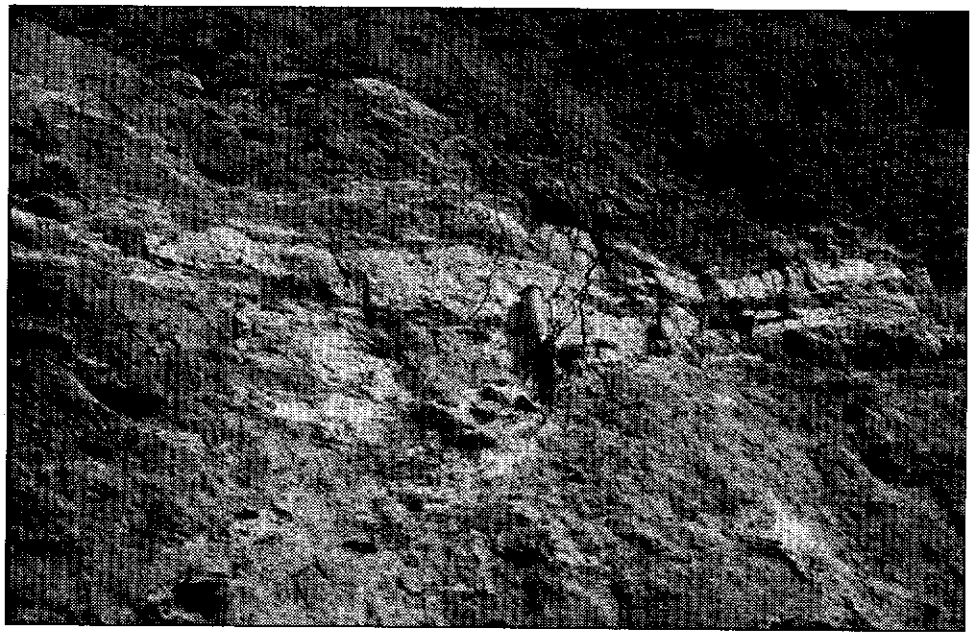


Photo 3. *Diamicton in unit 2, Section SM96-06.*

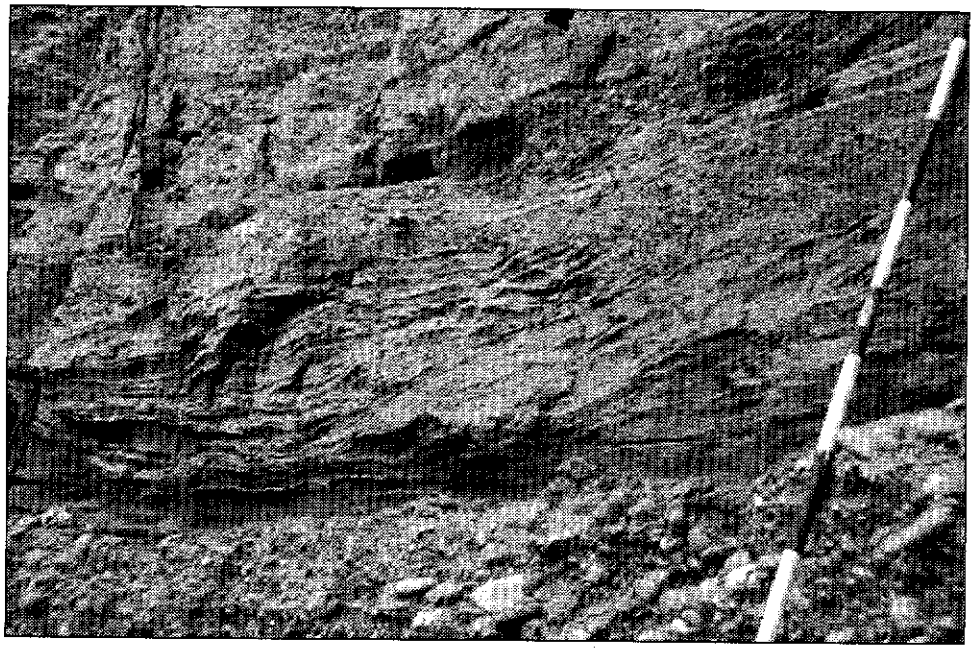


Photo 4. *Ripple cross-laminated sand with discrete gravelly intrabeds with scoured bases in unit 3, Section SM96-06.*

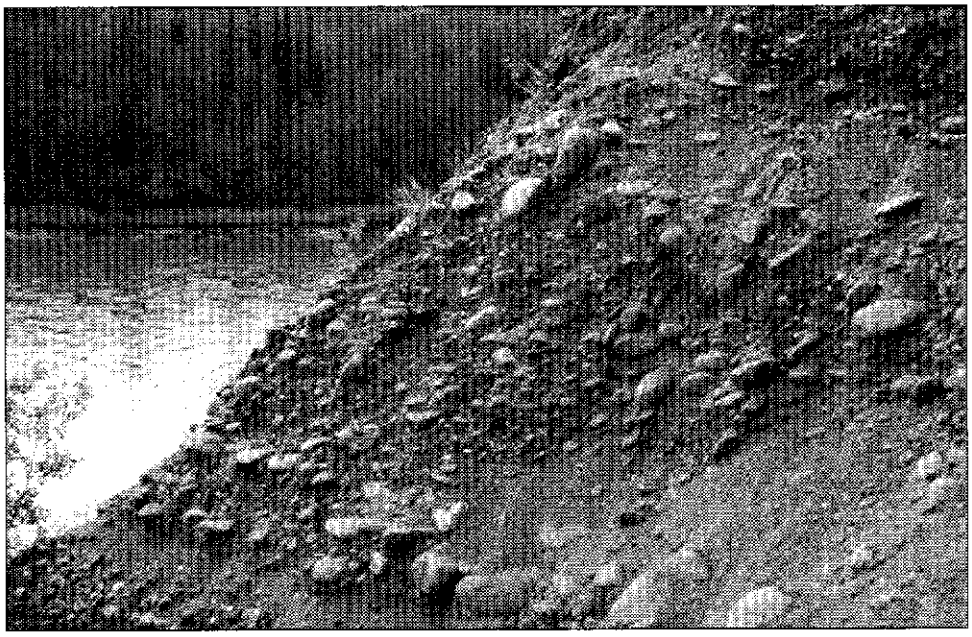


Photo 5. *Example of units 5 to 15, Section SM96-06.*

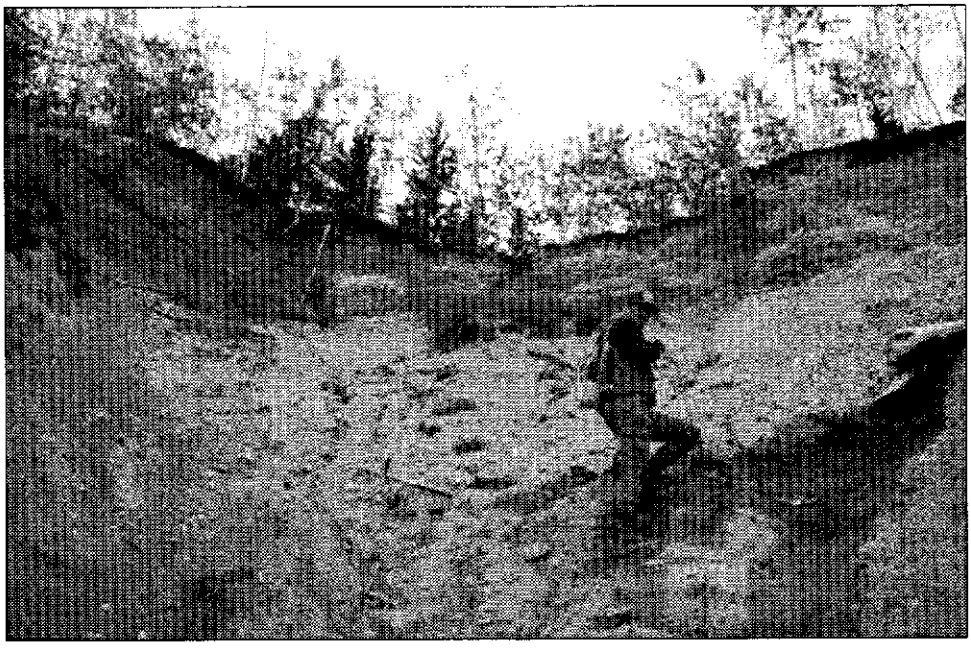


Photo 6. *North slope-covered gravel, unit 16, Section SM96-06.*

Units 5 through 15: This is a sequence of matrix-filled and clast-supported massive to crudely stratified and distinctly stratified coarse gravelly facies (Photo 5). These gravels were deposited in a proglacial outwash setting, probably during the retreat stage of a pre-Reid glaciation.

Unit 16: This slope-covered unit is a matrix-filled and clast-supported, distinctly stratified gravelly sequence (Photo 6) deposited in a proglacial outwash setting probably during the advance stage of a pre-Reid glaciation. This unit is distinctly finer grained than the overlying cobbly and bouldery gravelly facies in units 5-15, has a distinct "grey" colour and contains oxidation staining thoughout the lower portion of the unit. Pebble counts (SM9608) show this unit to contain approximately 35% quartz, 28% quartzite, 15% chert and minor amounts of schist, felsic volcanics and a variety of mafic rocks (Fig. 6a). The relatively lower

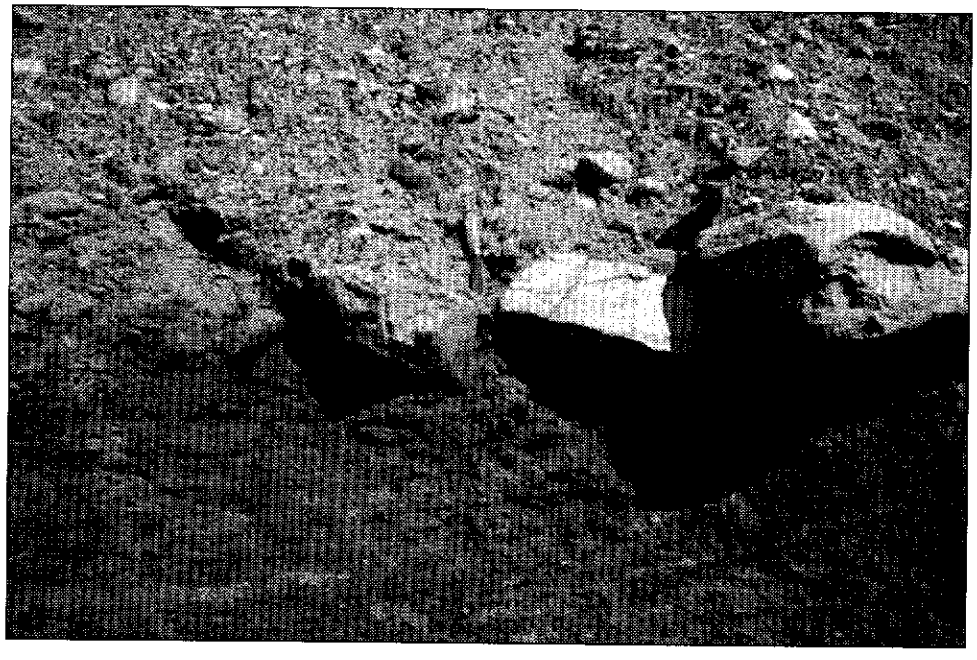


Photo 7. *Boulder lag deposit (unit 17) above scoured bedrock (lower half of photo), overlain by unit 16, Section SM96-06.*

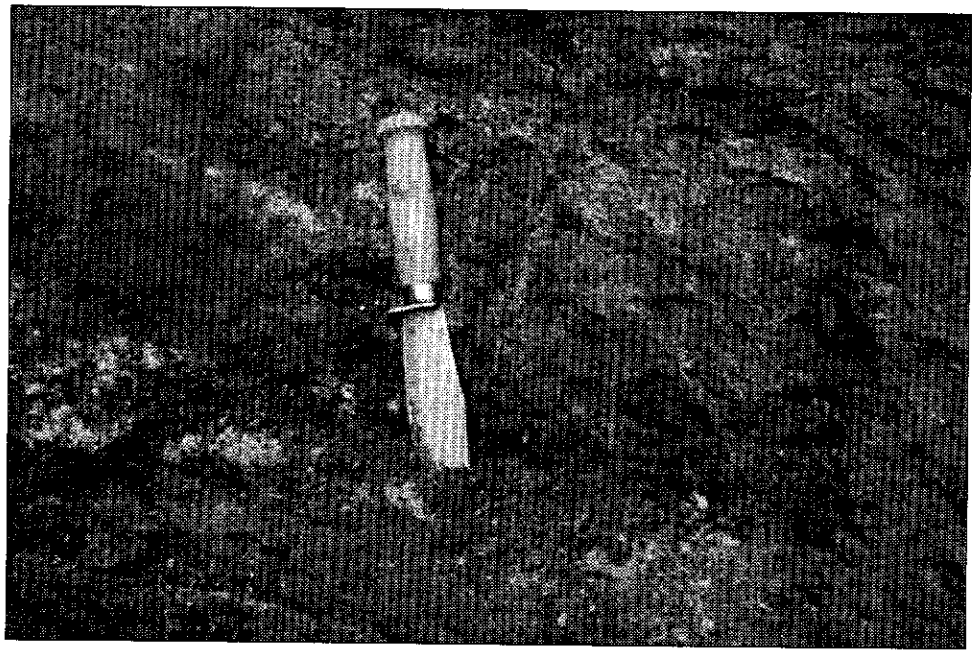
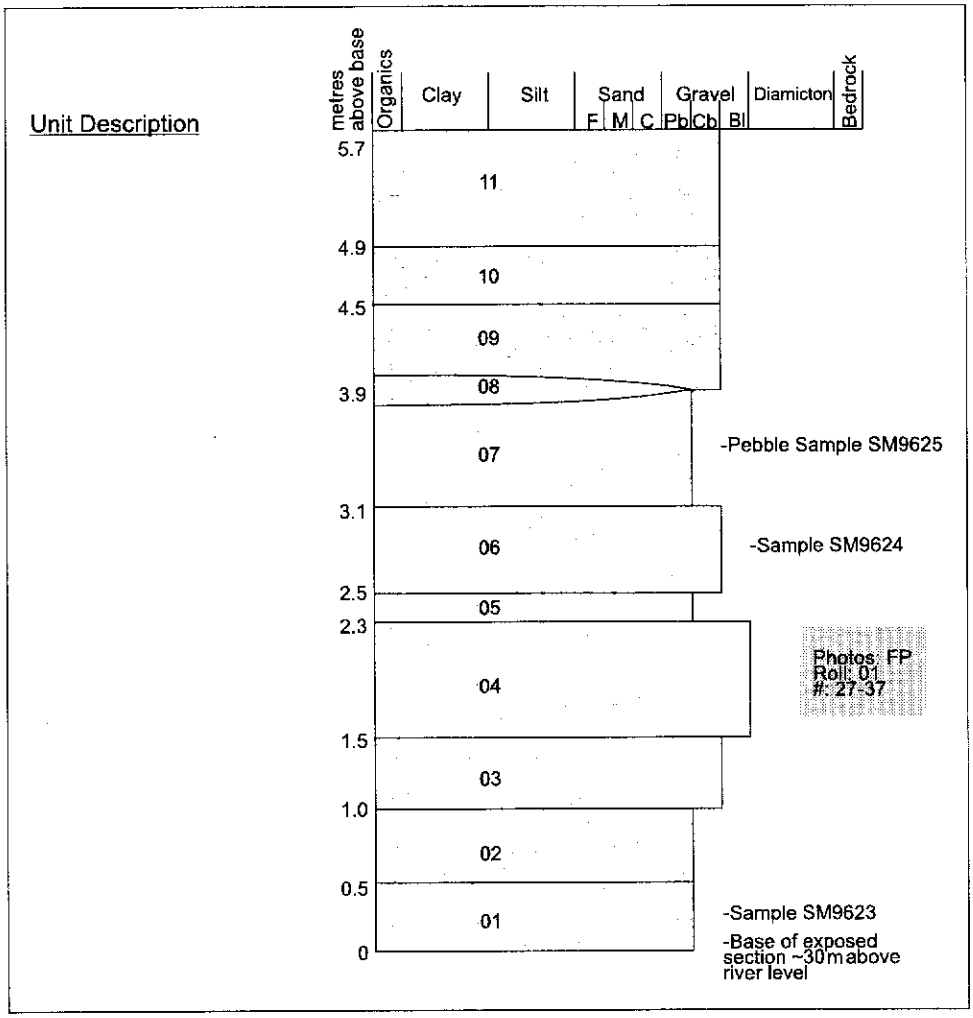


Photo 8. *Altered schistose bedrock (unit 18), Section SM96-06.*

percentage of quartz and the very low percentage of schist (e.g. less than 5%) confirms that this is not a locally derived gravel unit such as White Channel Gravel.

Unit 17: At the base of unit 16 is a bouldery lag deposit that has a scoured contact with the underlying altered bedrock (Photo 7). The boulders are locally derived, subangular to angular clasts of quartz and Klondike Schist which are up to 1.0 m in length. It is unlikely that clasts of this size could be transported as bedload in a proglacial setting, hence this unit is interpreted to have been deposited directly from wasting pre-Reid glacial ice in the lower reaches of the Stewart River valley. It is likely that these clasts were "rip-up" clasts incorporated into pre-Reid ice from local bedrock sources.

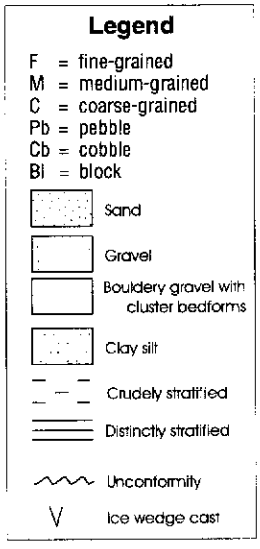
Unit 18: Altered schistose bedrock (Photo 8).



SECTION SM96-07

This section (Fig. 9) is a gravelly sequence of clast-supported and matrix-filled, distinctly stratified to massive, pre-Reid glacial outwash (Photo 9), which is found as a high-level terrace in the mid-reaches of the Indian River drainage basin upstream from the mouth of Quartz Creek (Fig. 2). The highly oxidized and distinctly weathered upper gravelly facies in this section is interpreted to be a remnant Wounded Moose paleosol. Pebble lithologies from unit 7 (SM9625) include approximately 48% quartz, 16% quartzite, 27% schist, and minor felsic volcanic rocks (Fig. 6a). The low percentage of locally derived schist clasts supports the regionally derived nature of these glaciofluvial gravels.

Figure 9. *Section SM96-07.*



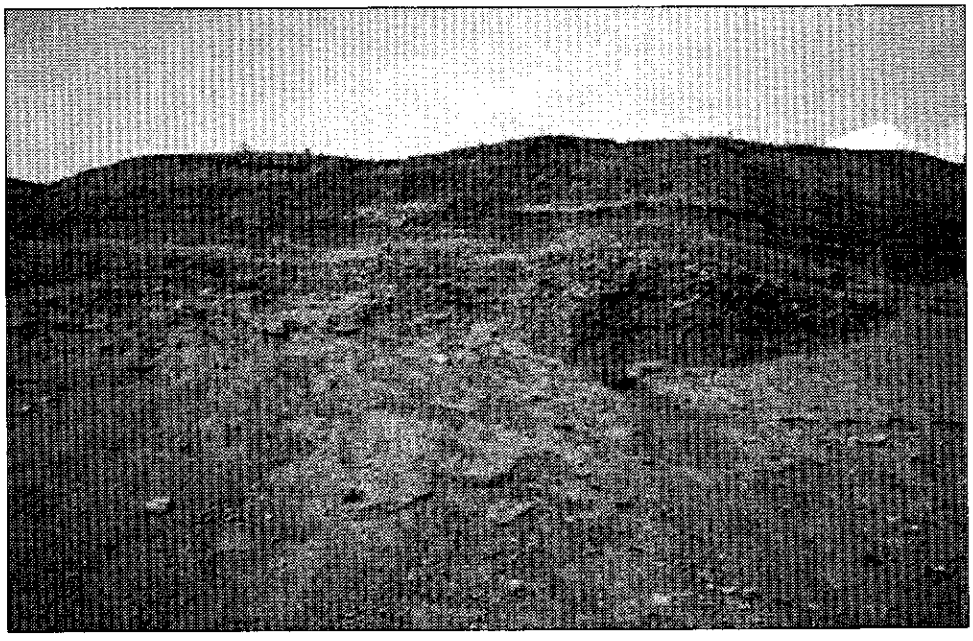


Photo 9. *View of Section SM96-07.*

SECTION SM96-08

Section SM96-08 (Fig. 10) is found as a high-level terrace in the Indian River drainage basin upstream from the mouth of Quartz Creek (Fig. 2). This section is a gravelly sequence of clast-supported and matrix-filled White Channel Gravel in excess of 11 m thick, that is overlain by pre-Reid glaciofluvial gravel. Example facies include: massive gravel, stratified gravel and cross-bedded sand (Photo 10). Pebble lithologies from White Channel Gravel in unit 7 (SM9616) are characterized by up to 38% quartz, approximately 12% quartzite and 48% schist (Fig. 6c). Units 15 and 16 are interpreted to be distal pre-Reid glaciofluvial gravel. These gravelly facies are distinctly finer grained, have improved sorting and stratification (Photo 11) and contain a wide assemblage of pebble lithologies which are regionally derived. The pebble count for unit 15 (SM9618) shows up to 50% quartz, approximately 6% quartzite, 42% schist clasts, and less than 2% felsic volcanic clasts (Fig. 6a). The elevated value for the schist clasts is probably the result of mixing of the upper White Channel Gravel facies (e.g. unit 14) into the lower glaciofluvial gravel facies (e.g. unit 15) through slope movement.

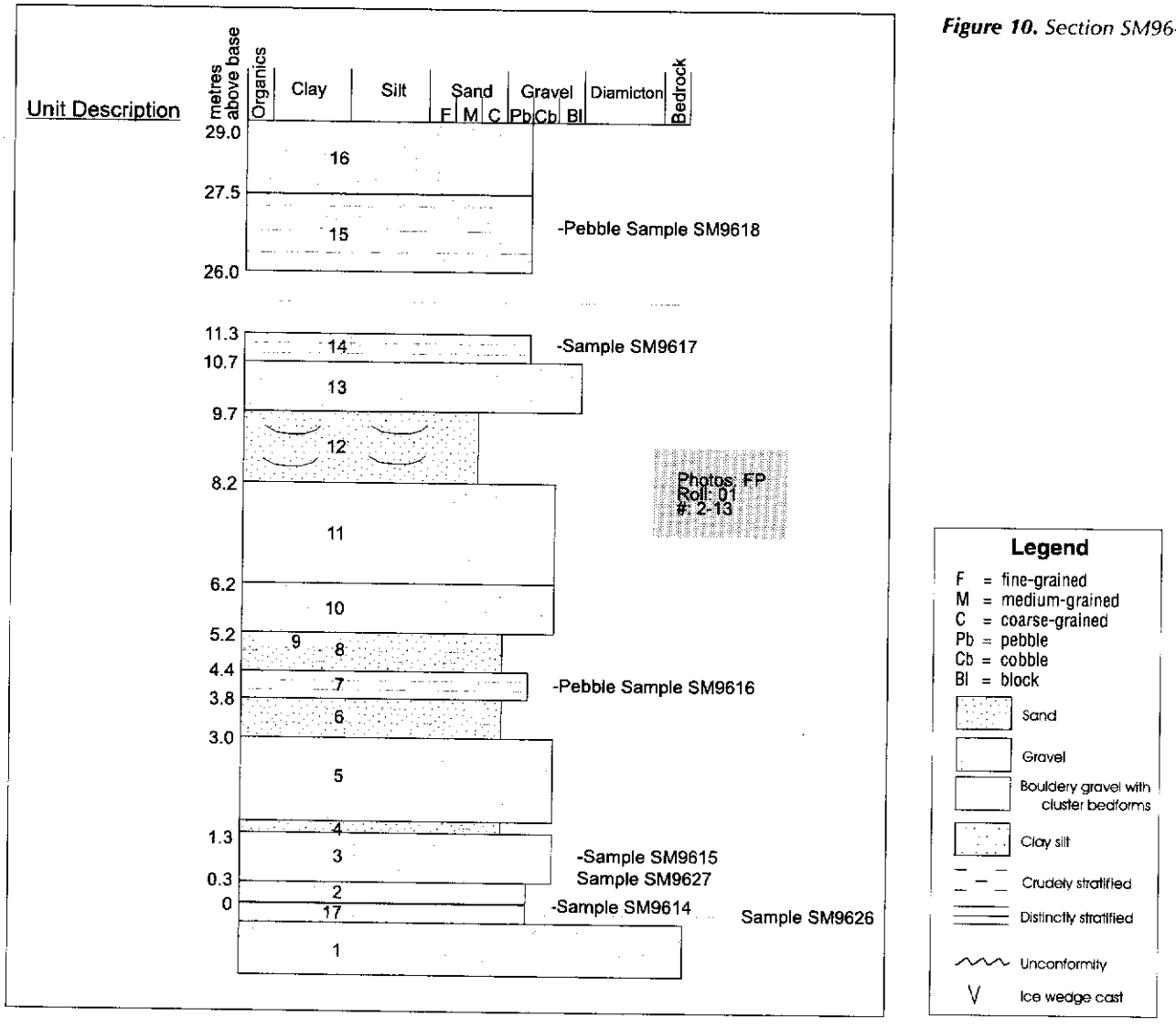


Figure 10. *Section SM96-08.*

Photo 10. *White Channel Gravel includes stratified gravel and cross-bedded sand facies, Section SM96-08.*

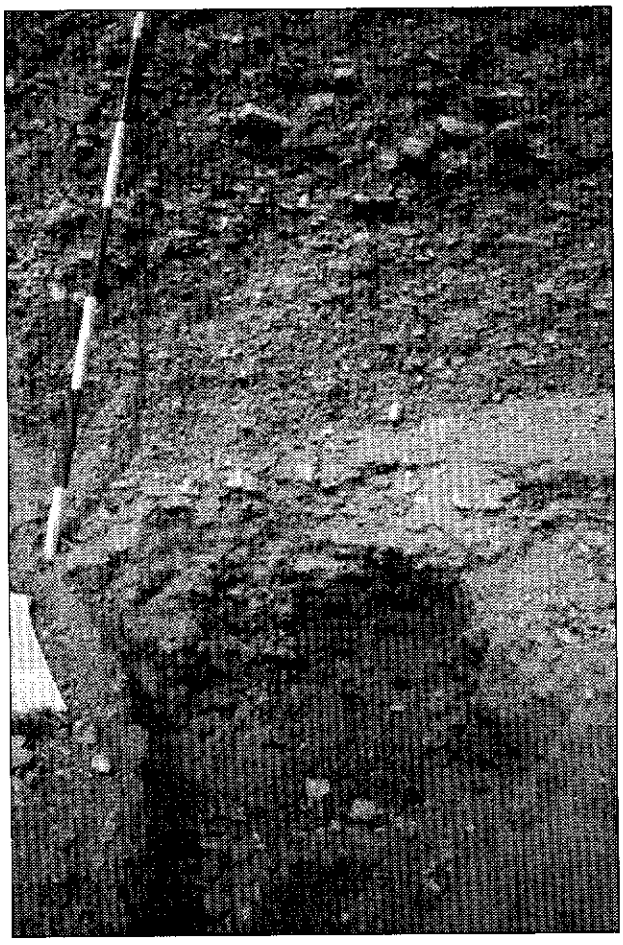


Photo 11. *Distal pre-Reid glaciofluvial gravel in unit 15, Section SM96-08.*

SECTION SM96-09

Section SM96-09 (Fig. 11) is found in a high-level terrace in the Indian River drainage basin upstream from the mouth of Quartz Creek (Fig. 2). This is a section of interbedded White Channel Gravel which contains the following facies:

- clast-supported and matrix-filled, massive and disorganized gravel.
- clast-supported and matrix-filled, planar stratified gravel.
- trough cross-stratified and planar cross-stratified sand.
- "scoop-shaped" cross beds (Morison, 1985) in thicker gravelly facies.

Pebble counts in unit 2 (SM9619) at the base of this exposure shows approximately 43% quartz, 12% quartzite and 44% schist clasts (Fig. 6c). Additional pebble counts were taken at the top of the exposure in unit 12 (SM9622) which showed a distribution of 52% quartz clasts, approximately 12% quartzite, and 34% schist clasts (Fig. 6c). The lack of regionally derived pebble clasts supports the White Channel Gravel interpretation for this exposure.

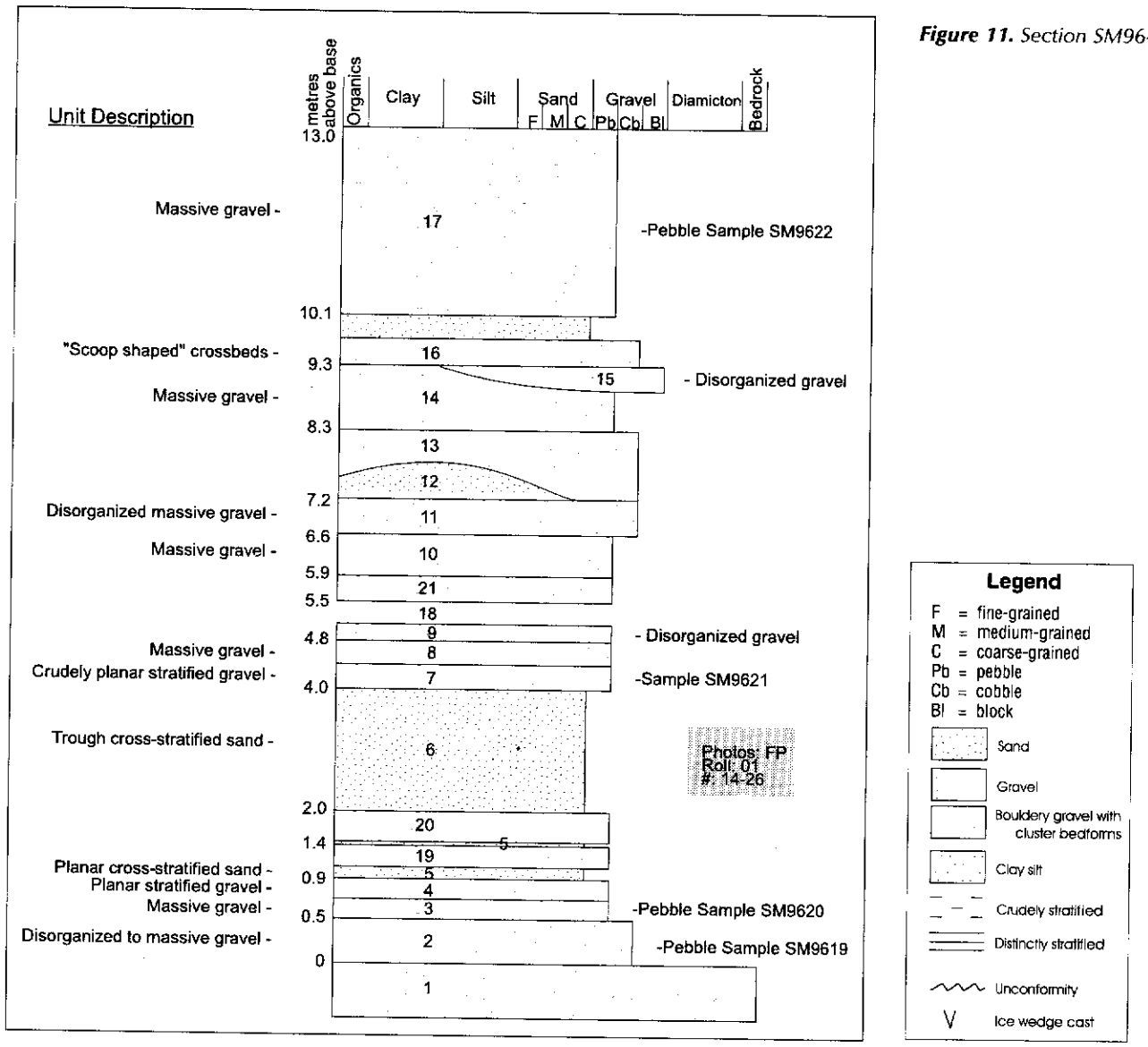


Figure 11. *Section SM96-09.*

SECTION SM96-10

Section SM96-10 (Fig. 12) is found as a high-level terrace in the Indian River drainage basin upstream from the mouth of Quartz Creek (Fig. 2). This section is a good example of the internal stratigraphy which is present on the high-level terraces in the Indian River area upstream from Quartz Creek. This section contains a sequence of White Channel Gravel in excess of 14 metres thick that directly overlies bedrock. Iron-staining is seen throughout the White Channel Gravel in this section and in places bedrock fragments are directly incorporated into lower White Channel facies above the bedrock surface. Stratified pre-Reid glaciofluvial gravel directly overlies the White Channel Gravel in this section and has a minimum thickness of 10 metres. Pebbly clast lithologies found in the White Channel Gravel at this site (SM9628) are typically 55% quartz and 45% schist (Fig. 6c). The absence of regionally derived lithologies such as chert supports the local interpretation for this unit.

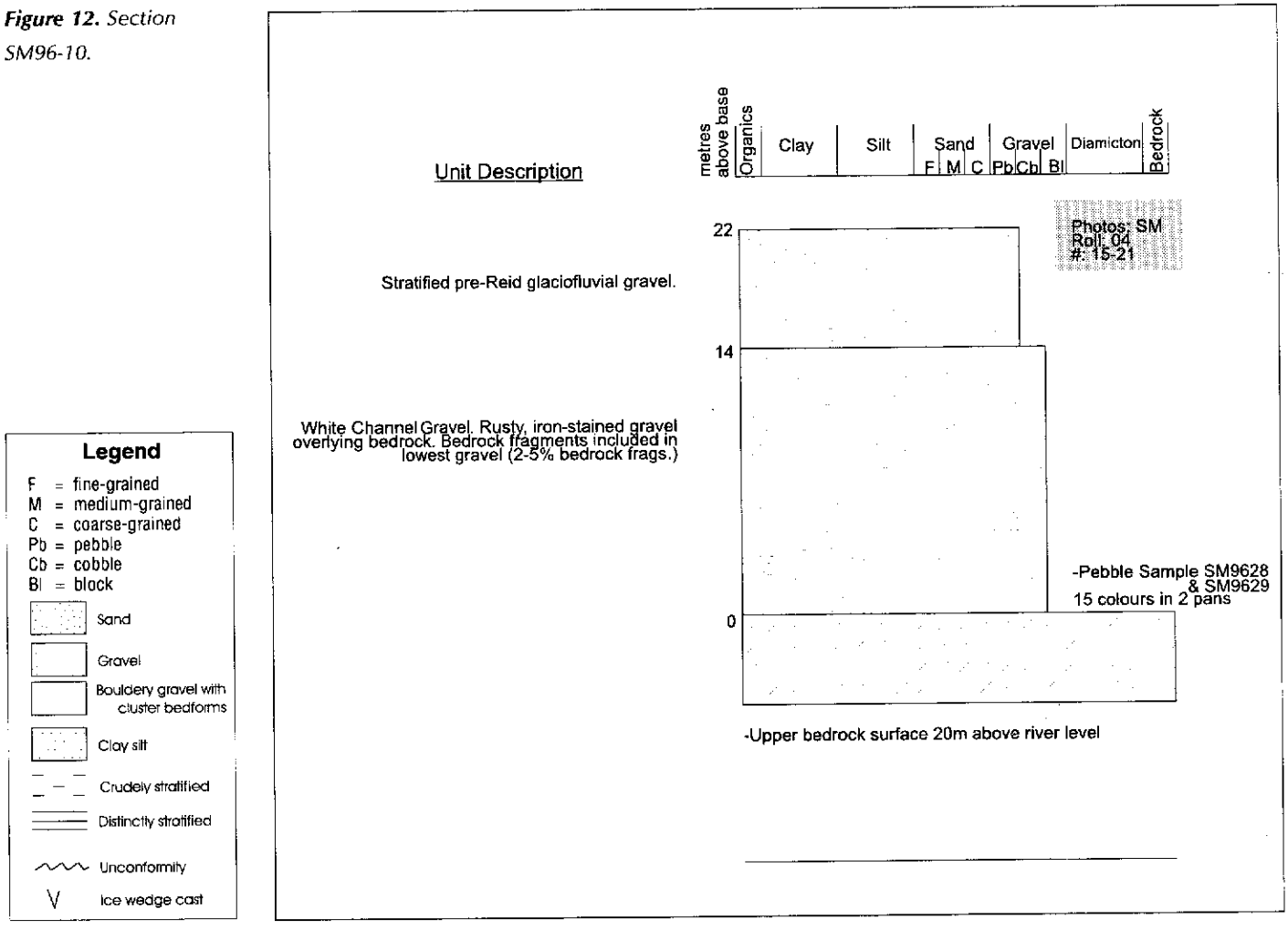


Figure 12. *Section SM96-10.*

SECTION SM96-12

Site SM96-12 (Fig. 13) is found near the mouth of Quartz Creek (Fig. 2) in an abandoned open pit on a low-level alluvial terrace. There is approximately 7 m of exposed gravel that overlies unaltered bedrock. There is also a fine sand to silt loess cap which contains pockets of organic debris and charcoal and is approximately 1 m thick. This loess cap overlies a moderately to poorly sorted pebbly gravel that is clast-supported, matrix-filled and massive to crudely stratified (Photo 12). This gravelly unit is approximately 2 m thick and also contains interbeds of massive pebbly sand. An ice wedge was observed at the top of the gravel bed which indicates this was an exposed erosional surface during aggradation. This section is interpreted to be equivalent to low-level alluvial terraces found in the Bonanza and Hunker creeks drainage basins which are late Pleistocene in age.

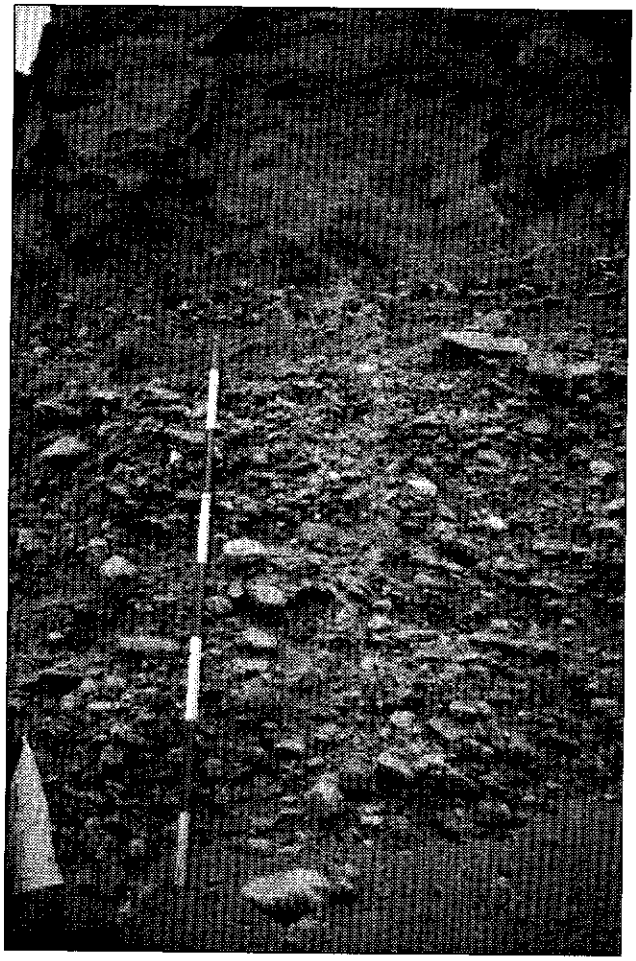


Photo 12. *Crudely stratified moderately sorted pebbly gravel, capped by silty loess, Section SM96-12.*

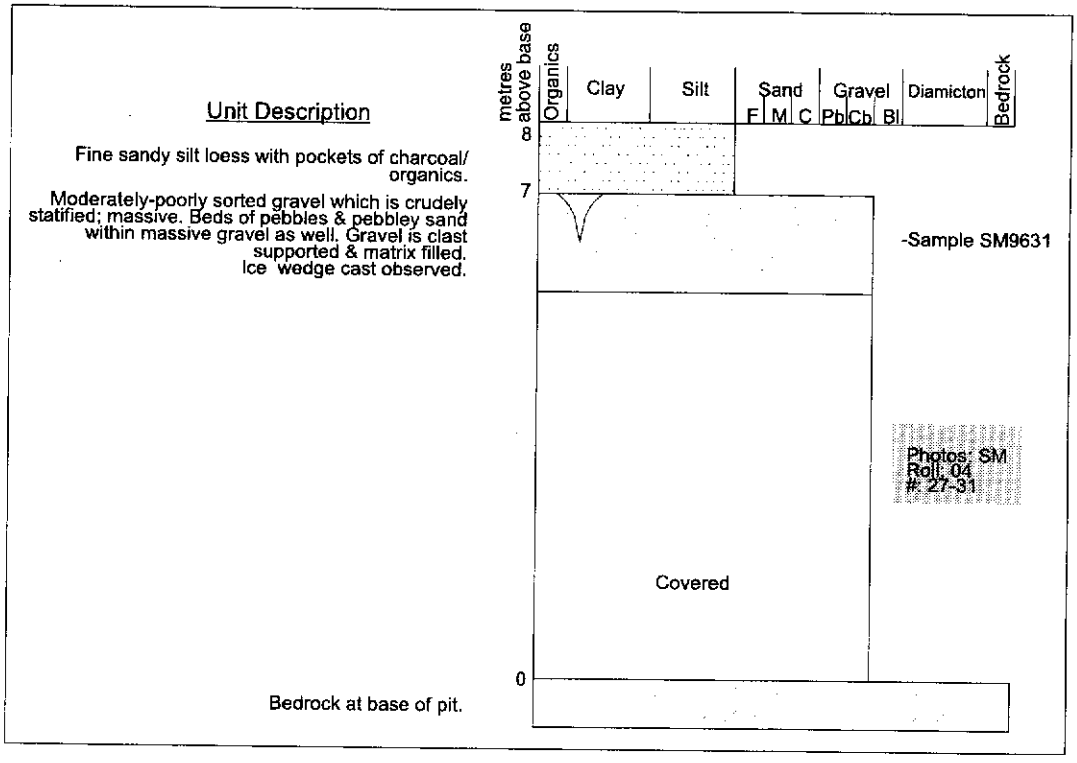


Figure 13. *Section SM96-12.*

SECTION SM96-13

This exposure is found along the road access for the Indian River placer area, downstream from the mouth of Quartz Creek (Fig. 2). This exposure is in excess of 15 metres thick and extends laterally some 200 metres along the road (Photo 13). It was decided to measure this exposure in vertical sections to obtain the maximum thickness for this exposure and to describe the variety of facies as completely as possible. Section SM96-13A was measured at the west end of the exposure and section SM96-13B was measured at the east end of the exposure.

Photo 13. *General view of station, Section SM96-13.*

SECTION SM96-13A

This section (Fig. 14) is a sequence of interbedded gravelly facies which are poorly sorted, coarse-grained, matrix-filled and clast-supported, with structures which include massive to disorganized, cluster bedforms and planar stratification. Clast lithologies appear to be locally derived and the gravel tends to be bouldery. Planar stratified and massive sandy facies are also found between the gravelly beds.

Photo 14. *Typical poorly sorted, bouldery gravel facies with cluster bedforms, Section SM96-13A.*

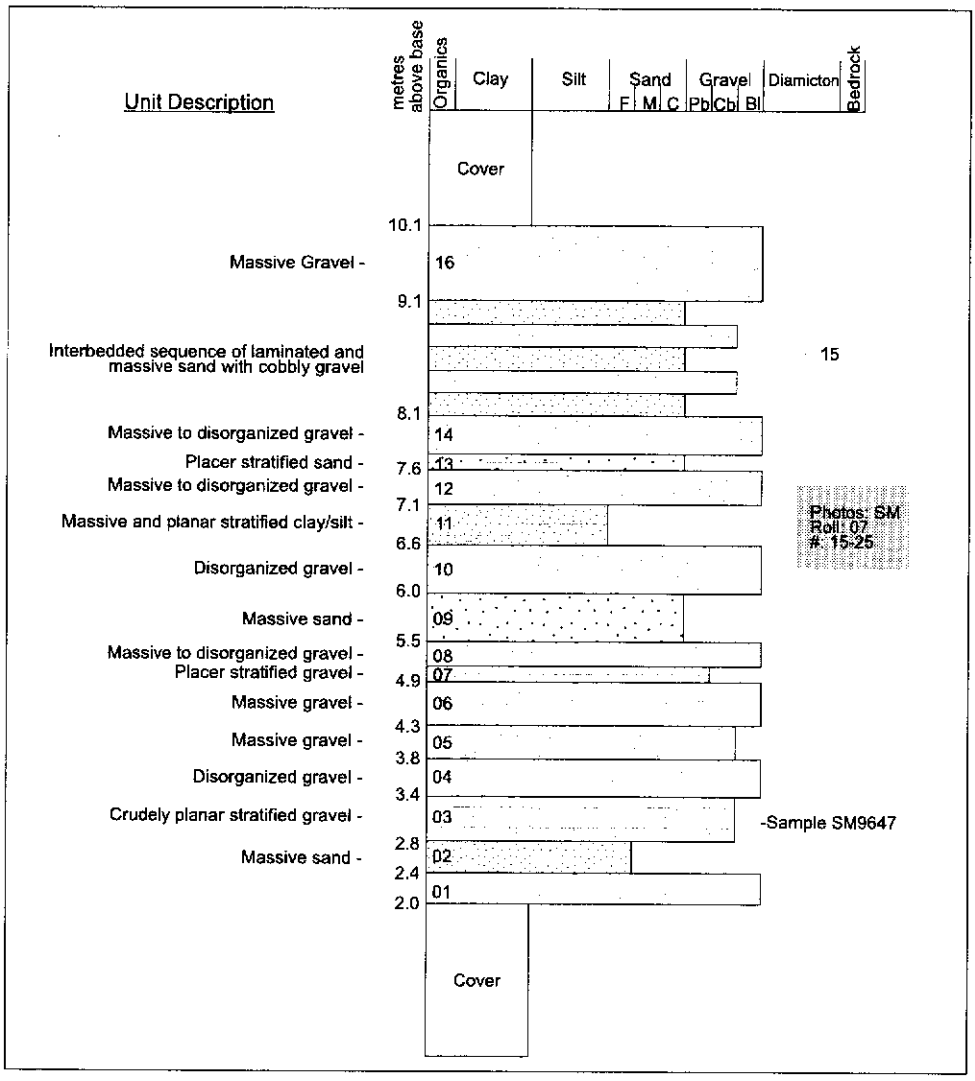


Figure 14. *Section SM96-13A.*

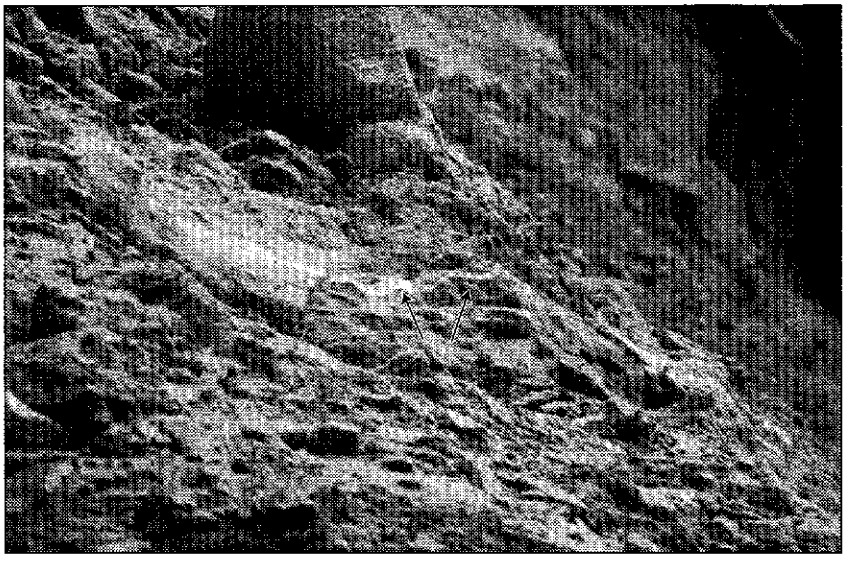


Photo 15. Unit 11 is a locally convoluted massive to planar stratified silt containing a light-coloured tephra horizon, as indicated by arrows, Section SM96-13B.

SECTION SM96-13B

This section is a continuation of SM96-13A and is another vertical slice through this thick gravelly section (Fig. 15). This section is a sequence of cobbly and bouldery, massive and disorganized gravel that is clast supported and matrix filled with sedimentary structures that range from massive and disorganized to crudely planar stratified. Unit 09 is a planar stratified silt unit that contains detrital organic debris and charcoal that was sampled for radiocarbon dating. Unit 11 is a massive to planar stratified silt that is convoluted in places and contains a volcanic tephra (Photo 15). This tephra was also sampled for dating purposes.

This exposure is interpreted to be an paraglacial alluvial fan which was deposited in a valley wall and tributary setting. It is likely that the tributary drainage system at this site influenced the alluvial fan sedimentation in this area.

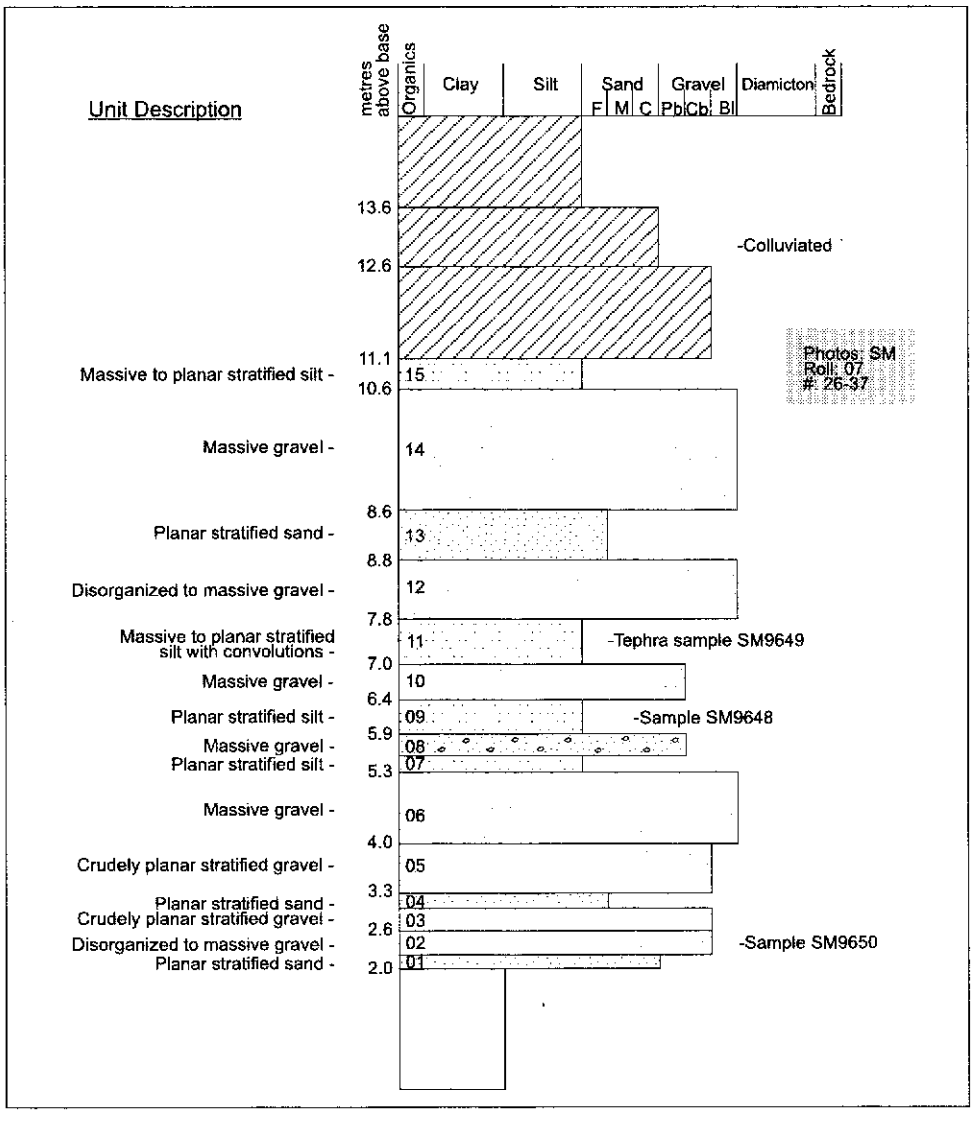
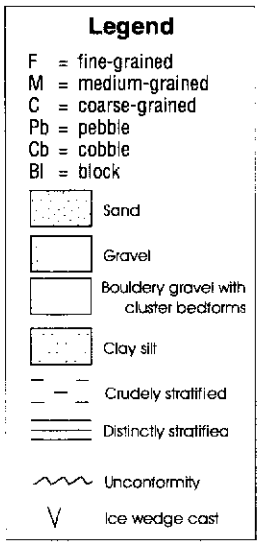
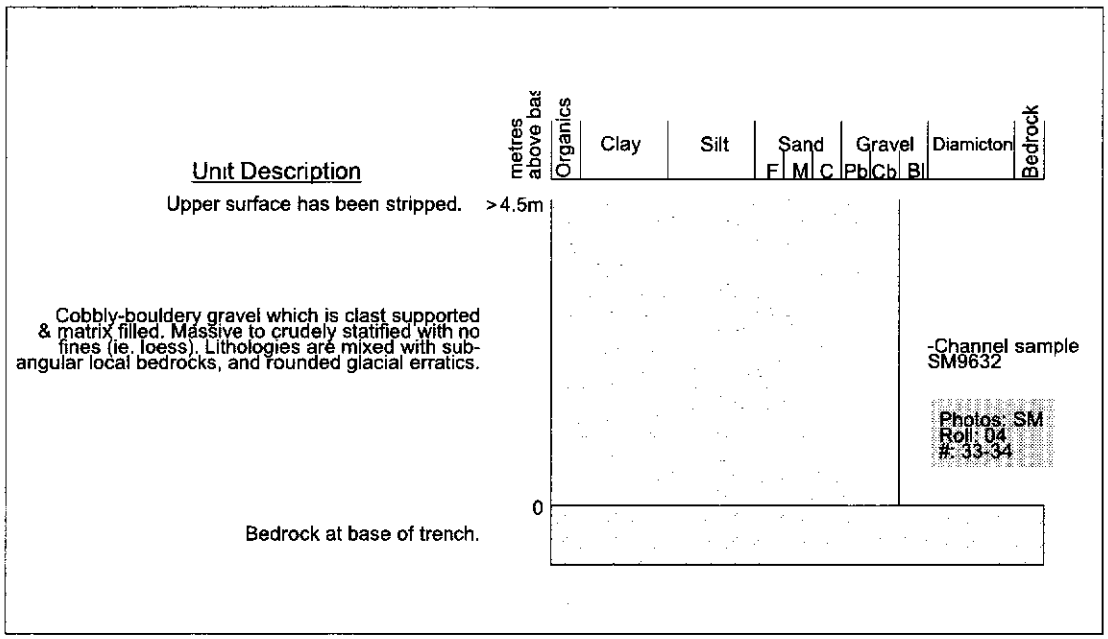


Figure 15. *Section SM96-013B.*



SECTION SM96-14

Site SM96-14 (Fig. 16) is found in the lower reaches of the Indian River drainage basin near Ophir Creek (Fig. 2). This exposure is in a trench on a lower level terrace which contains up to 4.5 m of cobble to boulder gravel which is clast-supported and matrix-filled, massive to crudely stratified with mixed lithologies of rounded glacial erratics and subangular local bedrock fragments. This is interpreted to be the same environment of deposition as for SM96-012.



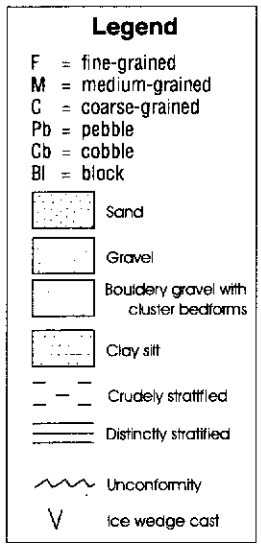
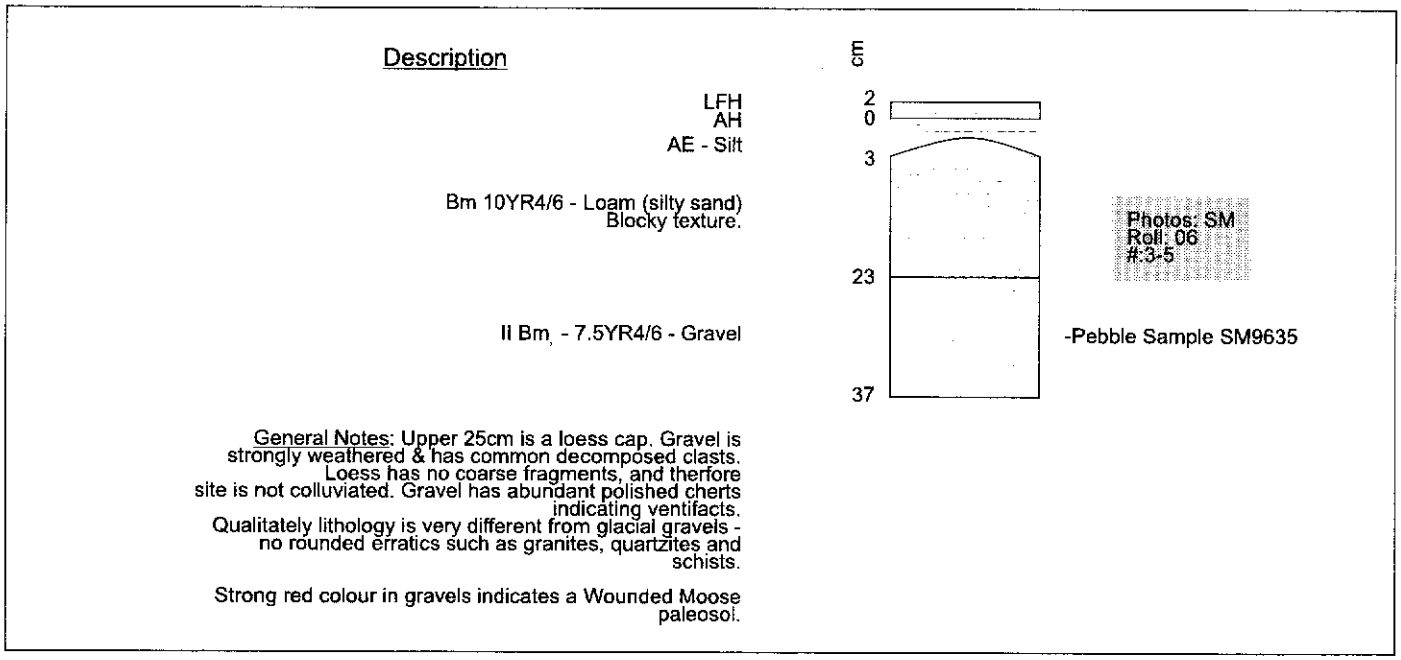


Figure 16. *Section SM96-14.*

SOIL PIT SM96-21

Site SM96-21 (Fig. 17) is a soil pit which was dug on the edge of a dissected and discontinuous terrace surface that is higher in elevation than the surrounding pre-Reid terraces in the Yukon River valley (Fig. 3). This is the highest level terrace in the study area and is termed "paleo-Yukon River terrace" and is found above the 1,500-foot contour (Photo 16). This soil pit has a silty loess cap which covers a highly weathered, fine-grained and well sorted distal gravel deposit. The gravel at this site is in excess of 5 m in thickness and was deposited by a south-flowing paleo-Yukon River system. The main source of evidence for this interpretation is the distinct gravel pebble lithology which does not contain locally derived clasts or rounded, glacially-derived, clasts. A pebble count was conducted at this site (SM9635), and it showed the most abundant lithology is quartzite with minor quartz (10%), up to 18% chert and minor mafic rocks (2%), (Fig. 6d).

Figure 17. *Soil pit, Section SM96-21.*



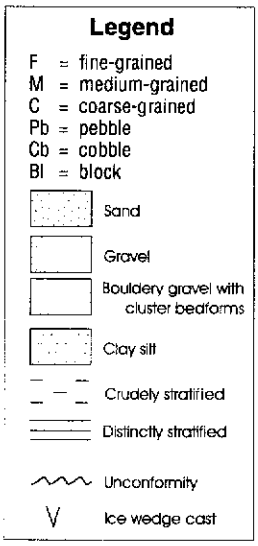


Photo 16. *Section SM96-21.*

TERRACE SETTINGS

Figure 18 shows the distribution of alluvial deposits and terrace systems in the Yukon River valley. The four main terrace settings are: high-level paleo-Yukon terraces, pre-Reid glaciofluvial terraces, low-level alluvial terraces and pediment terraces.

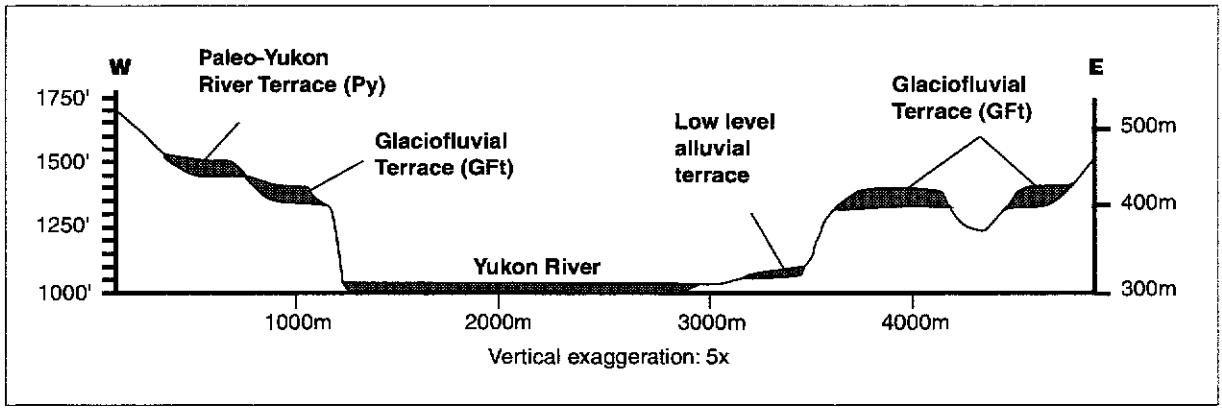


Figure 18. *Yukon River valley cross-section.*

GLACIOFLUVIAL TERRACES

Bostock (1966) documents a Nansen or pre-Reid glacial spillway through a distinct pass northeast of Wounded Moose Dome at the 2,300-foot elevation. It is thought that glacial ice did not move through this pass but was a conduit for meltwater which transported gravel into the Australia Creek and Indian River drainage systems (Fig. 2). This allowed for the aggradation of pre-Reid terraces in the Indian River drainage basin. The influx of gravel in this area buried pre-existing White Channel Gravel deposits. The terrace stratigraphy in the mid-reaches of Indian River, upstream from Quartz Creek, typically consists of up to 20 m of pre-Reid glaciofluvial gravel that overlies up to 15 m of White Channel Gravel (Fig. 19). In places, the upper White Channel gravelly and sandy facies are interbedded with lower units in the pre-Reid glaciofluvial gravel. In the lower reaches of the Indian River valley, pre-Reid gravel has buried an interglacial or preglacial tributary stream system (Fig. 20).

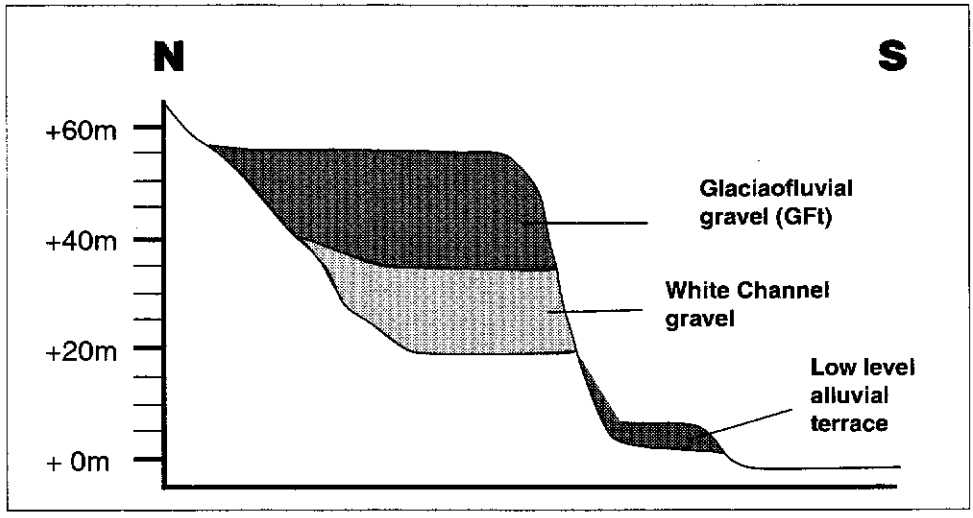


Figure 19. *Glaciofluvial terrace – Indian River above Quartz Creek.*

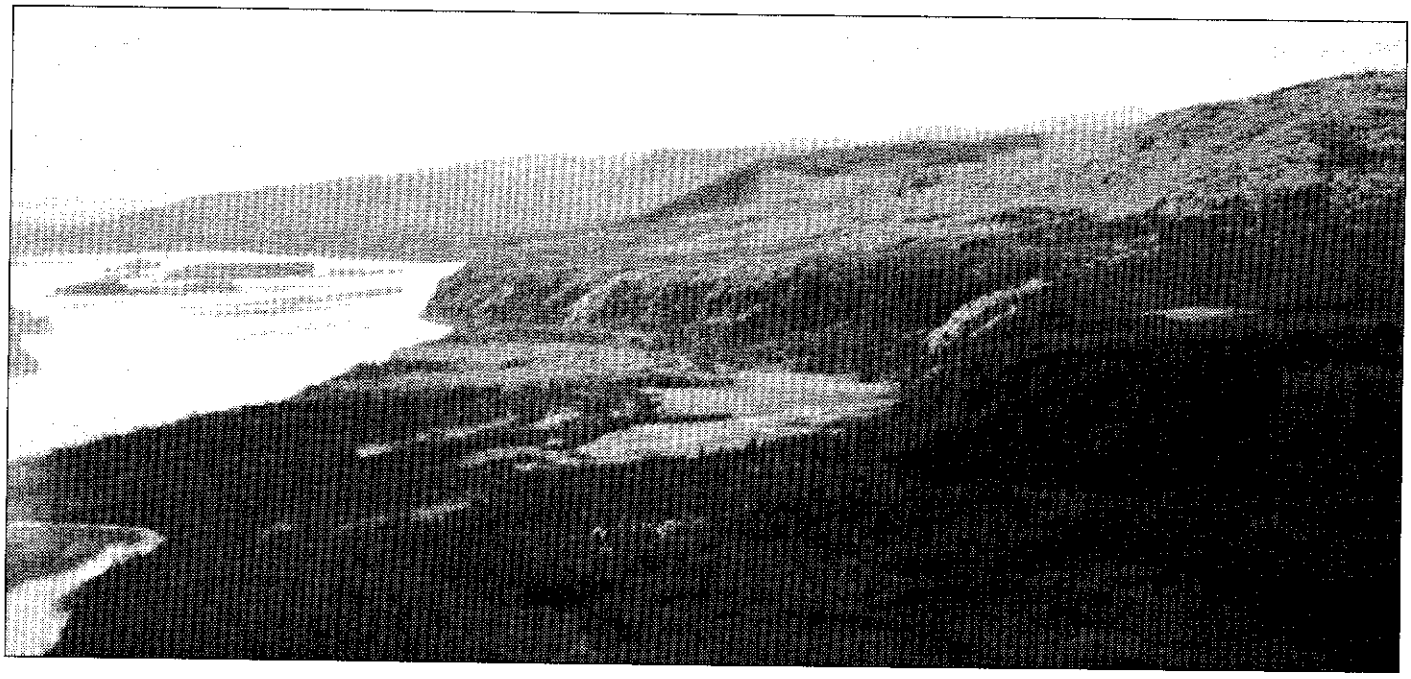


Photo 17. *View south along the Yukon River, approximately 6 km north of Indian River mouth. Note glaciofluvial terraces approximately 100 m above low level alluvial plain, Section SM96-21.*

There are distinct high-level terraces along the Yukon River downstream from the confluence with the Stewart River (Photo 17). These high-level terraces are interpreted as pre-Reid glaciofluvial terraces that formed as a result of pre-Reid melt water from both the Stewart River drainage basin and the White River drainage basin. Figure 5 shows the extent of glaciation in the Stewart River map sheet and the surfical geology maps for Garner Creek, Matson Creek and Ogilvie (Figs. 3 and 4, in pocket) shows the distribution of the glaciofluvial terrace system in the Yukon River valley. Generally, these terraces in the main Yukon River valley have limited aggradation of sand and gravel.

PALEO-YUKON RIVER TERRACES

A discontinuous and dissected older terrace system is found at elevations above the pre-Reid terrace level and is interpreted to be a remnant feature from the southward-flowing paleo-

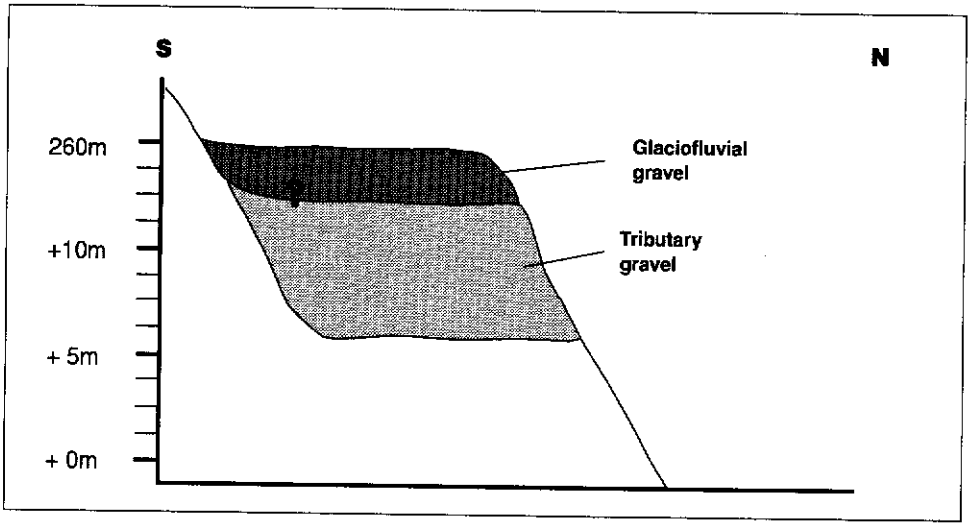


Figure 20. *Glaciofluvial terrace – Indian River below Quartz Creek*

Yukon drainage system (Fig. 18). This interpretation is based largely on the higher elevation of these terrace systems and the presence of pebble lithologies (e.g. chert) which have a northerly provenance (Duk-Rodkin, pers.com., 1997).

LOW-LEVEL TERRACE SYSTEMS

There are low-level terraces throughout the map area which are incised through both glaciofluvial terraces and thick White Channel Gravel deposits (Fig. 18). The gravel on these low level terrace systems is thin and late Pleistocene in age.

PEDIMENT TERRACE SYSTEMS

Pediment terraces in this study area are inclined fluvial surfaces which are found at a mid-slope position in unglaciated tributary drainage systems. There is limited aggradation of stream gravel and there has been significant colluviation which results in a thin, poorly sorted, mixed gravel deposit that is composed of both locally derived subangular stream gravel deposits and rubbly bedrock fragments. The pediment terraces in the study area are inclined and have been formed by a combination of limited stream aggradation and periglacial slope erosion (Fig. 22).

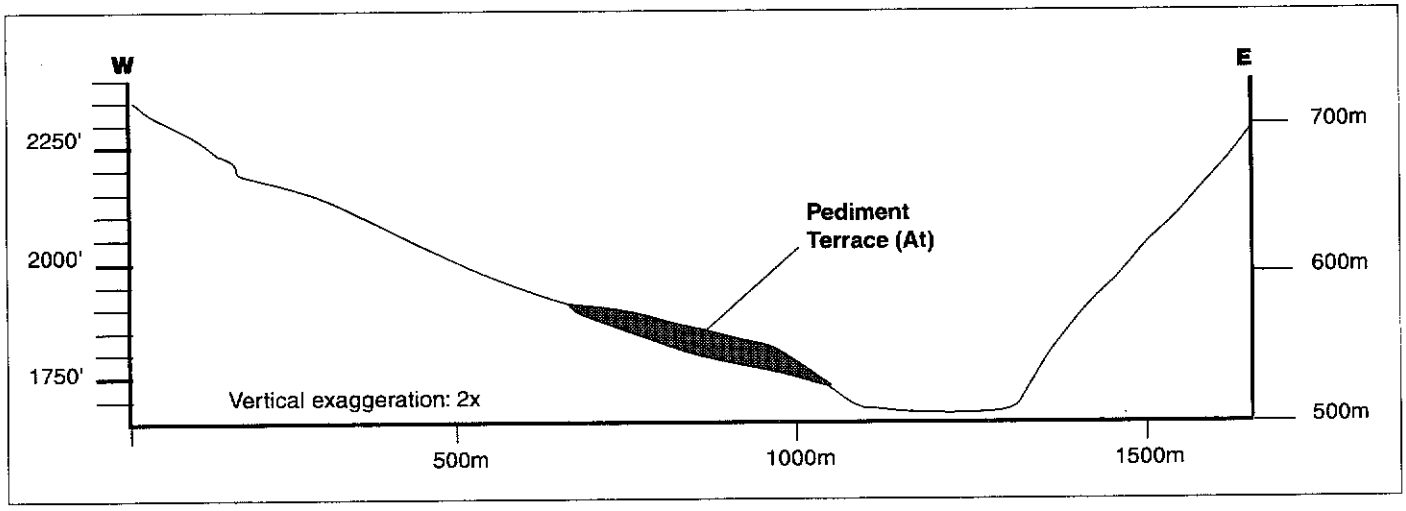


Figure 21. *Pediment terrace surface.*

HEAVY MINERAL INVESTIGATIONS

The goal of the study was to examine, on a reconnaissance scale, the heavy mineral fraction of samples collected from a variety of settings (gravel over bedrock, soil samples, colluvium, placer bench, etc.), and to associate the heavy minerals, particularly any metallic ones, to mineral showings of economic interest. In addition, study of the heavy mineral fraction provides information on the sedimentology of the area. It was hoped that geochemical signatures of underlying mineral deposits could be delineated by documenting metallic and pathfinder heavy minerals associated with various types of ore deposits.

A conclusive heavy mineral study, of the type produced by Gleeson (1970) for the Klondike area, was beyond the scope of this study. In the study by Gleeson, sophisticated laboratory equipment, such as a Frantz separator, was used for the heavy mineral separation. Furthermore, grain mounts were made of each sample, and X-ray diffraction and chemical treatments were used for mineral identification.

The samples taken for this heavy mineral study used simple mineral extraction and mineral identification techniques. The cost-effective methodology developed for this study can be adopted by prospectors and exploration geologists interested in using heavy mineral analysis as an exploration tool.

With the exception of 23 mineral grains which were sent for microprobe analysis, all mineral identifications in this study should be considered tentative.

METHODOLOGY

Samples for the study were collected across the project area from both high-level terrace settings and in creek bottoms. The samples were collected in plastic sample bags and weighed from 2 kg to 10 kg. Three sample suites were collected: the SM series, FP series and SJ series. These samples were collected from a variety of gravel, sand, clay and soil deposits.

SAMPLE PROCESSING AND EXTRACTION OF HEAVY MINERALS

A total of 70 samples were processed at the H.S. Bostock Core Library facility (Exploration and Geological Services Division, Indian and Northern Affairs Canada) in Whitehorse, Yukon. Heavy minerals were recovered from 61 samples. At the start of this heavy mineral study, the 2 size fractions which were extracted included the -18 mesh size fraction and the -18 to -4 mesh size fraction. During the course of the study, it was found that only the -18 mesh size fraction was suitable for heavy mineral analysis. In this size fraction, the finer grains are more numerous than in the coarse fraction, and contain a greater variety of heavy minerals. The finer, more crystalline grains are easier to identify than the larger grains, which tend to exhibit more rounding. Subsequently, extraction of the -18 to -4 mesh size fraction was eliminated from the procedure.

Procedure:

1. The sample was washed through a -4 mesh screen to remove large cobbles and rock fragments. Then, the sample was washed through a standard -18 mesh screen. A large plastic washtub (to hold the water for panning), a black plastic gold pan, a -4 mesh screen and a -18 mesh screen were used.
2. The -18 mesh fraction was panned down by hand in the goldpan to between 3 to 20 grams (approximately) of heavy mineral concentrate.
3. Each pan concentrate was checked for gold content before removal from the goldpan.
4. The pan concentrate was allowed to dry on a coffee filter perched on top of a paper plate.

5. The coffee filter containing the dried-pan concentrate was used as a funnel to shepherd the concentrate into a small beaker containing methylene iodide. This procedure was carried out under a fume hood.
6. Minerals or rock fragments with a specific gravity greater than 3.32 sink to the bottom of the beaker.
7. Minerals or rock fragments with a specific gravity less than 3.32 float on the surface of the methylene iodide and are removed with a spoon or are poured off.
8. The remaining heavy mineral grains and rock fragments in the bottom of the beaker (those with specific gravity greater than 3.32) are rinsed with ethyl alcohol and flushed out to dry on filter paper set on a paper plate.
9. When dry, the filter paper is used as a trough to channel the density >3.32 fraction into a labeled glass vial.

Note 1. Methylene Iodide should be used under a fume hood. The rinsed portion of methylene iodide and alcohol was placed in a separating funnel and the methylene iodide was recovered for re-use.

Note 2. The above method does not a produce a completely "clean" heavy mineral concentrate, but was adequate for the purpose of this study. Gleeson (1970) recommends using a set of sluice boxes to produce a concentrate, then using bromoform, a hand magnet and a Frantz isodynamic separator to remove the heavy minerals.

Note 3. It should be noted that the >3.32 density mineral fraction also includes rock fragments. In some cases, rock fragments, as opposed to individual mineral grain, made up almost 100% of the sample.

EXAMINATION OF HEAVY MINERAL FRACTION

Microscope work was carried out at the Yukon Geology Program office in Whitehorse, Yukon, using:

- binocular microscope
- longwave and shortwave ultraviolet light
- penlight and handheld microscope with micrometer (for measuring the size of individual grains)
- needle for moving around mineral grains
- fine-tipped tweezers
- variety of magnets
- dilute HCl
- dichroscope for determining pleochroism
- stainless steel pushpin (for scratch tests) and hardness points

The heavy minerals recovered from the samples were examined using the following procedure:

1. The fraction with density >3.32 was placed on black construction paper and examined under the binocular microscope.
2. The room lights were turned off and the sample was examined under longwave and shortwave ultraviolet light. Due to the extremely small size of the mineral grains, the sample was aligned in the binocular microscope, and any fluorescence was observed under magnification by holding the ultraviolet light source as close as possible to the sample.
3. The room lights were turned back on and the sample was placed on white paper.
4. Magnetite grains were removed and the remaining minerals were examined.
5. If warranted, the density <3.32 fraction was also looked at.

Mineral identification was difficult due to the very small size of most mineral grains, which were, on average, less than 1.0 mm. Mineral identification was done using basic techniques (ultraviolet light, magnification, magnetism, crystal form).

A total of 23 grains from the Stewart River Placer Project heavy mineral samples were extracted and sent to Cannon Microprobe Inc. in Seattle, Washington, U.S.A. for microprobe analysis. The purpose of this was to identify unknown minerals and to confirm tentative identifications of others.

RESULTS

The percentages of the more common heavy minerals in the samples are shown as tables in Appendix 4. Characteristics of these minerals are noted below:

Amphibole

Amphibole grains are generally euhedral prismatic or tabular and green or blue-green. Amphibole occurs in trace amounts in a few of the samples.

Apatite

Apatite was noted in trace amounts in a few samples; however, anhedral or subhedral light-coloured apatite is difficult to recognize. Apatite probably occurs in greater quantities than noted for the study.

Barite

A tentative identification of barite was made in sample FP96-01. (This sample also contains two galena fragments.) The barite(?) forms white to clear grains with good cleavage in three directions. It is soft and does not react to HCl. The grains fluoresce light blue/green under both longwave and shortwave ultraviolet light.

Gleeson (1970) noted barite is fairly common in the Klondike gravels. It was derived from quartz-barite veins which cut the Klondike Schist.

Epidote

Epidote is a common trace mineral. It occurs as yellowish-green to yellow, anhedral to subhedral grains.

Garnet

Garnet is one of the three most common heavy minerals found in the study. Garnets vary from light pink, tan, orange, red to almost clear. Garnets vary from being completely transparent to cloudy with inclusions. They are euhedral, forming gem-like dodecahedral and trapezohedral crystals to anhedral colorless blebs, sometimes etched.

Samples SM9618, SM9632 and SM9656 contain over 80% garnet.

Goethite (mixture of limonite and hematite)

Most of the goethite observed forms euhedral cubes and pyritohedrons pseudomorphous after pyrite. Gleeson (1970) observed pyrite cores in some of the goethite grains from the Klondike.

Samples SM9630 and SM9631 contain abundant goethite after pyrite, up to 90% of the samples. Gleeson (1970) noted positive correlation between goethite content and placer gold in the Klondike.

Gold

Gold grains were noted in samples SM9615 (1 grain gold), SM9616 (1 grain gold), SM9626 (2 grains gold), SM9628 (1 grain gold), SM9640 (1 grain) and FP9611 (1 grain gold). The gold grains noted are small (<0.05 mm) flattened anhedral discs, with the exception of the gold grain with wire form noted in SM9616.

Hypersthene

Euhedral, glassy olive-green to brown crystals of hypersthene were identified in trace amounts. The crystals showed characteristic spherical gas bubbles and inclusions of magnetite and ilmenite. The crystals often show rounded edges, as though they were slightly melted. Sample SJ96-08 contained the largest hypersthene grains, up to 2 mm.

Hypersthene is present in trace amounts in some samples between SM9631 to SM9658. It is slightly more abundant in the FP sample series.

Ilmenite

The three most common heavy minerals in the samples are ilmenite, magnetite and garnet. Ilmenite generally forms black, submetallic grains which show conchoidal fracture and a high lustre. Ilmenite grains sometimes display an alteration rim of leucoxene.

Samples SM9633, SM9638, SM9651, SJ9603 and SJ9605 all contain ilmenite in quantities of 50% or greater.

Kyanite

Samples collected from sections SM96-07 to SM96-08 contain up to 5% kyanite. The kyanite is in the form of colorless to light blue bladed tabular crystals with good cleavage. Samples SM9614 to SM96, which contain up to 5% kyanite, also contain up to 3% staurolite. Gleeson (1970) noted that, in the Klondike, staurolite accompanies kyanite.

Leucoxene

Leucoxene was found as a creme-colored alteration product on ilmenite grains. Gleeson (1970) noted that much of the material he initially called leucoxene was identified, by XRF analysis as very fine-grained anatase or sphene.

Magnetite

Almost every sample in the Stewart River study contains magnetite. Samples which contain greater than 50% magnetite are listed below:

SM9634	SM9651	FP9611	SJ9610	SM9640	SM9658
FP9612	SJ9611	SM9642	FP9602	FP9613	SM9643
FP9609	SJ9601	SM9645	FP9610	SJ9604	

Higher magnetite content is, in general, associated with higher ilmenite content. The sample with the most magnetite is SM9645, which is from a soil pit.

Pyrite

Most pyrite observed in the sample sets has oxidized to goethite. Fresh, lustrous, untarnished pyrite is rare. Sample FP9601 contains trace amounts of fine-grained euhedral fresh pyrite crystals. This is the sample which also contains galena and barite(?). Sample SM9635 also contains trace amounts of unoxidized pyrite.

Rutile

Bright yellow-orange, prismatic, striated rutile fragments, some showing elbow twins, was noted as a trace mineral in many samples. In general, rutile in the SM sample series was a brighter yellow-orange color than the darker red to black rutile from the FP and SJ sample series.

Sphene

Euhedral sphene was easily identified in the samples as a common trace mineral. Sphene is in the form of pale yellow, green or brownish euhedral flattened crystals.

Staurolite

Staurolite is present as transparent, amber-coloured broken fragments showing a vague squarish outline and conchoidal fracture. Staurolite was one of the minerals confirmed in the microprobe analysis.

Most of the staurolite noted in the study was in samples SM9601 to SM9618 and in FP9601 to FP9609.

Zircon

Zircon is present in trace amounts in many samples. It generally forms colourless to pale brown, yellow or pink euhedral to spherical crystals of high relief. Most zircon fluoresces bright orange-yellow under shortwave ultraviolet light.

Six samples contain anomalous (more than trace amounts) of zircon. These are SM9640, SM9643, SM9645, SM9654, SM9655 and SM9658. The more abundant zircon in these samples may reflect a nearby granitic source.

DISCUSSION

In general, the heavy minerals from the Stewart River area samples are highly mixed; they show great variety in the degree of homogeneity within the sample and in the angularity of the heavy mineral grains. For instance, many samples contained a wide variety of minerals with forms ranging from euhedral to anhedral. Samples which contain mostly euhedral heavy minerals or angular heavy mineral fragments indicating a nearby bedrock source were rare. Rock fragments and rock-forming mineral grains were abundant.

The most abundant heavy minerals were magnetite, garnet and ilmenite in varying proportions.

Any gold greater than >0.01 mm should have been recovered; however, gold grains were rare. Samples SM9615, SM9640, SM9650 and FP9611 each contained one flattened rounded small grain of gold. Two rounded, flat gold grains were noted in SM9626. Sample SM9616 contained 1 grain of wire gold.

Metallic heavy minerals were rare, except for pyrite and geothite/limonite/hematite pseudomorphs after pyrite. Pyrite occurs in trace (<1%) amounts in many of the samples, and goethite after pyrite comprises 50% or greater of samples SM9630 and SM9631. Pyrite grains from the Stewart River area often showed extensive oxidation. The microprobe study confirmed that pyrite in many samples had been replaced by a hematite/goethite combination. These pseudomorphs after pyrite form cubes, pyritohedrons or anhedral blebs. Fresh, lustrous, untarnished pyrite was only noted in sample FP9601 and in SM9635.

It was noted by Gleeson (1970) that pseudomorphs of goethite, limonite and hematite after pyrite are found in quantity in the creek gravels and eluvium over and near deposits of lode gold.

Sample FP9601 from Baker Creek is the most interesting sample of the study. It contains two galena cleavage fragments, and also contains 10-30% of a white to cream cubic, soft fluorescent mineral tentatively identified as barite. The galena is bright, lustrous and shows no signs of weathering. The largest of the two galena fragments is 0.6 mm x 0.4 mm. Sample FP96-01 also contains unoxidized, lustrous small pyrite clusters.

Samples which contain large amounts of goethite/limonite/hematite pseudomorphs after pyrite may be interesting in light of Gleeson's observation of an association between goethite and lode gold deposits in the Klondike area.

IMPLICATIONS FOR PLACER GOLD EXPLORATION

Placer gold can be found in a variety of terrace settings throughout the Stewart River map area. Sampling associated with this project noted discrete occurrences of placer gold in:

- White Channel Gravel which is stratigraphically below and interbedded with pre-Reid glaciofluvial gravel (e.g. SM9610);
- occasionally in pre-Reid glaciofluvial terrace settings along the lower reaches of the Stewart River; and
- low-level alluvial terraces.

Favourable placer gold concentrating environments, such as interglacial gravelly sedimentation (Froese and Hein, 1996) or pre-glacial stream sedimentation (Ager et al., 1994), appear to be lacking in the study area and generally throughout the lower reaches of the Stewart River valley. The scoured high-level glacial terraces in the Yukon River valley, the non-glacial pediment terrace systems and the high-level paleo-Yukon River terraces are not favourable placer environments for exploration. In addition, the paucity of hardrock mineral occurrences in the Matson Creek, Ogilvie and Garner Creek map areas combined with a lack of metallic minerals in the heavy mineral analysis, indicates little potential for new placer gold occurrences in this area.

The extensive glaciofluvial terraces in the Indian River valley area appear to be the most favourable geomorphic setting for new placer gold occurrences in the study area. Here the White Channel Gravel is found stratigraphically below pre-Reid glaciofluvial gravel. Additional occurrences of White Channel Gravel may be located in the Indian River area.

Alluvial terraces in lower slope positions in tributary valley systems of the study area are also favourable exploration targets. These low level terraces can be buried below slope deposits and alluvial fans. Air photo interpretation to locate these low-level alluvial terraces is recommended prior to exploration in the area.

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Appendix 1

CONTENTS

Note: Many of the sections were photographed by Fuller (TF), Timmerman (JT), Brent (DB) and Andersen (FA). This visual record is currently held by Fuller but will be stored with archived data at the Yukon Geoscience Office, Whitehorse, Yukon.

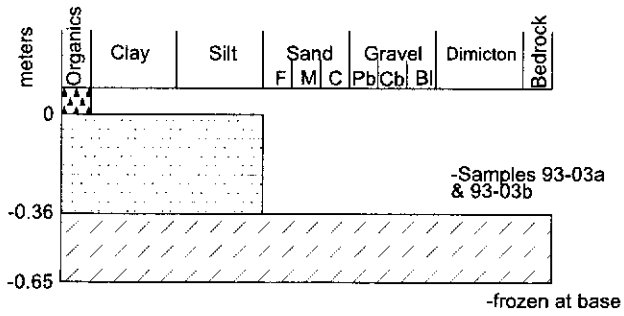
Station 93-03

Mouth of Rosebute Creek

Unit Description

Olive brown massive loess.

Angular flat chips of amphibolite gneiss bedrock
Sandy matrix.



Station 93-04

Yukon R., E side, 28 km NW of mouth of Stewart R.

Unit Descriptions

Moss

Loess

Fine sand matrix supported pebbly layer with root hairs. Pebbles are well rounded and flat.

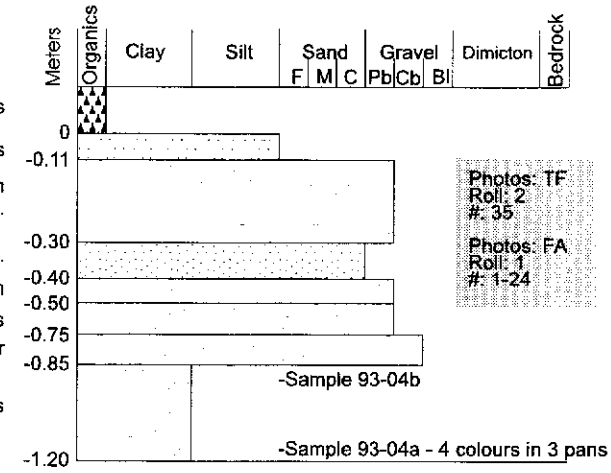
Washed granular layer, open-work.

Pebble layer. Small washed pebbles < 1 cm

Course sand grit matrix w/ abundant flat pebbles

Sub-rounded cobble layer

White yellow clay with angular rock fragements



Station 93-05

Yukon R., W side, 1 km S of mouth of Sixtymile R.

Unit Description

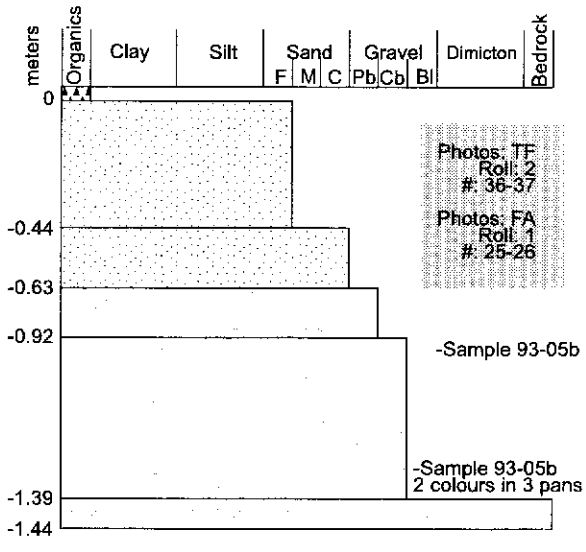
Mottled rusty grey/green fine sand to coarse silt. Upper portion massive; bedded in lower portion. No clay, but some charcoal found.

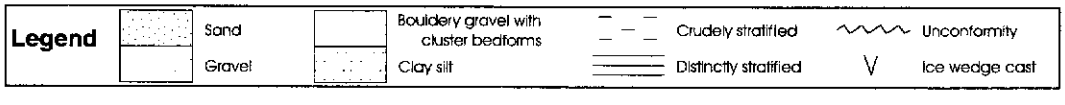
Brown pebbly sand - rotted subrounded pebbles. Crude stratification. Indistinct lower contact.

Clast supported orange-brown pebble gravel; rotted granite pebbles.Coarse sandy matrix, no siltskins. Planar lower contact.

Light olive brown well packed clast supported cobble gravel with gritty sand matrix. Cobble layer at top, no apparent imbrication. Max clast size > 16cm. Lots of subrounded quartzose rocks; siltskins on cobbles only; rotted schist pebbles.

Angular chips and rocks of hematite stained and clay infilled fractures of amphibolite. Broken blocky bedrock with sand and small pebbles within fractures.





Station 93-06

Yukon R., W side, 8 km N of mouth of Sixtymile R.

Unit Description

Olive brown mottled massive fine sand/coarse silt.

Fissile grey fine sand with granular angular fragments up to 4mm. Ventifacts? some pollished chips.

Washed medium sand - fining upward with pebbles at base.

Dark grey brown coarse silty sand with some pebbles.

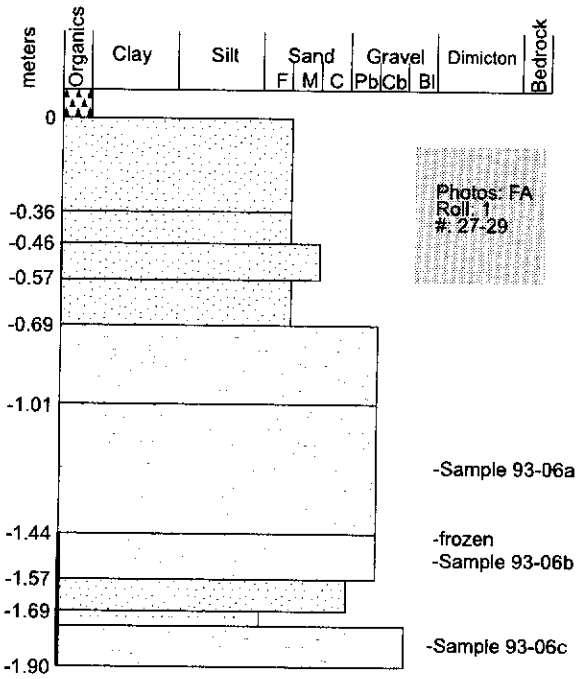
Greyish brown coarse silty sand with some pebbles. Pebbles up to 7cm - siltskins on tops of pebbles. Openwork at 85cm depth

Clast supported washed openwork pebble gravel. Pebble tops have $CaCO_2$ coating. Wavy bedding with westward trending weak imbrication.

Dark gray brown "salt&pepper" matrix supported gravel with coarse washed gravel.

Dry, loose grey-brown coarse sand.

Frozen grey silt enclosing 1-2cm pebbles overlying light brownish grey matrix supported frozen gravel. Silt maybe drape deposit after flood.



Station 93-07

Unit Description

Reddish to yellowish brown McConnell loess.

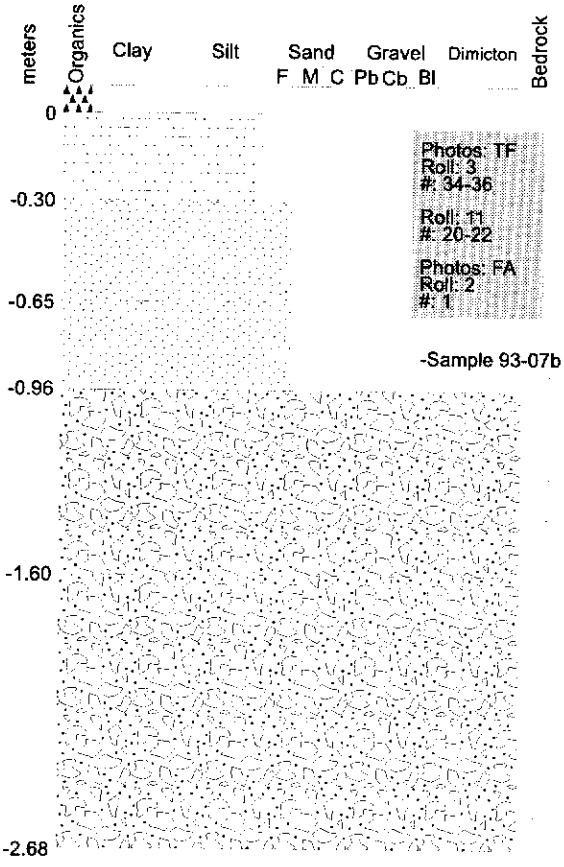
Fine light olive brown sand. Subrounded to rounded pebbly/granular layer at base. Sharp sub-horizontal lower contact.

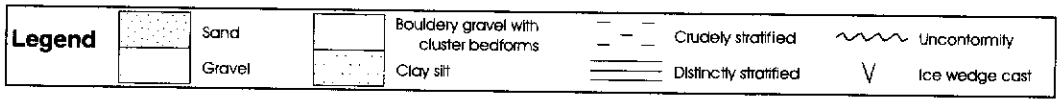
Damp, yellowish brown cryogenically altered silty sand. Perhaps a buried soil profile? Wavy distinct lower contact.

Olive grey silty, clay rich diamicton - perhaps a till?. Shiny soil with sporadic pebbles, roots and cobbles. Cobbles are striated. No bedding. Football-shaped pebbly sand lens - horizontal contact.

Pit dug with Kubota below this point

Similar olive grey stony "mud". Well striated bullet shaped boulder found at 2m depth - support that deposit is glacial drift.





Station 93-08

Unit Description

Flaggy chlorite schist slabs - up to 35cm - below moss mat.

Dark brown colluvium with randomly oriented chips up to 3cm. Sub-horizontal strata of silty sand.

3 separate organic 1cm thick beds in very fine olive horizontally bedded sand.

Alternation planar, gently dipping fine grey sand beds and brown micaceous silty sand beds. Possible ripples at 70cm depth.

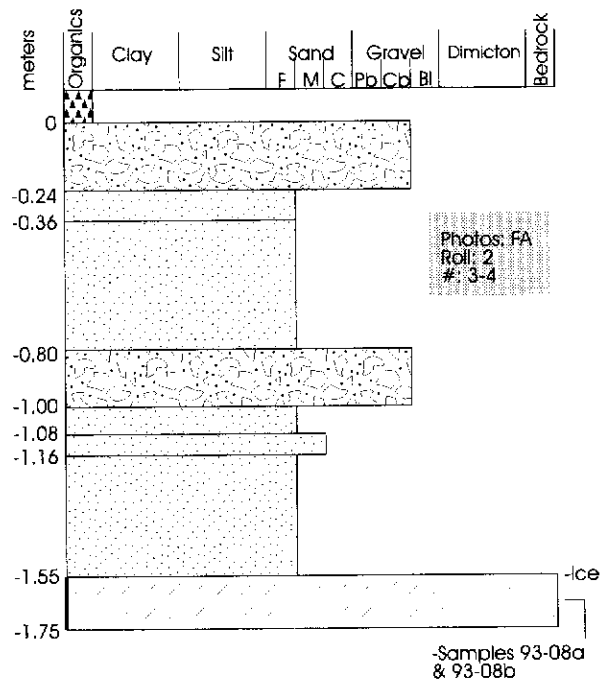
Colluvium - angular chlorite-hornblend-quartz schist fragements.

Fine grained, well sorted and washed, normally graded micaceous sand.

Mauve micaceous, medium to course sand with rounded pebbles.

Light grey to brown, horizontally bedded very fine sand.

Rotten, brown to black (mafic) chlorite schist with some pyrite. Ice crystals observed in samples.



Station 93-09

Stewart R., S side, 18 km NE of mouth of Valley Cr.

Unit Description

Dark brown massive coarse sandy matrix supported gravel with 2cm pebbles. Wavy lower contact

Pebbly olive yellow fine sand with no bedding.

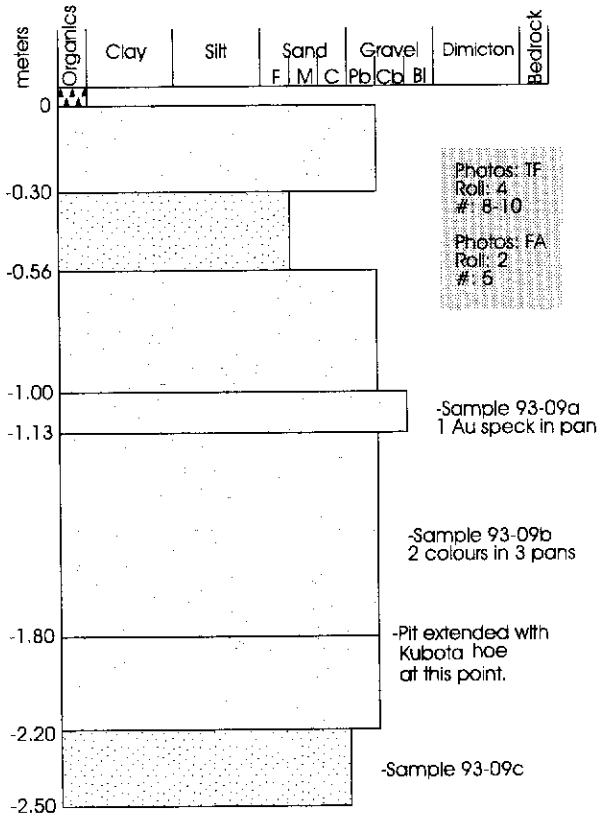
Light brown, washed, clast supported pebbly gravel. Max clast size 8cm. Pebbles coarsen upwards.

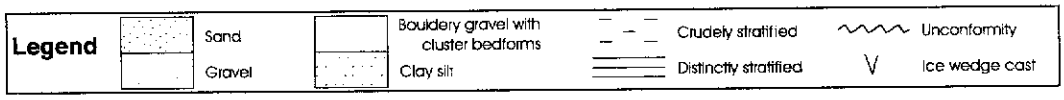
Dark brown, washed sub-rounded cobble gravel. Max clast size 10cm.

Olive brown washed pebbly gravel with gritty matrix. No fine material. Pebbles < 5cm, typically 2.5cm. A coarse sand layer at 1.28m depth.

Washed pebble gravel, grit matrix - no fines.

Brown clay and coarse sand in 5cm interbeds. Sand well sorted, but clay exhibits no structure.





Station 93-10

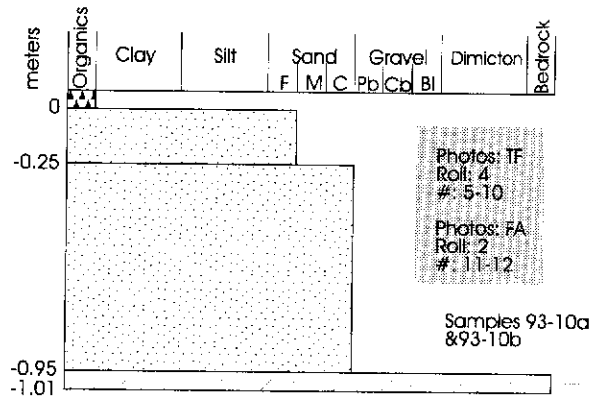
Stewart R., S side, 10 km NE of mouth of Valley Cr.

Unit Description

Fine olive brown sand with scattered < 2mm pebbles. Horizontal strata. Unit overlain by 4cm of black silt.

Olive brown with white quartz coarse pebbly sand. Pebbles are randomly oriented and subangular. Few cobbles, >> 95% sand. Black organic layer at 36cm depth. Soil damp and cold, but unfrozen.

Orange-brown decomposed muscovite quartz schist. Schist cut by heavily fracture white bull quartz veins.

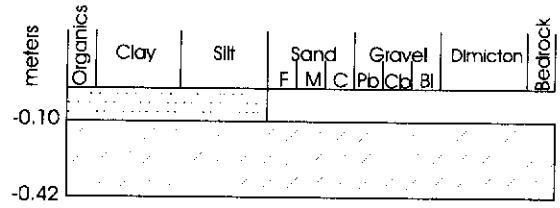


Station 93-11

Unit Description

Reb brown McConnell loess.

Heavily weathered felsic granite.



Station 93-12

Unit Description

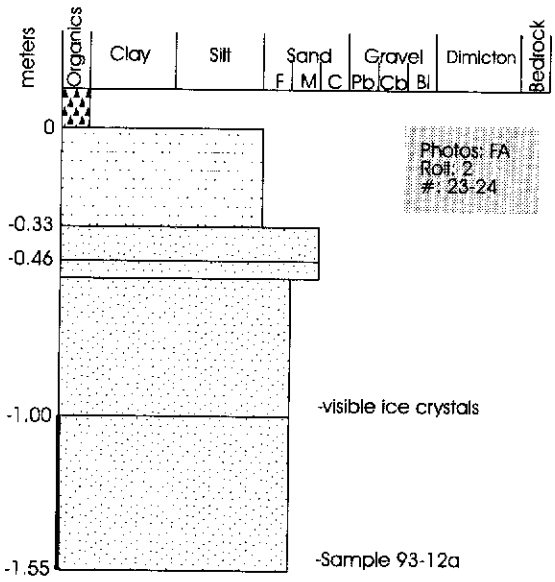
Mottled yellow brown and grey loess. Ventifacted and striated pebbles found under loess.

Dark yellowish brown medium sand with granules < .5cm. Contains some silt.

Grey well sorted medium sand; no grading - scour-fill or lens.

Silty sand with granules and pebbles to 3cm. Siltskins atop pebbles. Discontinous clayey silt layers 1.5cm thick. Yellow brown coarse sand layer at 65cm depth - cryogenic texture. 15cm long sand lens at 87cm depth.

Compact brown silty sand. Semi-frozen with platy parting. No bedding, but breaks along wavy cryogenic planes.



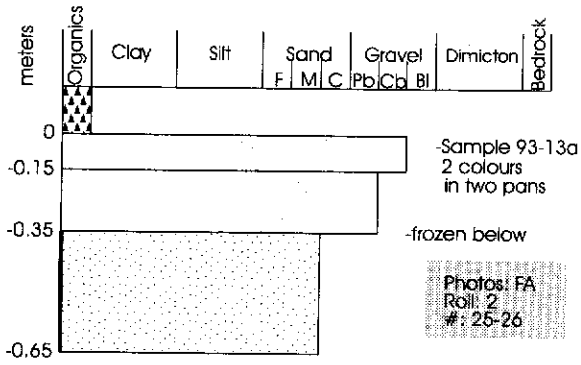
Station 93-13

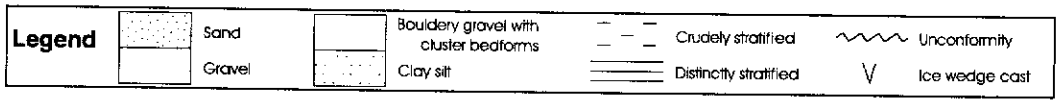
Stewart R., SE side, 8 km NE of mouth of Valley Cr.

Unit Description

Very wet saturated gravel, silty sand matrix supported. No clay. Well rounded, polished pebbles, micaceous sand and mica flakes to 1mm. Cobble to boulder lag forms top 15cm. Washed tops of stones.

Hard semi to solidly frozen fissile micaceous fine silty sand. Poorly sorted, isolated pebbles and cobbles.





Station 93-14

1 km E of Stewart R., 5 km E of mouth of Valley Cr.

Unit Description

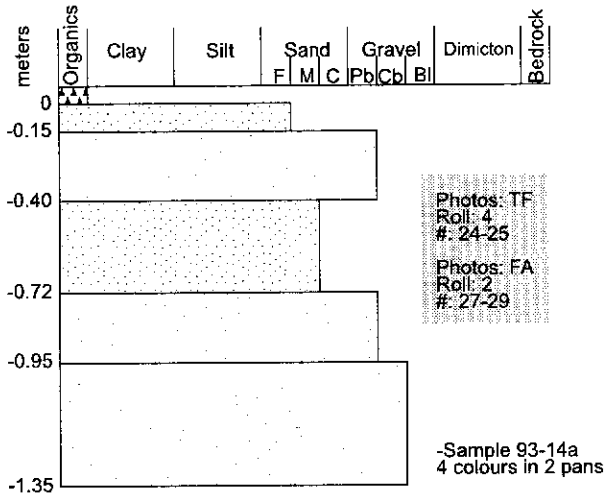
Light olive brown fine gritty sand. Well sorted clasts to 3mm. No bedding.

Clast supported pebble gravel. Clay skins on top of pebbles. Wavy upper and lower contacts.

Sand lens with pebbles to 1cm. Clay skins around pebbles. Washed pebble layer with pebbles up to 4cm at 57cm depth.

Pebbly gravel with coarse sand matrix. Clasts to 4cm. Clay skins around pebbles.

Yellowish red washed gravel coarsening downward. Apparent flow direction to south. Clay skins thinning at bottom of pit.



Station 93-16

Stewart R., NE side, 500 m W of mouth of Valley Cr.

Unit Description

Yellow red loess.

Olive brown loess. Abundant roots and hairs.

Very fine micaceous sand. Pebble layer with ventifacts at 70cm depth.

Massive medium sand. Widespread pebbles. Rusty silty soil layer at 77cm depth

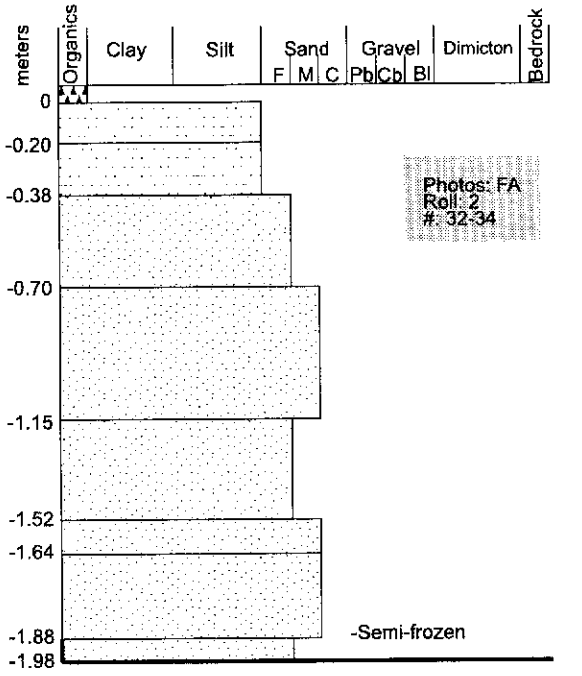
Alternating light grey and yellow brown faulted fine sand. Dips to west at 30 degrees. Intruded by brown medium sand. Sand cryoturbated and wavy.

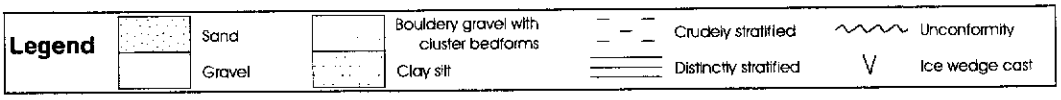
1mm frozen silt layer overlain by 2cm hard, fine sand. Light grey fine to medium sand with 1cm clay layer at base underlies frozen silt layer.

Olive brown medium sand with clay interlayers a few millimeters thick.

Compact semi-frozen fine sand.

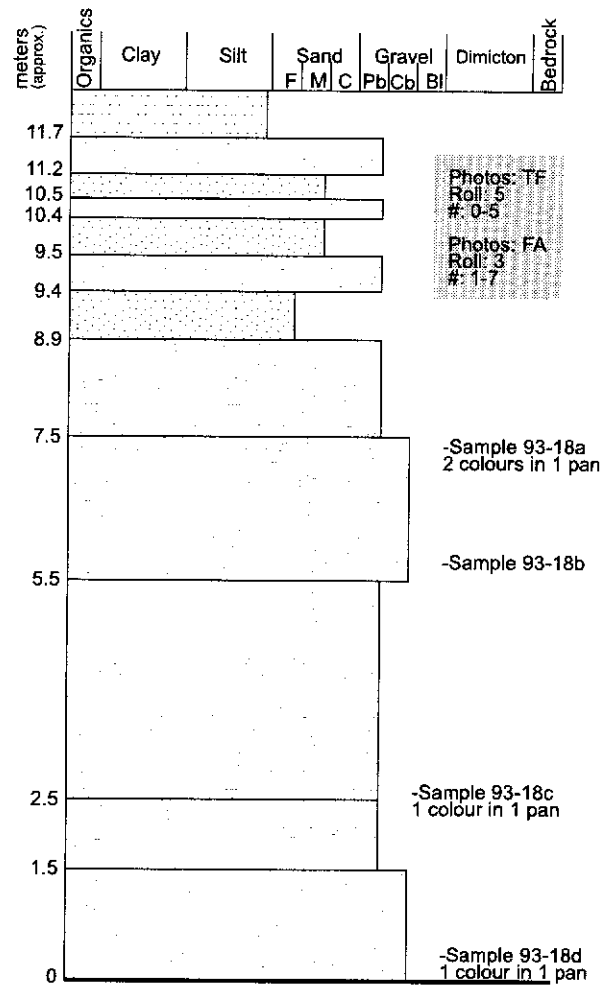
Amphibolite rich biotite schist - mafic phase of gneiss.





Station 93-18

Stewart R., N side, midway between Black Hills and Valley creeks



Unit Description

Yellowish brown McConnell loess

Clast supported flaggy gravel - colluvium?

Medium to coarse light grey and brown interlayered sand. Normally graded with small pebbles at base. Clast supported subrounded pebbly lens.

Horizontal wavy, stratified laminae of fine to medium sand. Stratified and well sorted.

Normally graded, well sorted clast supported gravel with sand lens. Bar sequence

Dark grey to light brown cross-bedded fine to medium sand. Stratified and well sorted.

Massive, well rounded clast supported pebbly gravel. Possible weak imbrication in northwest direction. Washed, gritty matrix

Clast supported poorly sorted cobbly gravel. Matrix of pebbles and grit. Some sand and a few boulders present. General coarsening downwards

Interlayered sequences of normally graded, moderately sorted sand, clast supported pebble/cobble gravel. One-boulder thick lag at base.

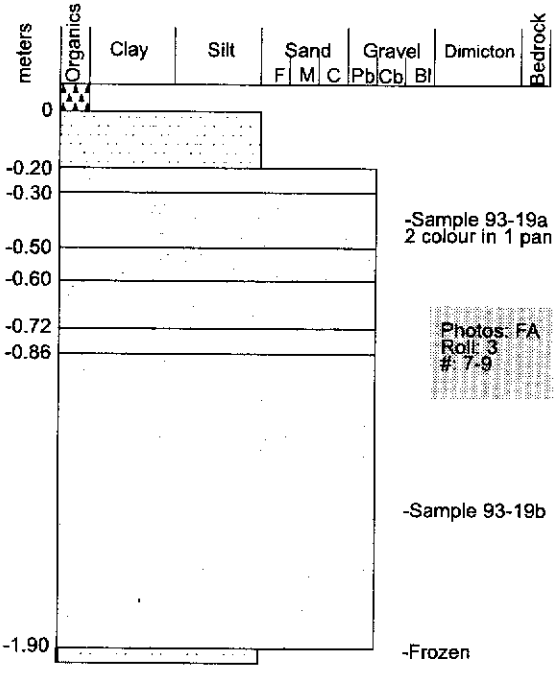
Sand to pebble clast supported gravel. Normally graded with cobble lag at base. Lower half of sequence rust coloured

Massive, unsorted clast supported pebble/cobble gravel

Weathered felsic schist. Prominently fractured 150/60N Hematite and manganese staining abundant on fractures. Carbonate coating on some surfaces. Feldspars white, soft, and heavily weathered. Some patches of chlorite

Station 93-19

Stewart R., SW side, 6 km NE of mouth of Black Hills Cr.



Unit Description

Reddish yellow loess. Pebbles with silt skins on tops. No ventifacts.

Openwork washed pebble gravel. 1cm subrounded horizontally bedded pebbles. 4cm largest clast size.

Clast supported poorly sorted brown pebble gravel. 10cm max clast size.

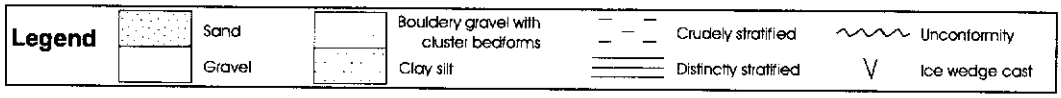
Light grey washed subrounded pebble gravel. 8mm common clast size; max size 3cm.

Poorly sorted matrix supported pebble gravel. Washed sandy matrix

Grey, clast supported, washed pebble gravel. Normal grading; scoured basal contact.

Washed, loose, subangular gravel. No fines, 2mm matrix. 6cm max clast size. Weak horizontal stratification. Poorly defined cobble layer at 1.5m depth. Max clast size 12 cm.

Semi-frozen brown silty clay to sandy silt.



Station 93-22

Stewart R., SE side, 4 km NE of mouth of Black Hills Cr.

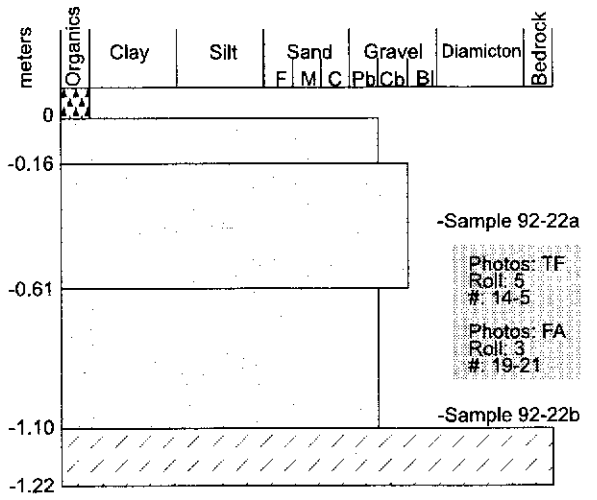
Unit Description

Matrix supported pebble gravel. Micaceous muddy sand. Poor sorting. Cobbles to 20cm.

Poorly sorted cobbly clast supported gravel. Granular matrix, vertically oriented stones. Clay and silt skins on top of pebbles. Massive structure. Many broken stones - ice history? Cryoturbated. Yellowish red mafic mica schists broken down to sand. Pebbles are subrounded & flat.

Clast supported gravel of fractured pebbles. Silt skins on tops.

Angular bedrock fragements of quartz mica schist. Size varies from 1-5cm with 1-2mm of silt on top.



Station 93-23

2 km SE of Stewart R., 8 km NW of Grizzly Dome

Unit Description

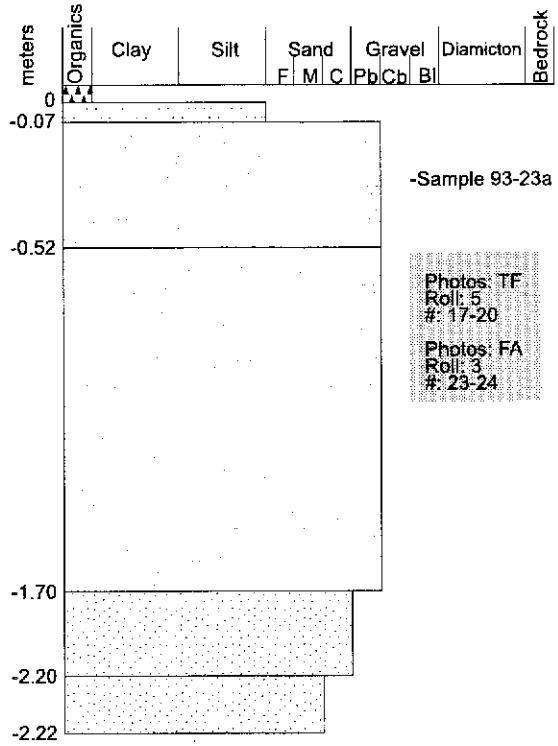
Yellow red McConnell loess - ventifacted pebbles

Poorly sorted reddish brown pebble gravel. 5% pebbles. Pebbles subrounded to subangular, weathered, silt skins on tops. No stucture. Gradational lower contact.

Sandy, reverse graded, matrix supported gravel. Pebbles widely spaced. Pebbles rotted to 1.7m depth. Weak wavy bedding. Gravel pockets 6x12cm enclosed in sand.

Coarse, olive brown micacous sand. Well sorted, non graded - some pebbles.

Brown/black organic sand.



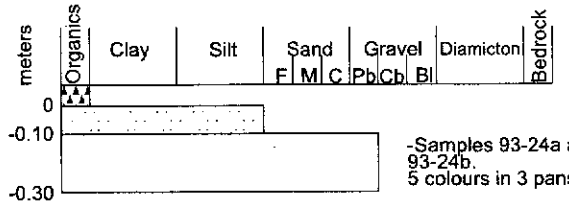
Station 93-24

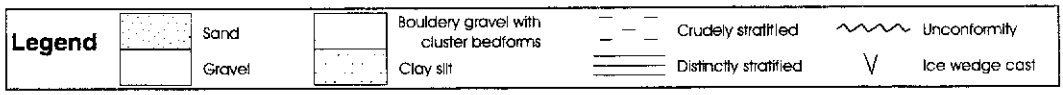
Stewart R., SE side, 2 km S of mouth of Maisy Mae Cr.

Unit Description

Dark brown loess soil.

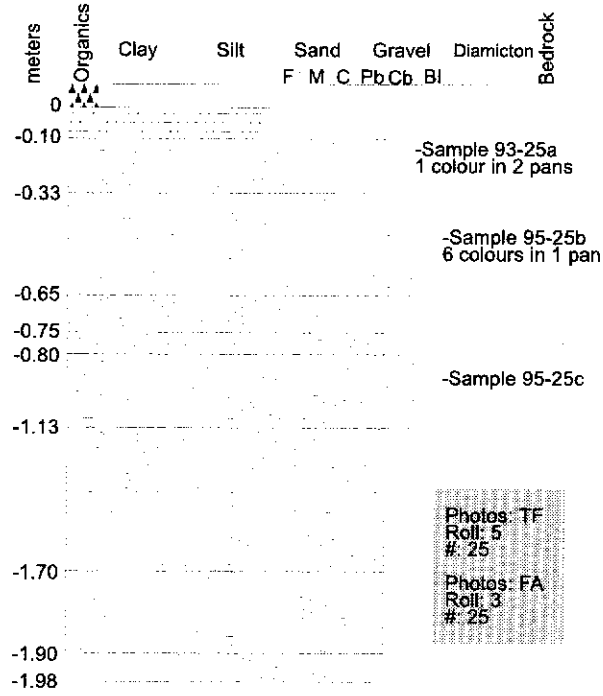
Mix of granular washed gravel with lots flaggy broken bedrock. Pebble gravel < 3cm. Bedrock of crenulated mafic biotite schist. Thick silt skins on bedrock fragments.





Station 93-25

Scroggie Cr., 500 m S of mouth



Unit Description

Loess mixed with coarse sand, some pebbles Irregular/gradational lower contact.

Flat lying flat cobbles; pebble gravel 1-2cm. Gritty matrix , striated pebbles. Disorganized.

Clast supported cobble gravel. Flat pebble matrix. Max clast size 20cm.

Grey, washed small pebble gravel. Magnetite layer on top.

Matrix supported gravel. 5-6mm stones. Wavy lower contact.

Openwork, washed pebble gravel. 3-5cm pebbles. Up to 14cm rounded cobbles in scour. Fine sand lens at 1m depth.

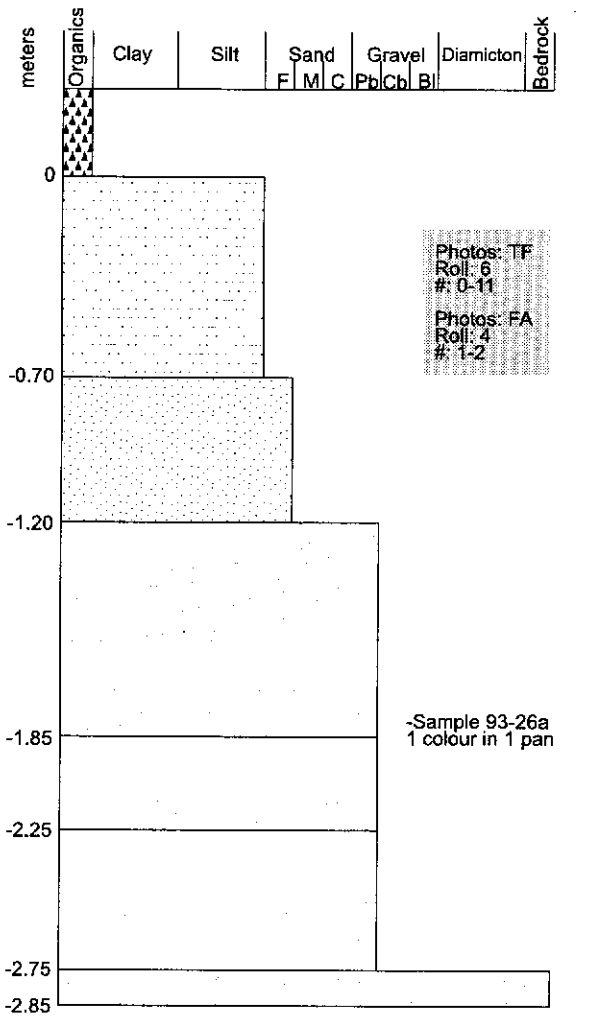
Tightly packed subrounded pebble gravel. Silty to sandy matrix. Pebbles 4-5cm. Washed openwork gravel 1.4m depth.

Washed openwork 2cm shiny pebble gravel. Horizontally bedded.

Tightly packed pebble gravel as above.

Station 93-26

Barker Cr., 3 km S of mouth



Unit Description

Overbank deposit. Trough shaped black organics in dark olive grey sandy silt

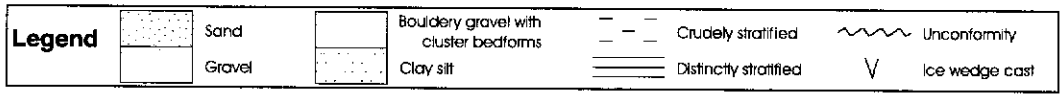
Mix of fine sand, coarse silt, angular fragments, subrounded small pebbles. Poorly sorted, non graded, non bedded.

Clast supported, subangular to subrounded pebble gravel. Cobble layer at base. Weak imbrication in upstream direction. Fine to sandy matrix

Clast supported, disorganized, subrounded poorly sorted non graded pebble gravel. Muddy matrix. Silt skins on tops of larger pebbles.

Subangular to subrounded clast supported pebble gravel, coarse sand matrix.

Mix of biotite, amphibole schist and sandy gravel. Some pebbles.



Station 93-27

Barker Cr., 2 km S of mouth

Unit Description

Brown to light brown loess, fine silt with few granules.

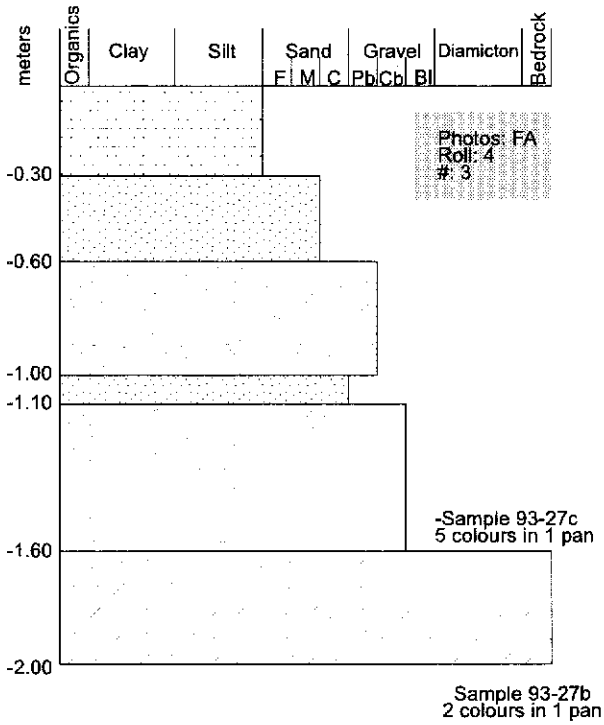
Medium sand, decomposed pebbles, and angular rock fragments. Lower contact wavy.

Angular to subangular clast supported pebble gravel. Pebbles average 2cm. Matrix granuler to medium sand. Flat lying decomposed schists. Bottom contact scoured.

Coarse sand lens with some small pebble gravel pockets.

Subangular to subrounded clast supported pebble to cobble gravel. Medium to coarse sand matrix. Very thin silt skins on tops. Pockets of openwork granule gravel beneath larger cobbles. Cobble lag at base of unit.

Decomposed quartz mica schist bedrock.



Station 93-28

Stewart R., N side, across from mouth of Telford Cr.

Unit Description

Light brown loess. No soil development and no ventifacts.

Clast supported, well rounded cobble grave - max clast size 15cm. West flow imbrication. Mixed matrix of coarse sand and silt. Rotted schist dominate clasts

Olive brown clast supported cobbly pebble gravel. <3mm granular matrix - no silt or fine sand. Openwork patches. Upward coarsening. Rounded to subrounded cobbles with silt skins.

Loose openwork washed gravel. Subrounded to rounded 5cm pebbles common. No matrix.

Clast supported, matrix filled poorly sorted pebble gravel. Coarse to medium sand matrix with up to 6cm clasts.

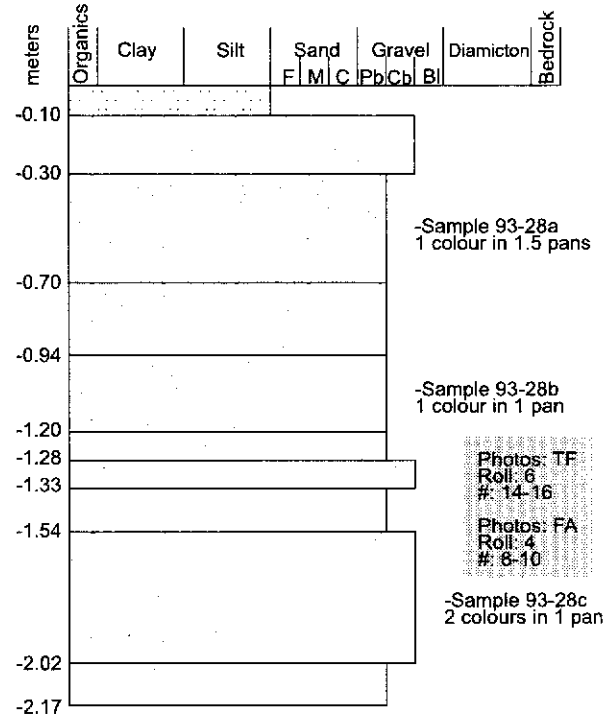
East dipping washed pebble gravel - 2mm to 7cm.

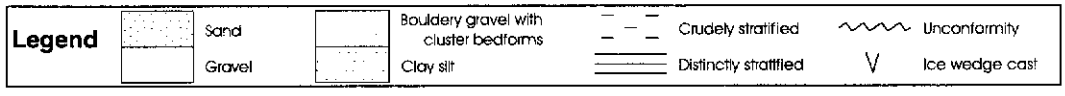
Cobble lag.

Moderatly sorted, dark grey, washed, loose openwork, subrounded pebble gravel. Manganese stained pebbles.

Clast supported, matrix filled poorly sorted cobble gravel. Coarse to medium sand matrix.

Well rounded, horizontally laid gravel.





Station 93-30

Stewart R., S side, mouth of Telford Cr.

Unit Description

Colluvium - Dark brown damp silty sand, angular rock chips. Siltier near base.

Matrix supported, subrounded pebble gravel. Damp muddy matrix; moderately sorted. Horizontal bedding.

Clast supported, flat lying pebble gravel. Sub to well rounded, washed and sorted, normally graded coarse sand matrix. Good horizontal stratifcation of pebbles.

Horizontally stratified, washed, matrix supported pebble gravel. 10cm max clast size. Coarse sand matrix - some openwork gravels. Silt skins on some pebble tops.

Light brown, matrix supported, non-graded gravel. Coarse sand matrix - horizontally stratified.

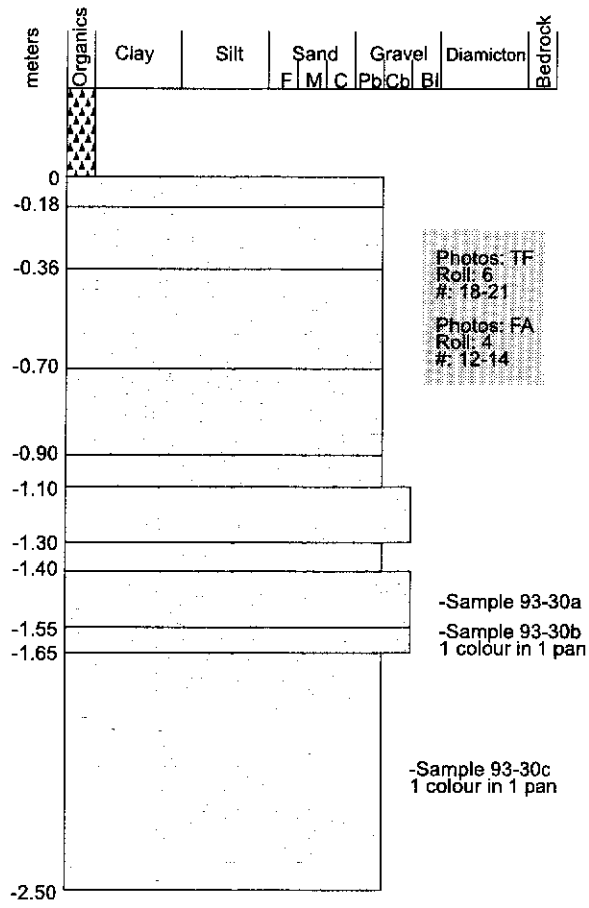
Cobble bed. 12 cm average size. Washed gritty sandmatrix.

Imbricated pebble gravel, thick (1mm) skins. East flow direction. Coarse sand matix supported. Poorly sorted

Cobbly gravel. Coarse sand to grit matrix supported.

Cobble lag, one cobble thick.

Loose openwork wet washed gravel. 2cm average clast size. Clean pebbles, coarse sand matrix. Grey cherts.



Station 93-32

Stewart R., NE side, 22 km SE of mouth (coincides w/ mineral occurrence 115O-005)

Unit Description

Light brown loess.

Light olive brown loess loess with a few pebbles - max size 1.5cm.

Matrix supported, subrounded pebbly gravel. Poorly sorted sand matrix.

Moderately sorted gravel. Pebbles rotted to dust. Coarse sandy matrix. Silt skins on tops, carbonate coating on bottoms. Shallow dip in creek direction.

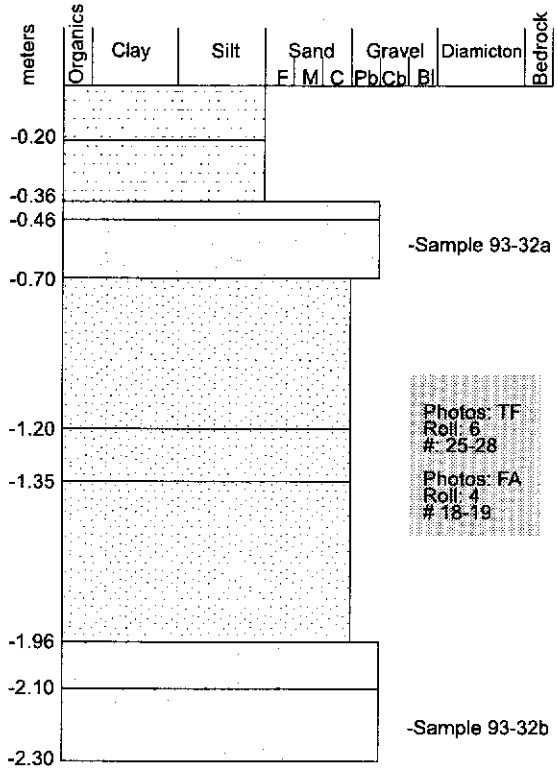
Bedded washed coarse sand to grit. Pebbly sand - pebbles 1cm common. <10% pebbles.

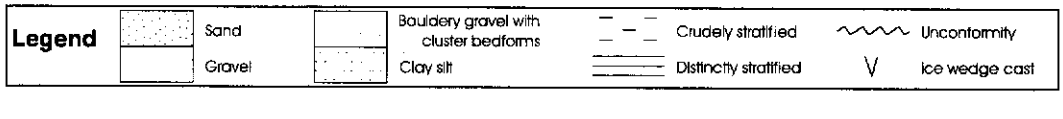
Bedded washed, well sorted brown coarse to very coarse sand; fining upwards.

Alternating medium to coarse sand beds to 10cm thick. Washed and well sorted with horizontal bedding.

Loose, openwork washed gravel. 1cm common clast size. Thin silt skins.

Clast supported pebble gravel. Coarse sand matrix Silt skins on tops. Disc shaped pebbles laying on sides, but imbrication not noticable. Reddish brown silt skins.





Station 93-33

Stewart R., SW side, 18 km SE of mouth

Unit Description

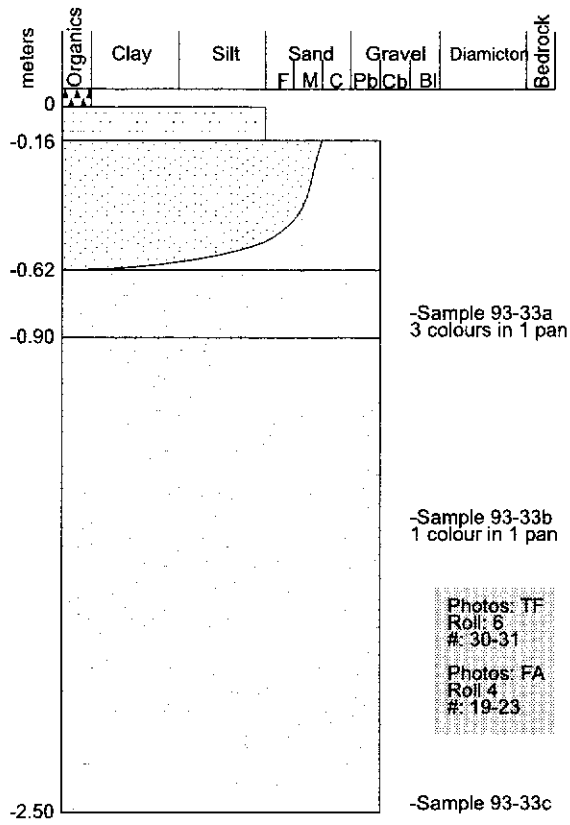
Brown to reddish brown powdery loess with small pebbles to 6cm.

Well sorted, horizontally laminated, slightly convoluted medium sand.

Brown, well washed massive pebble gravel. Fine to medium sand matrix. Pebbles to 2cm in size.

Greyish brown large pebble gravel. Poorly sorted - cobbles to coarse sand. Openwork-style washed matrix. Aligned flat long axis - but no imbrication. Silt skins on tops, rotten bottoms of clasts.

Clast supported, subrounded pebble to cobble gravel. Flat pebbles imbricated, stacking on south. Coarse sand matrix. Granitic with some mafic schist clasts. Silt skins on tops of pebbles. Cobble horizon at 1m depth.



Station 93-34

1 km S of Stewart R., 15 km SE of Stewart I. village

Unit Description

Light brown loess.

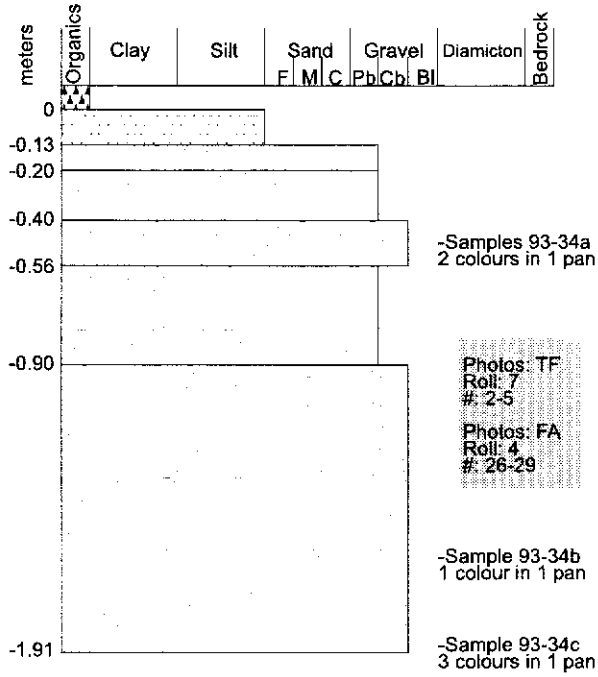
Poorly sorted, matrix supported pebbly gravel. Silt to coarse sand matrix. Cobbles present.

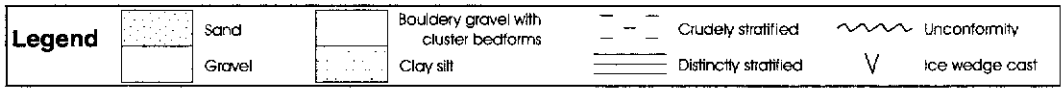
Clast supported pebble gravel, washed sand matrix. Sub-to well rounded clasts; Mn stains on bottoms. Dominantly flat stones. 17cm max clast size.

Imbricated cobble layer. Continuous sub-horizontal red brown soil layer. Pebbles strongly oriented 140°

Clast supported washed pebble gravel. Small channel cut through unit below. Coarse sand to grit matrix - no fines. No structures - scour fill?

Imbricated cobble gravel - flow from west. Coarse sand to grit matrix. No grading nor bedding. Coarse sand layer at 1.2m depth.





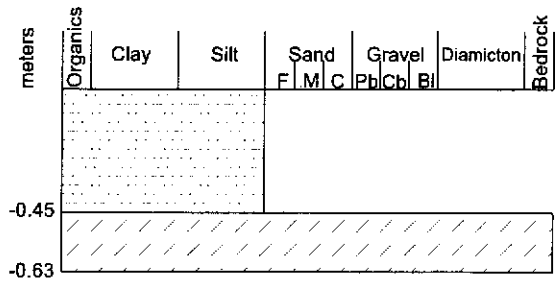
Station 93-37

Stewart R., N side, 6 km E of Stewart I. village

Unit Description

Silty, powdery loess with aspen roots.

Broken angular rock fragments of local lithology. Rock type is heavily weathered quartz feldspar schist - possibly meta-arenite.



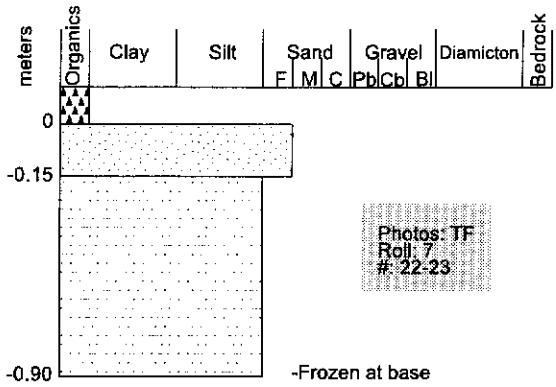
Station 93-38

Island in Yukon R., 5 km S of Stewart R. mouth

Unit Description

Fine loam soil.

Very fine silt loam soil. Some angular pebbles. Washed sand layer at 65cm depth.

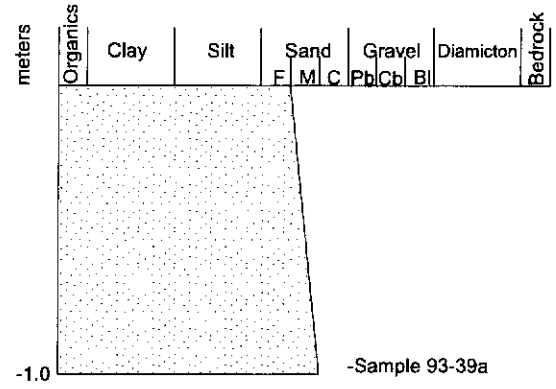


Station 93-39

Island in Yukon R., 5 km S of Stewart R. mouth

Unit Description

Light oilve grey dry micaceous medium sand. Angular fragments of biotite quartz schist.



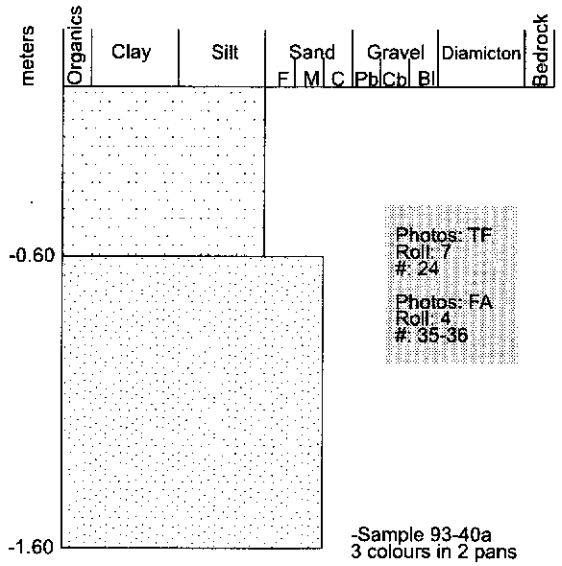
Station 93-40

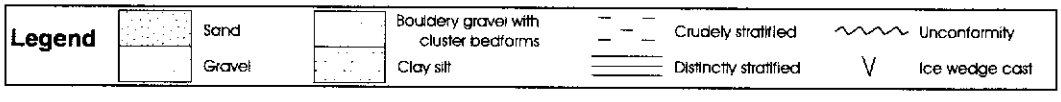
Island in Yukon R., 5 km S of Stewart R. mouth

Unit Description

Thick reddish brown loess.

Light grey sand with angular quartzose rock fragments. Weathered bedrock? No seepage, no frost.





Station 93-41

Stewart I. village
(mouth of Stewart R.)

Unit Description

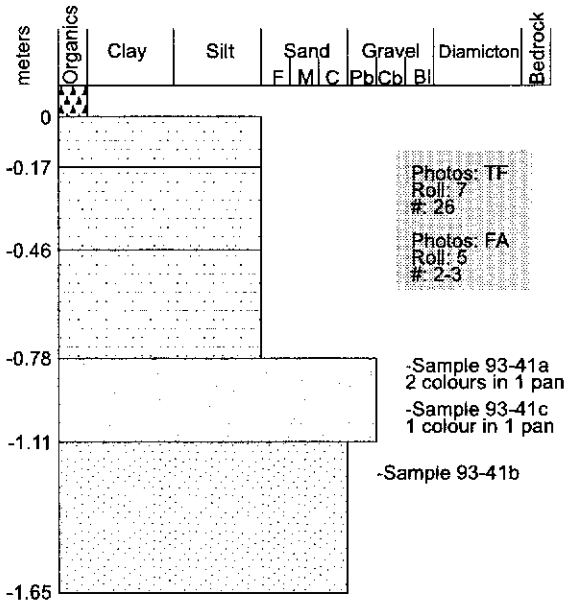
Strong brown coloured loess.

Light olive brown loess. Muscovite present, loess darkens with depth.

Light brownish grey loess.

Clast supported subrounded to well rounded pebble gravel. Cobbles in upper half. Silt skins on tops. Matrix of poorly sorted fine sand. Carbonate coating on undersides of pebbles. Lots of rotted schist pebbles. No obvious imbrication or bedding.

Reddish yellow granular material with relict bedding. Represents weathered bedrock. Horizontal layering Hematite in fractures.



Station 93-42

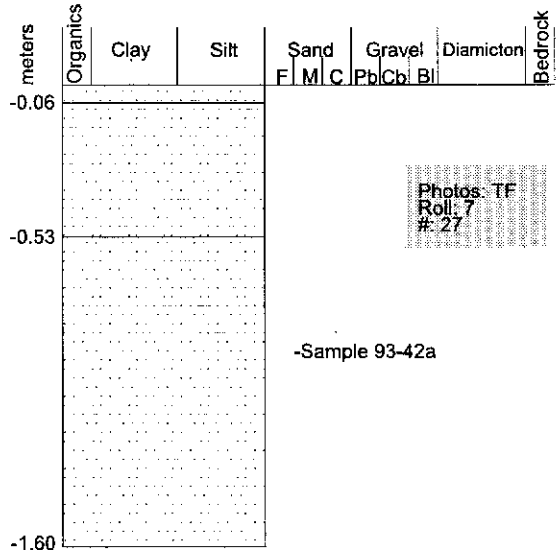
Stewart I. village
(mouth of Stewart R)

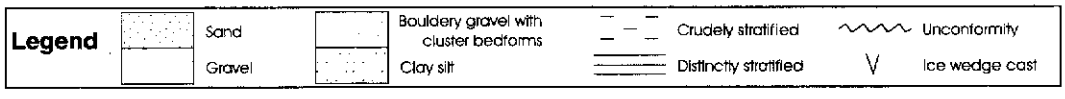
Unit Description

Strong brown loess

Light olive brown loess

Light brownish grey loess.
10cm reddish yellow colluvium layer at 0.9m depth





Station 93-43

Yukon R., SW side, 5 km W of Henderson Cr. mouth

Unit Description

Granular light olive brown loess with angular pink quartz schist pebbles. Dry massive powdery silt.

Coarse clast supported gravel. Coarse washed sand matrix - no fines. Carbonate coating on clast bottoms. Max clast size 15x9cm. Clasts are subrounded to rounded, stacked parallel to NE. Poorly sorted.

Lower 3cm grey clast supported gravel with a coarse, washed matrix. Dominant size 3cm pebbles. Dipping 20° east.

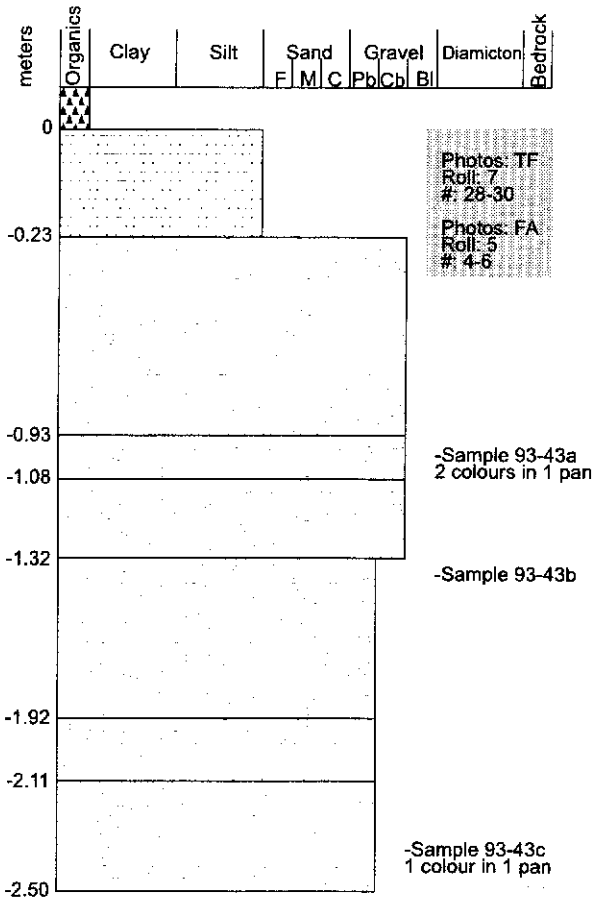
Clast supported, poorly sorted limonitic with Mn gravel. Max clast size 9x6cm. Sand matrix. 1cm hematite red below limonite.

Clast supported, poorly sorted, subrounded schist pebble gravel. Medium sand matrix. Dark grey clast stacked to northwest. Max clast size 12cm.

Clast supported, poorly sorted brown gravel composed of flat, subrounded pebbles stacked to northeast. Coarse sand matrix. Max clast size 8cm, dominatly 2cm.

Washed pebble layer, coarse sand matrix. 15cm pebbles at base. Grey rather brown, shiny pebbles with mica flakes, moderatly graded.

Clast supported gravel layer composed of flat, subrounded pebbles stacked northwards. Medium to coarse sand matrix. Angular rust coloured cobbles with rounded pebbles below.



Station 93-44

Yukon R., SW side, 11 km NW of Stewart R. mouth

Unit Description

Reddish brown loess.

Light olive brown loess.

Light grey loess - fizzes.

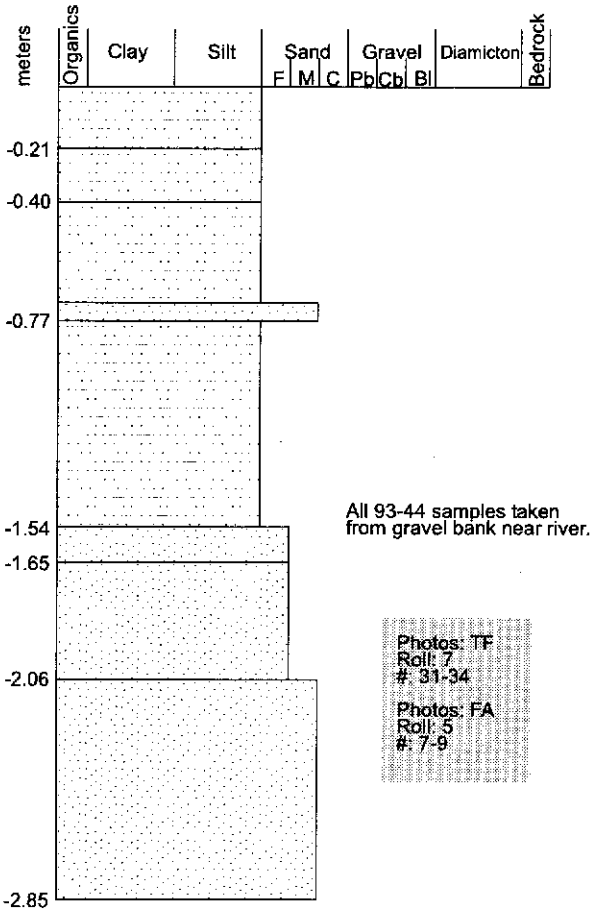
Angular chippy bedded sand layer. Slight limonitic stain Dips gently in slope direction.

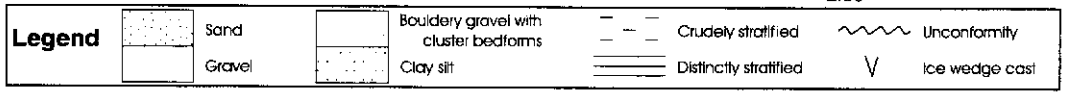
Massive coarse silt loess. Sub mottled, fizzes.

Limonitic zone of fine sand/coarse silt Groundwater affected.

Fine, micaceous sand. Slightly damp. Weak stratification by alternating grey/brown layers.

Well sorted, massive, washed grey/white medium sand with some mica flakes.





Station 93-45

Yukon R., SW side, 21 km SE of Sixtymile R. mouth

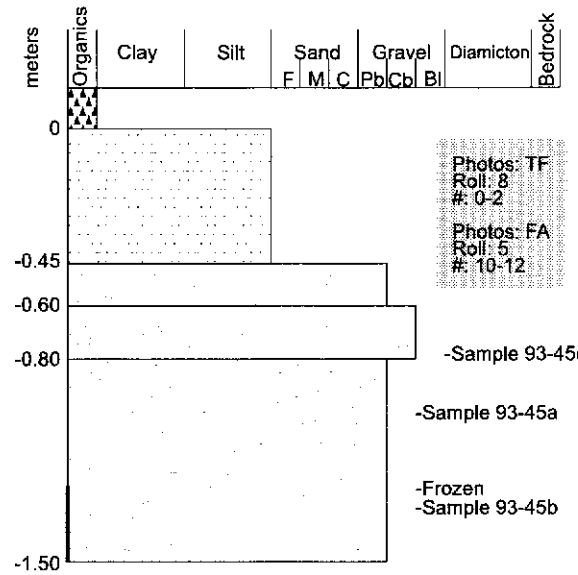
Unit Description

Fine sand-coarse silt forming massive loess. Upper 10cm strong brown colour. Lower portion is light yellowish brown.

Clast supported pebble gravel, openwork. 3cm average, 9cm max clast size. Moderately sorted, subrounded, rotting schist pebbles.

Crude cobble bed. Coarse sand matrix, poorly subrounded flat lying clasts. Carbonate coatings on bottoms, silt skins on tops.

Clast supported large subrounded pebble gravel with coarse sand matrix. Carbonate coating on bottoms, silt skins on topsl.



Station 93-46

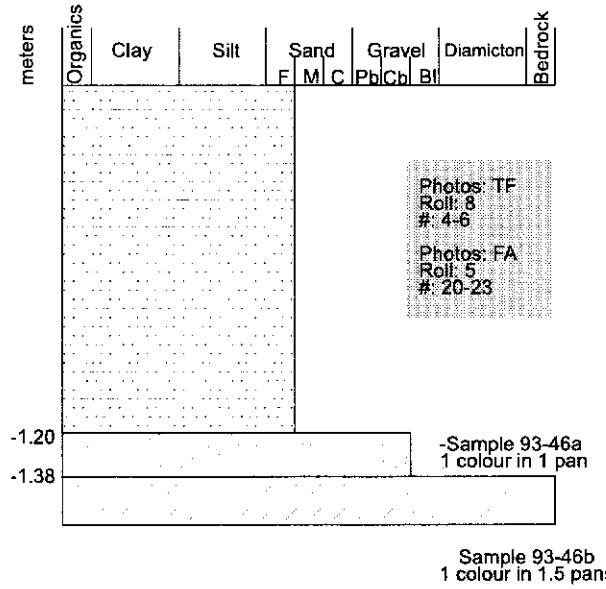
Yukon R., W side, 11 km S of Sixtymile R. mouth

Unit Description

Light yellowish brown loess with small granules, chips, and tiny pebbles.

Cobble/pebble gravel with sand matrix,and some weathered bedrock. Limonitic and calcareous sand.

Felsic quartz mica schist.



Station 93-47

1 km S of mouth of Rosebute Cr.

Unit Description

Light yellowish loess

$CaCO_3$ coated pebbly gravel. Semi-cemented, clast supported. Coarse granule matrix. Subangular pebbles. No sorting.

Loose, washed, well sorted pebbly coarse sand. Lensoidal stratification via normal grading, few pebbles.

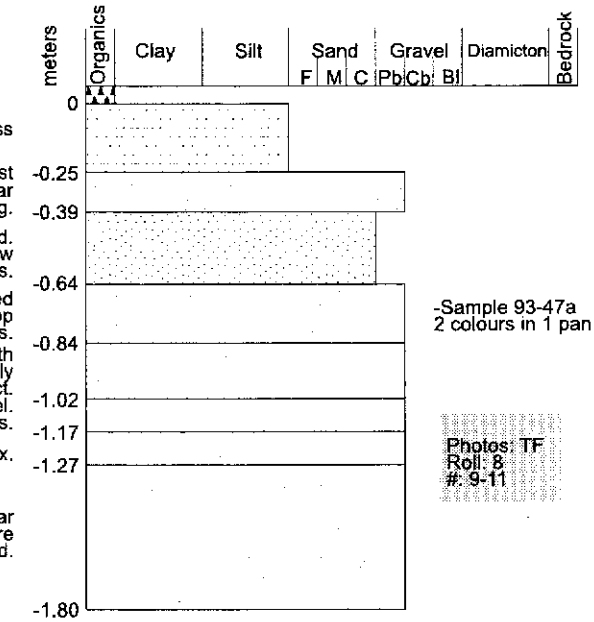
Poorly sorted large pebble gravel. 6cm subrounded clast size. Medium sandy matrix. Coarse lag at top of horizon. Thin silt tops.

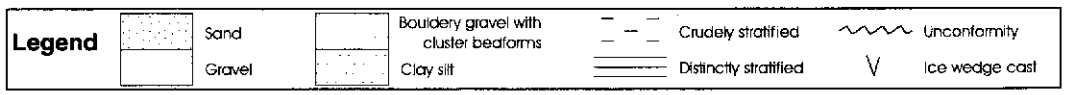
Smaller (3-4cm) pebble gravel, clast supported with well sorted fine to medium sand matrix. Horizontally stratified. Well defined upper contact.

Openwork of 1cm pebble clast supported gravel. Sharp upper and lower contacts.

Same as unit 0.64-0.84, but slightly finer matrix.

Loose openwork of pebbly gravel. Very little granular matrix. Pockets of larger pebbles (4-6cm) most are < 3cm. No carbonate coating, but pebbles are rotted.





Station 93-48

Yukon R., E side, 6 km N of mouth of Sixtymile R.

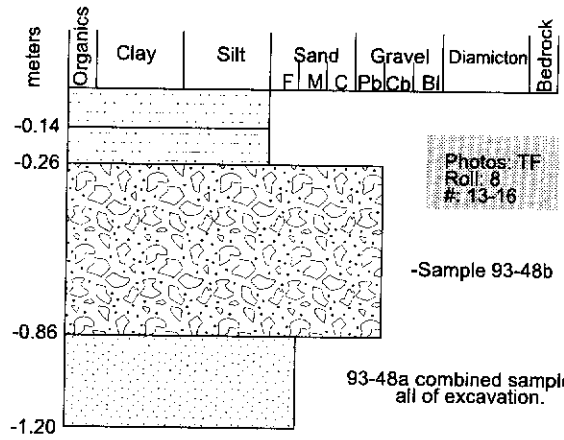
Unit Description

Strong brown loess

Light yellowish brown loess

Layered granular colluvium with rock chips of mica schist and quartz vein material. Alternating sub-horizontal bands of red brown and green black decomposed rock.

Sand grading to silty sand at depth. Moist, cool, probably frozen at depth. Some angular chips in sand.



Station 93-66

3 km N of Stewart R., 26 km E of Wounded Moose Dome

Unit Description

Pebbly clast supported red gravel. Granular to coarse sand matrix filled. Clay skins on pebbles. Well rounded clasts, poorly sorted. No structure. Thin loess veneer on surface

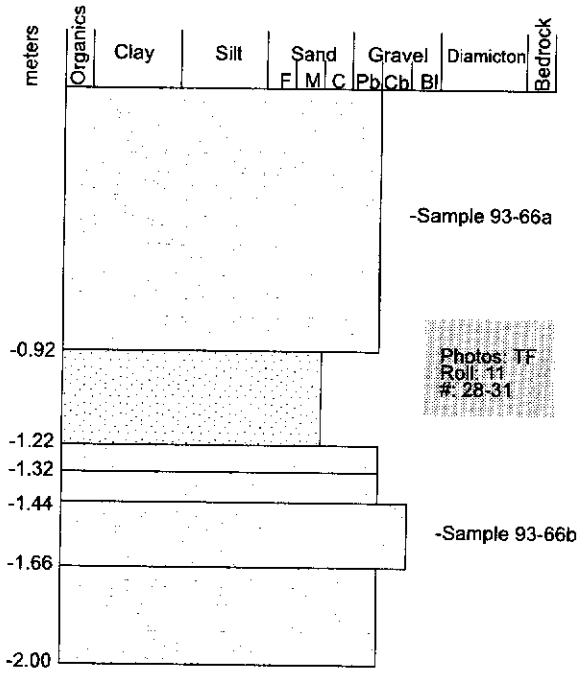
Massive coarse red sand. Crude fining upwards -normal grading.

1cm pebble gravel. Round to subround pebbles. Well sorted granular matrix

Washed 1cm gravel openwork. Wavy lower contact.

Red cobbly pebble gravel. Subrounded clasts. Clast supported. Granular sand, poorly sorted matrix.

Coarse sand matrix supported gravel. Poorly sorted Horizontally bedded.

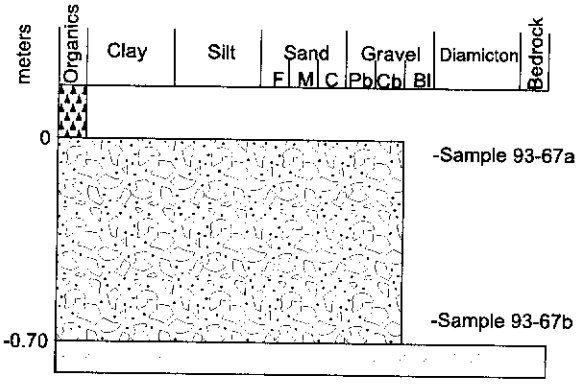


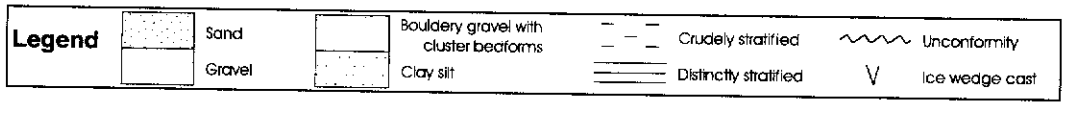
Station 93-67

Unit Description

Mix of colluvium, gravel and silt. Yellowish brown colour. Micaceous, horizontally layered. Dips to south128 /10 S. Largest clast 32x20cm - football shaped.

Weathered yellowish brown micaceous bedrock. Folliated (90 /10 N). Can be broken with knife.





Station 93-68

4 km NW of Stewart R., 10 km ESE of Wounded Moose Dome

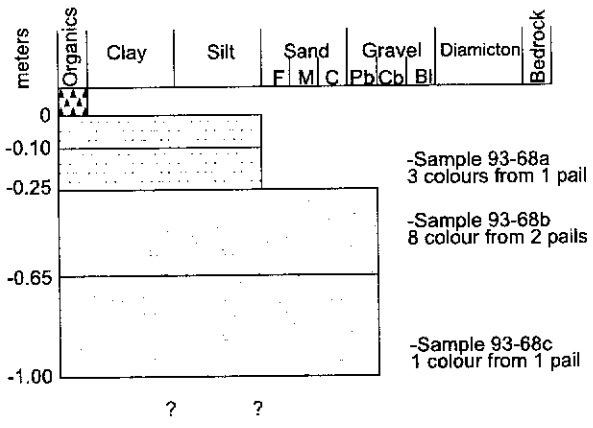
Unit Description

Dark brown loess

Yellowish brown loess, granular in places.

Dark brown coarse sand to small pebble gravel, matrix supported

Clast supported pebble gravel. Granular to coarse sand matrix - damp, dark brown in colour.



Station 93-69

Bluff on E side of Valley Cr., 3 km N of mouth

Unit Description

Strong brown loess with subround pebbles/cobbles to 12cm size.

Very fine sand/brownish yellow loess with pebbles to 6cm in size.

Brownish yellow clast supported, clcareous in places, rotted schist, subround to round pebble gravel. Poorly sorted matrix of fine coarse sand.

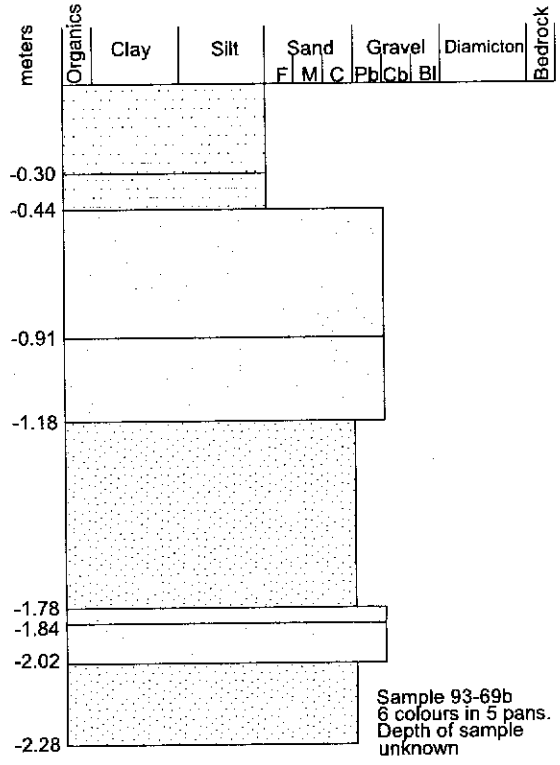
Matrix supported washed sandy gravel, 20% pebbles 2mm to 6cm. Pebble content and size deceasing with depth (reverse graded).

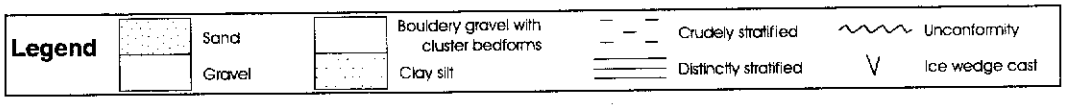
Horizontally bedded, limonitic, brown and grey banded coarse sand. Brown layers normally graded. Beds are laminated.

Coarse granular washed matrix supported gravel. Subrounded pebbles to 3cm.

Imbricated clast supported pebble gravel - flow from SW. Subrounded pebbles to 5cm in size

Washed coarse sand, no fines, with 20% pebbles.





Station 93-70

Stewart R., N. side, coincides w/ mineral occurrence 115O-003 (cf. 93-18)

Unit Description

Strong brown loess. Few angular stones. Lower contact is gradational.

Yellowish brown loess with 15-25% angular rock chips. Very few subrounded clasts. Discontinuous sandy gravel lens at 30-34cm depth.

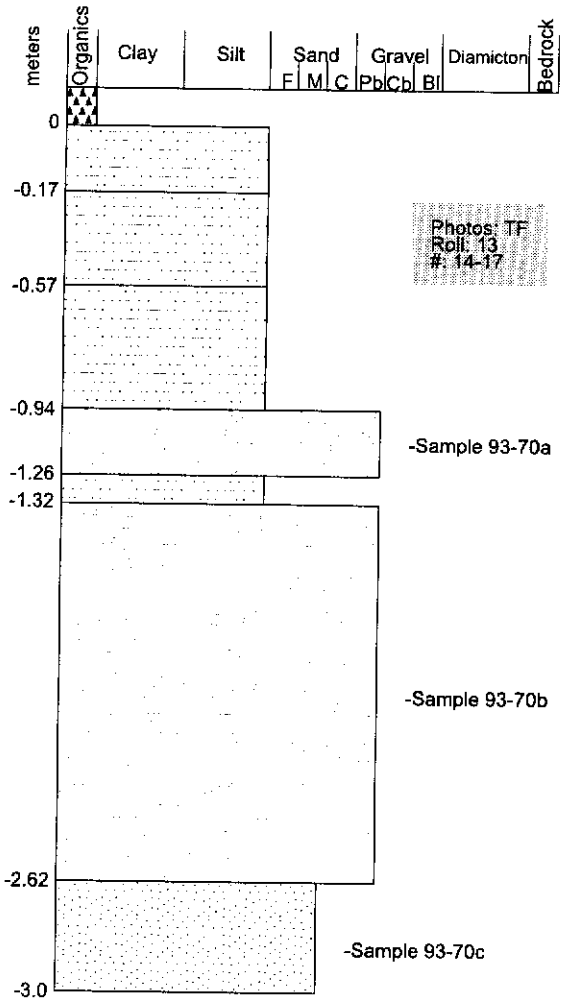
Colluvium mixed with strong brown loess. Rocks are all locally derived quartz mica schists.

Clast supported angular to subrounded stones in micaceous quartz rich, pooly sorted sand matrix.

Fine sand/silt lense with 1cm organic layer.

Poorly sorted clast supported subangular to subrounded gravel. Broken mica quartz schist. Poorly sorted matrix fine sand to granule-size. Manganese/limonite stain on clasts. Clasts imbricated with flow in 115° direction.

Horizontally bedded grey, finely laminated sand. Angular, 1cm stones in top 5cm of unit.



Station 93-71

Deep Cr., 2 km SE of mouth

Unit Description

Strong brown colour loess with subround pebbles up to 4cm in size.

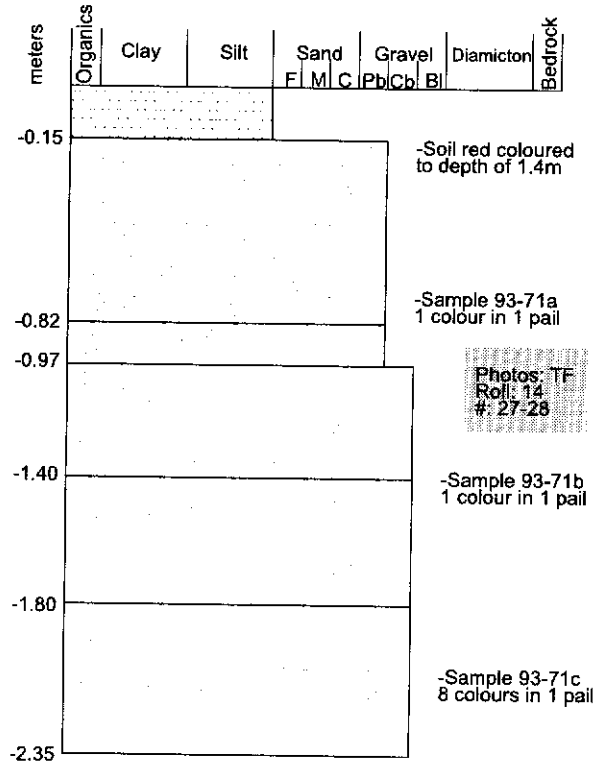
Clast supported, poorly sorted, subround pebble gravel. Pebbles rotted with clay skins. Imbricated with westerly flow direction. 10cm max clast size.

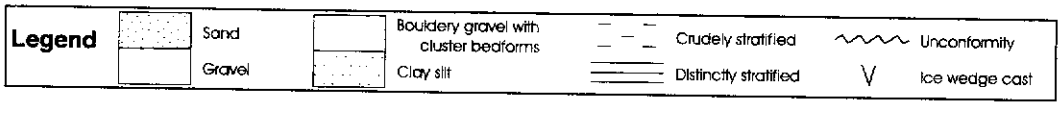
Washed 2-5cm openwork gravel with clay skins on tops. Moderatly sorted, normally graded, sub horizontal lying flat pebbles. Scoured lower contact.

Clast supported cobble gravel, poorly sorted coarse sand matrix. Crudely stratified. Clay skins on all but bottoms.
Washed cobble gravel open work at 1.2m depth
Washed openwork lens at 1.4m depth

Clast supported, well compacted gravel with brown silt skins - not red. Max clast size 8cm.

Cobble gravel, flat sub-horizontal lying, sub rounded cobbles. Crude imbrication shows westerly flow. Poorly sorted coarse sand matrix. Silt skins on tops of clasts.





Station 93-72

Stewart R., SW side, 6 km NE of Black Hills Cr., (cf. 93-19)

Unit Description

Strong brown loess, few pebbles, some ventifacted.

Olive brown loess with pebbles.

Matrix filled medium coarse sandy pebble gravel.

Washed clast supported 2cm gravel lens at 70cm depth. Poorly sorted sand and grit matrix. Normally graded.

Washed sand normally grading from a medium sand to a coarse sand with depth. Occasional pebbles at the bottom.

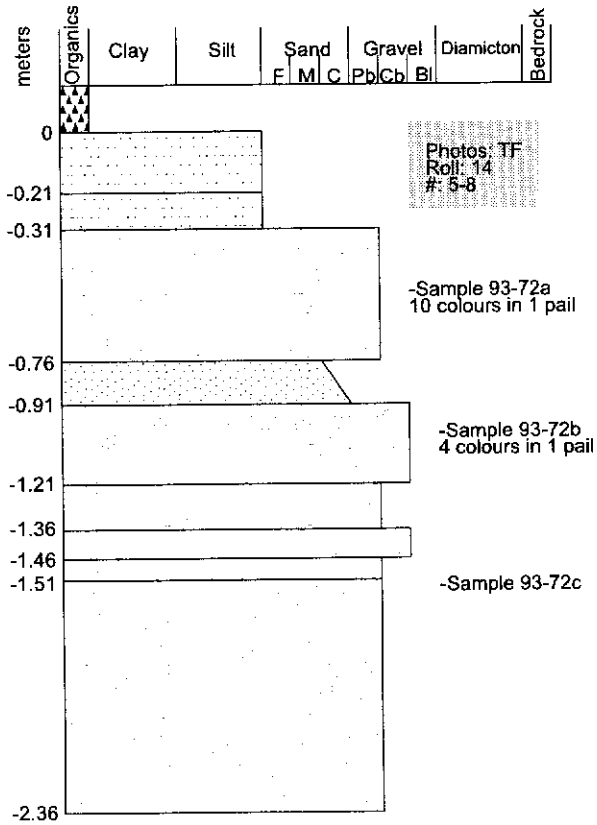
Clast supported cobbly pebble gravel. Imbricated with 38° flow direction. Cobble clusters. Scoured basal contact with washed sand matrix, and silt skins on tops

Openwork of washed, flat lying, pebbles.

Clast supported cobble layer. Poorly sorted matrix Max clast 10cm

Washed gravel - imbricated with flow to SW.

Clast supported pebble gravel. Flow to SW. Openwork lenses.



Station 93-73

Stewart R., NW side, 6 km NNE of Black Hills Cr., coincides with mineral occurrence 115O-144

Unit Description

Strong brown loess.

Clast supported, matrix filled pebbly gravel. Some sand lenses

Cross stratified coarse sand & grit.

5cm thick washed pebble gravel layer.

Cross stratified sand.

Washed pebbly gravel layer.

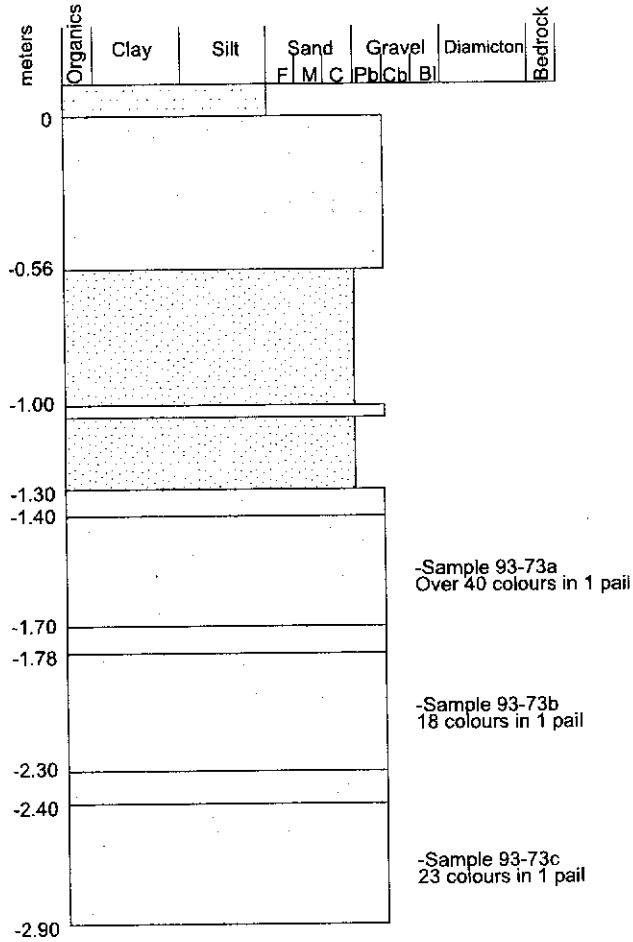
Clast supported cobbly pebble gravel.

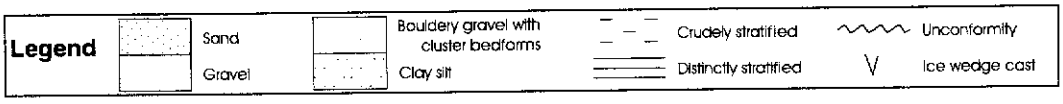
Washed pebble gravel.

Imbricated cobbly pebble gravel.

Washed pebbly gravel.

Imbricated cobbly pebble gravel.





Station 93-74

2 km W of Yukon R.,
9 km S of mouth of
Sixtymile R.

Unit Description

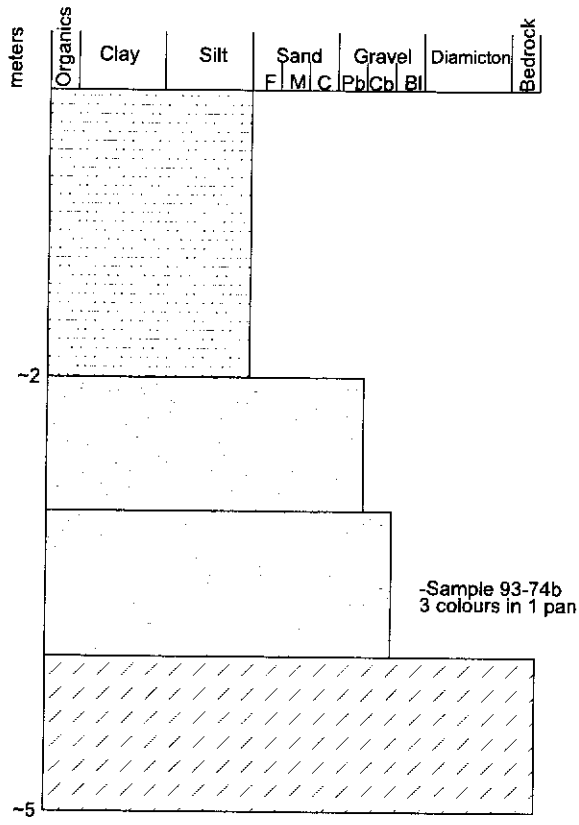
Loess

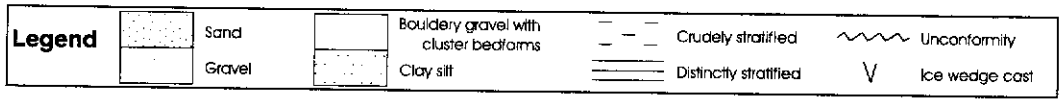
Gravel/loess

Loess/Gravel

Cobbly gravel
Subround to round cobbles, dominantly local lithology or leucocratic granite, lineated, medium grained <5% mafics. Clast supported with poorly sorted loamy sand matrix. Largest boulder measuring 60x40cm

Bedrock/gravel
Gneiss bedrock - strikes west, dips north.





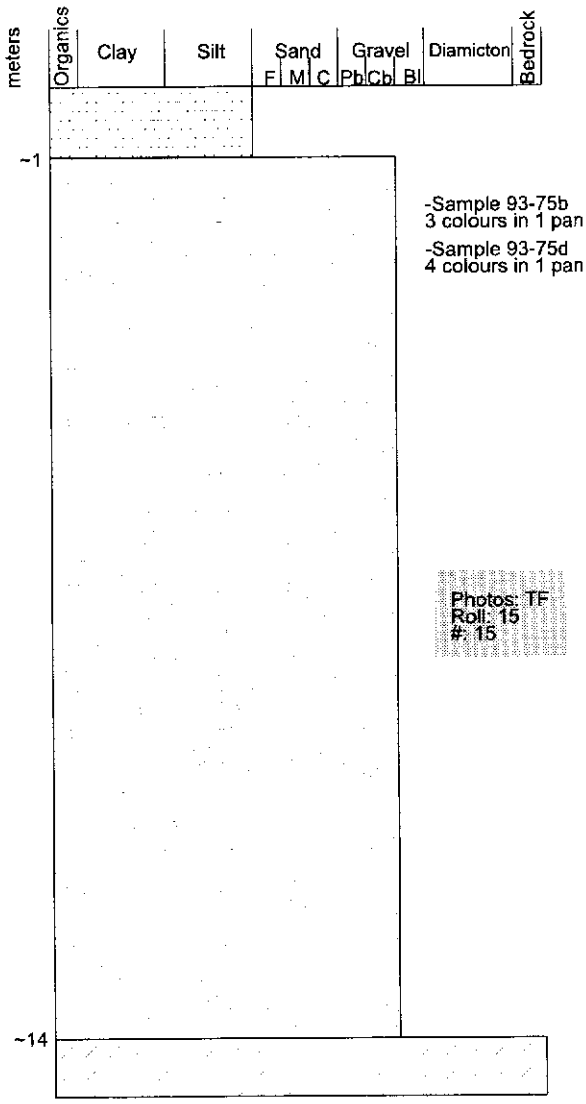
Station 93-75

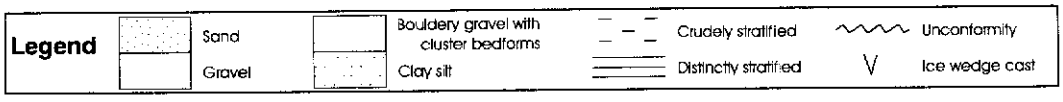
2 km W of Yukon R.,
9 km S of mouth of
Sixtymile R.

Unit Description

Loess

Clast supported bouldery cobble gravel, imbrication with a SE flow. Clasts are subround and 95% feldspar-quartz lineated ganite. A few mafic feldspar porphyry clasts seen. Matrix varies, but is a general mix of fine to coarse sand. 40' thickness. Boulders and cobbles flat lying, inclined to southeast.
Largest boulder seen is 45cm.
Possible White Channel gravel.





Appendix 2

CONTENTS

Station 94-01

Henderson Cr., bluff on S side, 2 km E of mouth

Unit Description

Red soil in loess.

Gradational brown soil in loess.

Gradational yellow soil in loess.

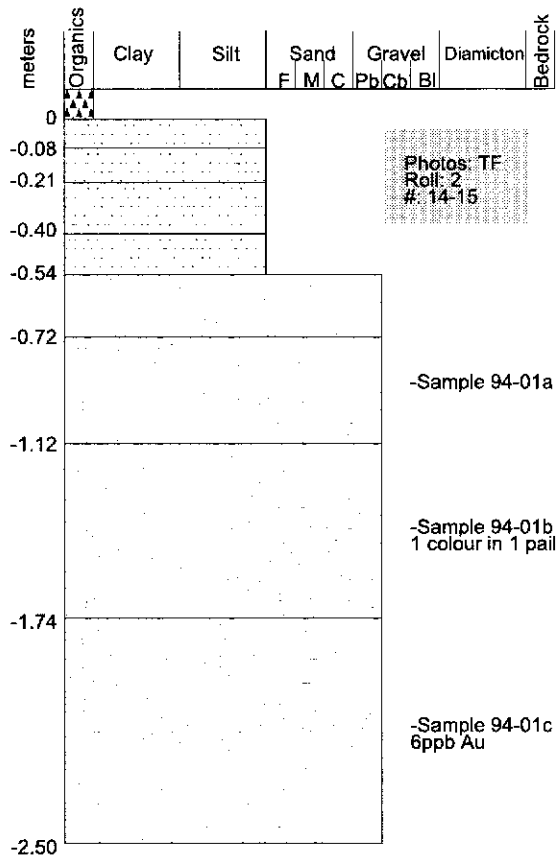
Grey unweathered loess; micaceous coarse silt/fine sand.

Calcareous coated pebbly gravel.

Non-calcareous pebble gravel. Interbedded with very coarse sand - slightly limonitic brown; rotted pebbles -mainly metamorphic & subangular. Lenses of normally graded pebble to coarse sand up to 4cm thick. Vertical sand wedge 4cm thick.

Clast supported granule gravel. Angular micaceous pebbles to 2cm, typically 3-4mm. Pebbles coarser at bottom. Sharp horizontal upper and lower contacts.

Subangular clast supported pebble gravel. Graunle matrix filled. Volcanic pebbles to 10cm; pebbles not weathered by display limonitic coating. Coarsening downwards. No clay skins. Some minor openworks & silt capping on pebbles.



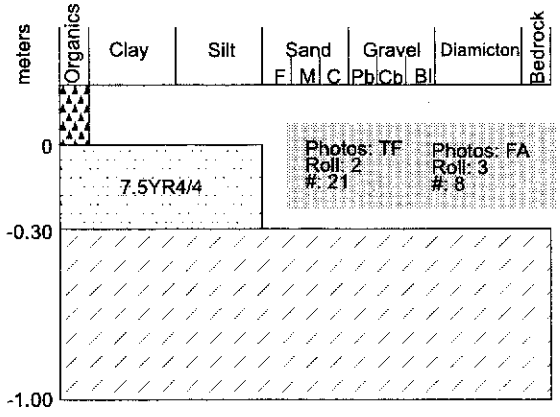
Station 94-02

Yukon R., NE side, 11 km NW of Stewart R. mouth

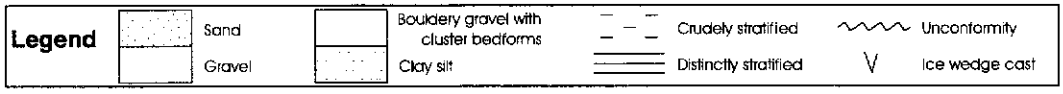
Unit Description

Brown fine sand-coarse silt loess

Weathered micaceous schist bedrock.

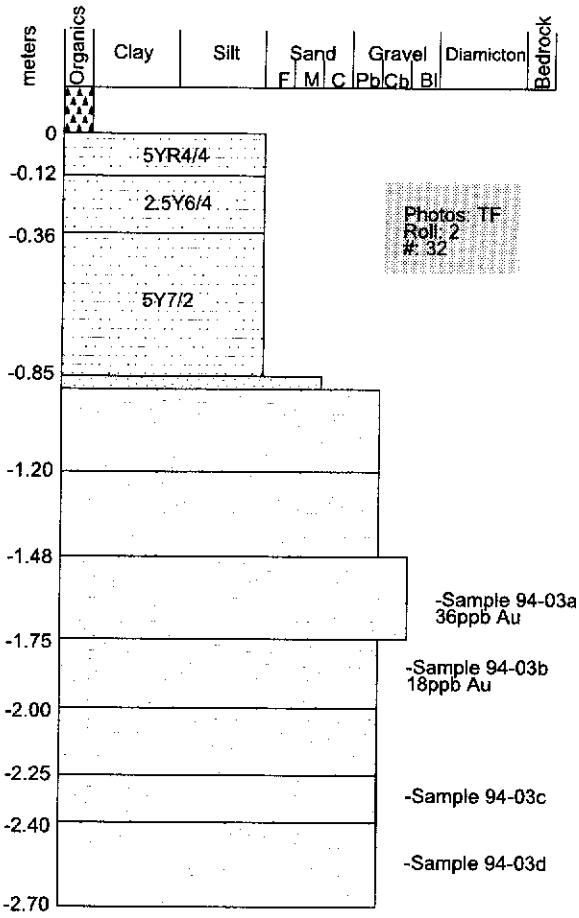


Sample 94-02a



Station 94-03

Yukon R., SW side, 20 km NW of mouth of Stewart R.



Unit Description

Brown soil on massive silt loess.

Yellow soil in massive silt loess.

Grey loess.

Light olive brown well sorted medium sand.

Medium brown, poorly sorted sandy pebble gravel. Decomposed pebbles. Matrix supported and filled.

Alterating 4cm & 2cm clast supported pebble gravel. Coarsens upwards.

Cobble gravel to 17cm. Lag deposit appears imbricated with flow to north. Some pebbles weathered.

Openwork, well sorted 0.5-3cm subrounded pebble gravel. Carbonate coating on bottom of pebbles.

Coarse, 4cm, well rounded pebble gravel. Silt capping tops of pebbles.

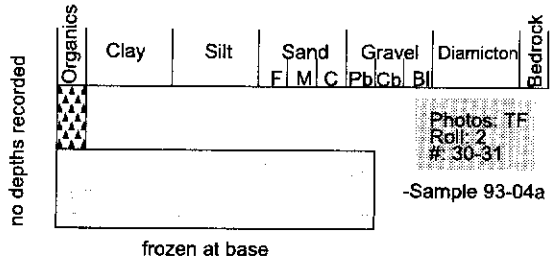
Fine washed pebble gravel.

4cm pebble gravel.

Pebble Lithology
White quartz-feldspar pegmatite, granite, white cream quartz-feldspar porphyry, white quartz, quartz-muscovite schist, grey chert, grey mudstone, pale grey chert.

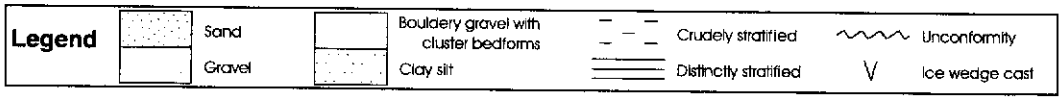
Station 94-04

1 km S of mouth of Rosebute Cr., 23 km NNW of mouth of Stewart R.



Unit Description

Brown, wet, 3cm size, muddy matrix supported pebble gravel.



Station 94-05

Excelsior Cr., 2 km SW of mouth, 16 km NW of mouth of Stewart R.

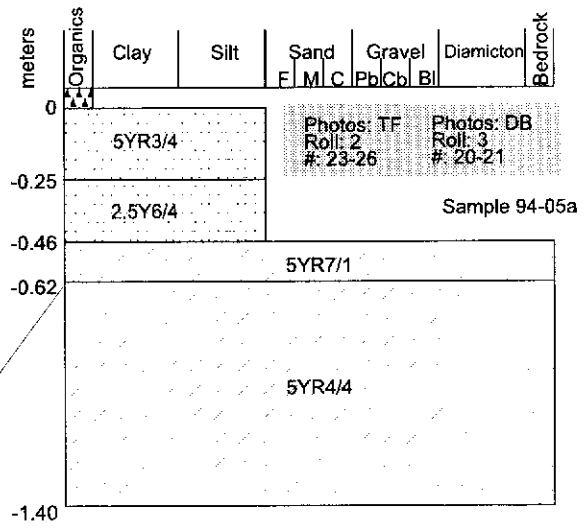
Unit Description

Reddish brown loess. Dry micaceous silt to very fine sand. Continuous layers.

Yellowish brown loess - more micaceous and dryer than overlying, but same composition; less cohesive. Gradational colour contact with above layer

Pale greyish-brown silty matrix in rotted and very fractured angular rock fragments - mica schist - up to 10cm. Entire layer is characterized by punky limy colour - calcareous. Also top horizon (~2cm) has slightly pink hue hematization (?) - many rock fragments are also moderatly steatized. Distinctly rotten looking shards sub-horizontal contact with upper loess.

Broken bedrock consisting of Fe-oxidzed quartz chlorite schist. Fresh colour is greyish green; altered colour is rusty brown. Some zones are more finely broken up and granular - these zones tend to be whitish and calcareous. Sharp contact with upper rotten layer.



Station 94-06

Yukon R., W side, 2 km S of mouth of Sixtymile R.

Unit Description

Olive brown fine sand to coarse silt - appears to be loess. No pebbles. Quartz pebbles at base, polished ventifact.

Washed 1-2mm very coarse sand with subrounded pebbles up to 4cm - forms lens.

Sandy alternating matrix & clast supported pebble gravel. Subangular to subrounded washed pebbles to 6cm, flat lying. Rottled pebbles, carbonate coatings on bottoms. Matrix is tan brown coarse gritty sand. Sharp upper and lower sub-horizontal contacts.

Washed, well sorted, clean, coarse sand with few pebbles. Sharp upper & lower contacts. Scoured by overlying gravel.

Alternating matrix & clast supported pebble gravel. Max pebble size 8cm, average 3-4cm. Trace carbonate on bottom. Imbricated flow to north.

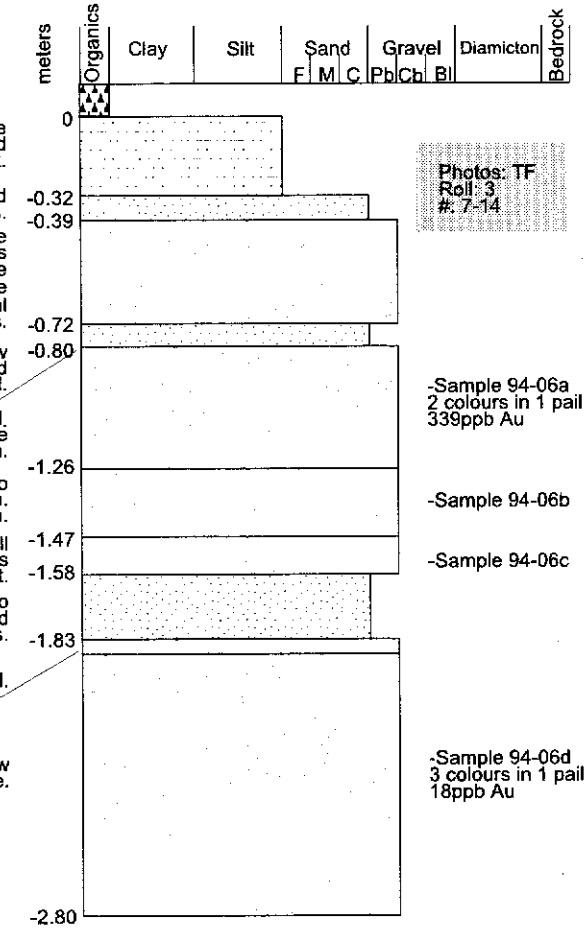
Clast supported cobbly pebble gravel. Clasts up to 10cm. Silt skins on tops, carbonate on bottom. Imbricated flow to north.

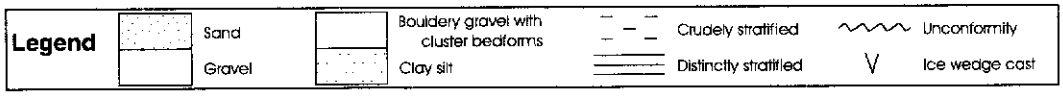
Openwork clast supported pebble gravel; well rounded clean pebbles 1-2cm in size. Continous unit.

Matrix filled, clast supported yellow medium to coarse sand. Some silt on tops of pebbles, washed on bottoms.

Openwork gravel lens - same as above gravel.

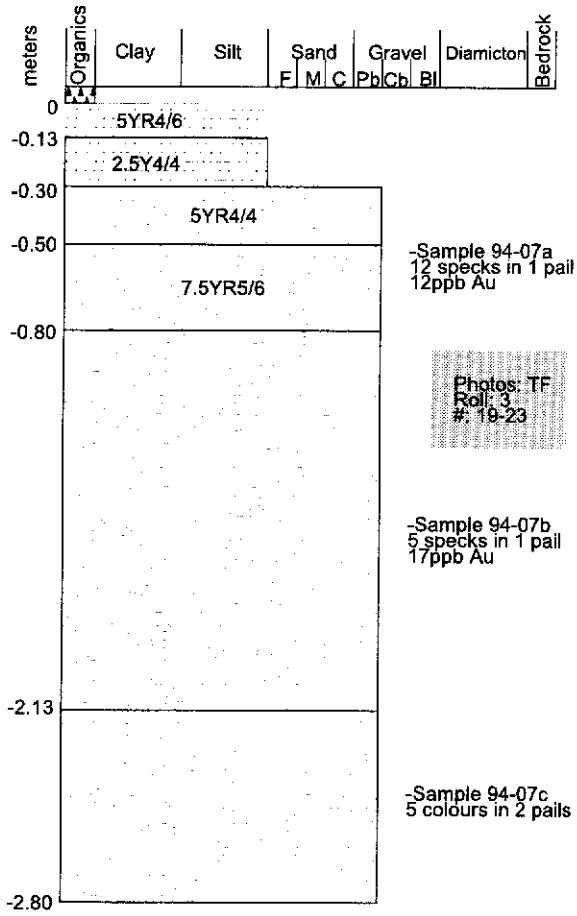
Matrix filled clast supported imbricated - weak flow to north. Silt skins. Orange colour at base.





Station 94-07

1 km W of Yukon R., 5 km north of mouth of Sixtymile R.



Unit Description

Orange brown, massive coarse silt/fine sand loess.

Olive yellow loess.

Strong brown pre-Reid Wounded Moose soil with clay skins. Poorly sorted, wethered/shattered pebble gravel. 5cm clasts. Clast supported, matrix filled. Ventifacts on top surface. Grey sand wedge tapers to 60cm depth and 4cm wide.

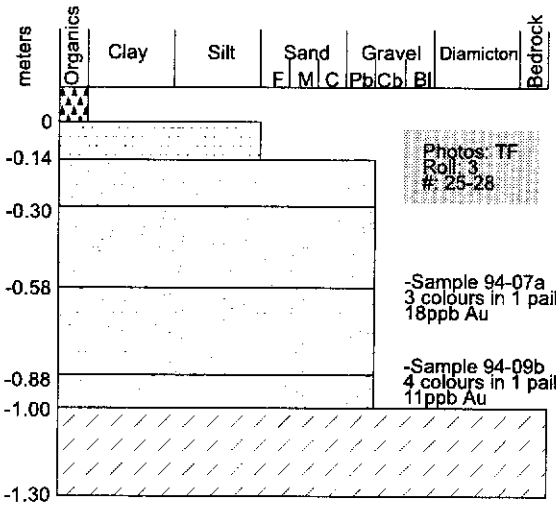
Strong brown clast supported pebble gravel. Shattered & rotted pebbles.

Horizontally bedded clast supported, coarse sand matrix filled, pebble gravel with crude imbrication - flow to the north. Coarsening upwards from 3 to 7cm max clast size. Horizontal upper and lower contacts.

Clast supported pebble gravel with brown matrix. Max clast 7cm. Similar to above gravel, but slightly coarser.

Station 94-09_1

Pit #1



Unit Description

Damp, reddish brown well sorted pebbly silt. 5% subrounded pebbles to 2cm.

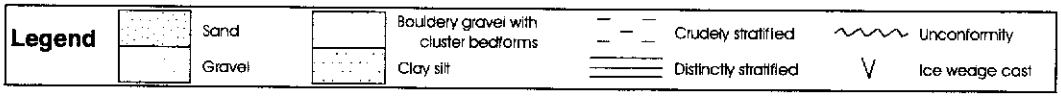
Matrix supported cobbly pebble gravel. Max clast size 19cm, average 4cm. Matrix is poorly sorted silt to granules. Matrix quite micaceous. Subrounded fractured pebbles, but still fresh looking. No structure - probably cryturbated.

Clast supported, matrix filled pebble gravel. Pebbles included rotted schist & quartzite. Silt caps, but clean bottoms. Pebbles 3-6cm. Pebbles imbricated, dipping to SE.

Clast supported, matrix filled pebble gravel. Greyish brown fine to coarse sand matrix. Schist clasts are weathered. Lots of quartz and quartzite pebbles. Weak clay skins on pebble tops. Pebbles 2-6cm.

Stacked pebble/cobble gravel with clay skins on tops, clean bottoms. Cobbles to 12cm - some rotted and carbonate weathered.

Fractured bedrock. Weathers pale beige-brown. Medium grey & aphanitic crystalline on fresh surface. Intermediate volcanic?



Station 94-09_2

Pit #2

100m north of Pit #1 Unit Description

Yellowish brown loess with slightly reddish patches locally. Well sorted coarse silt, fine sand. Dry and easy to dig. Micaceous with rare pebbles near base.

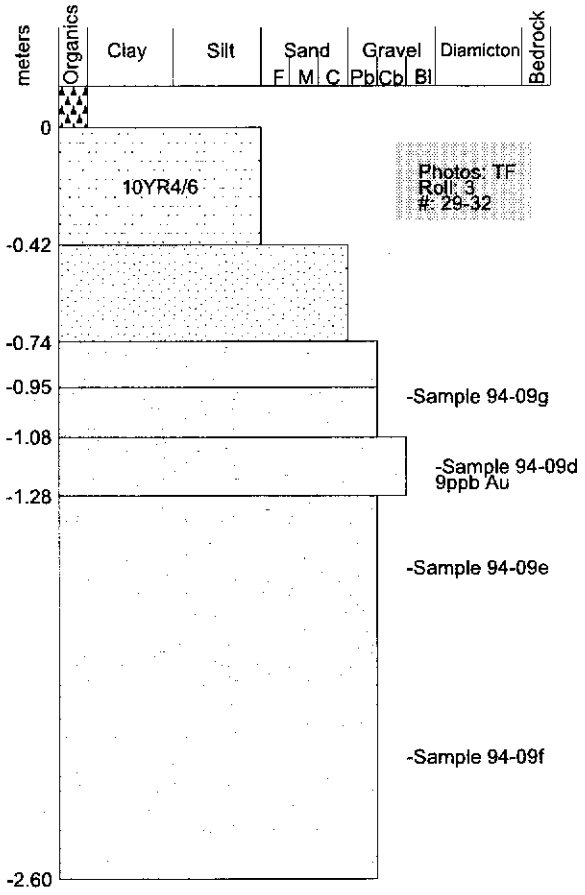
Coarse to very coarse pebbly sand, 20% pebbles. Pebbles to 6cm. No fines. Some completely decomposed rotted schist pebbles. Medium brown colour.

Clast supported, matrix filled pebble gravel with pebbles to 10cm. Imbrication stack flow to NNE. Sharp upper contact. Matrix is finer than overlying unit - a medium to coarse sand. Silt skins on top of pebbles. Schist rotted, but most pebbles fractured. Medium brown colour.

Clast supported fine pebble gravel with pebbles to 2cm. Some openwork - matrix is coarse to very coarse sand. Rotted schists. Undulating contact like channel fill.

Loose cobble gravel with some boulders upt to 30cm. Clast supported with very coarse sand matrix. Medium brown colour. Horizontal bedding.

Yellowish sand matrix pebble gravel. Subhorizontally bedded. Pebbles to 5cm with silt and clay skins, but clean bottoms. Fairly well sorted - channel deposit. Fairly straight contact. Matrix is medium to coarse sand.



Legend: Sand; Gravel; Bouldery gravel with cluster bedforms; Clay silt; Crudely stratified; Distinctly stratified; Unconformity; Ice wedge cast

Station 94-09_3

2 km NE of mouth of Indian R.

Pit #3

20m east of Pit #2

Unit Description

Yellowish brown loess, slightly damp. Contains some angular granules.

Medium brown, pebbly rounded sand. 1-1.5mm very coarse sand; 10% pebbles up to 3.5cm. Loose when disturbed. Sharp upper and distinct lower contact.

Brown clast supported pebble gravel. Coarse to very coarse sand matrix filled. Many vertically oriented pebbles. Minor silt skins on tops of pebbles. Max clast size 12cm, average 3.5-4cm. Fairly compact schists are fractured. No imbrication. Bedding cryogenically disturbed.

Coarse pebbly brown sand - 5% pebbles. Well sorted quartz-feldspar sand; pebbles up to 4cm.

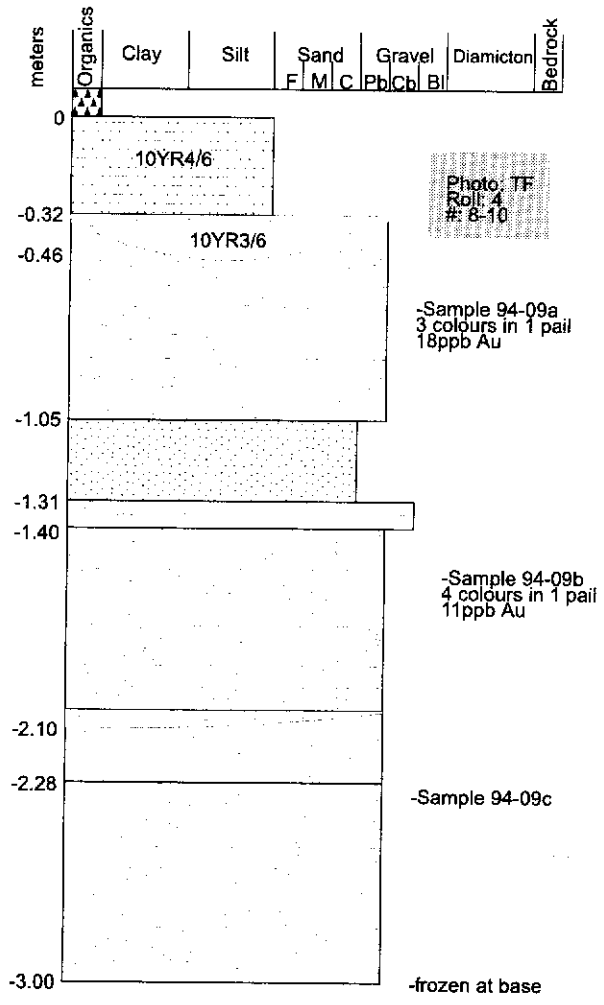
Subrounded cobble gravel lag. Max cobble size 20cm.

Sandy clast supported, matrix filled yellowish brown gravel. Imbricated flat pebbles flowing west. Silt on pebble tops. Pebbles to 7.5cm. Subrounded with some angular (volcanic) pebbles. Horizontally stratified; small pockets of clay skin pebbles (16cm) -looks like pre-Reid gravel.

Orange-yellow openwork pebble gravel lens. Pebbles to 7cm, typically 1.5cm. Thin clay skins on top & sides. Subangular & fractured pebbles with some rotted.

Clast supported pebble gravel. Pebbles to 8cm. Subrounded rotted pebbles. Clay skins on tops and sides of clasts. Very coarse sand/granule matrix. Damp

Pebbly to cobbly clast supported gravel with finer matrix - coarse sand. More silt caps. Cobbles to 12cm. Subrounded and micaceous pebbles are rotted. Many quatrz clasts. Yellowish brown in colour. Contains lenses of openwork gravel up to 4cm thick. Diffuse upper contact.



Station 94-11

Bluff 1 km N of Sixtymile R., 8 km W of mouth

Unit Description

Light olive brown powdery coarse silt/fine sand massive loess. Brown at top, light olive at bottom.

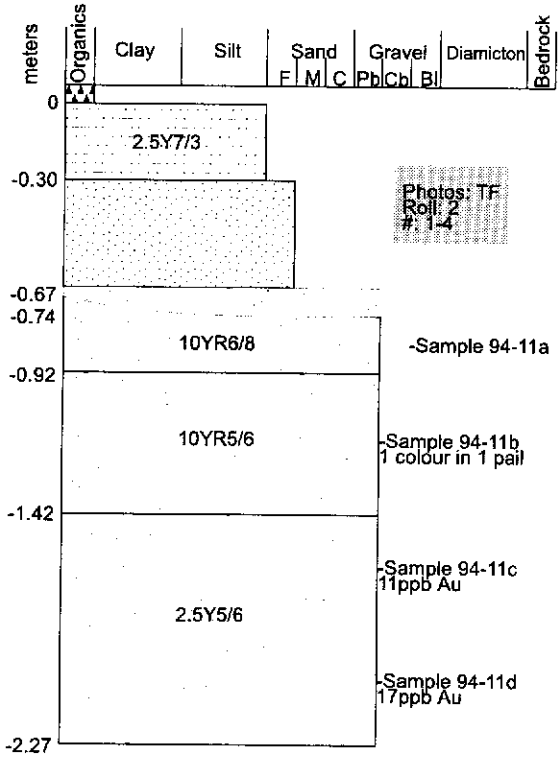
Massive poorly sorted silyt sand with mottles. 5% 1-2cm subrounded pebbles. Matrix supported. Rotted schist pebbles. Quartz in pebbles intact. Damper than loess and firm.

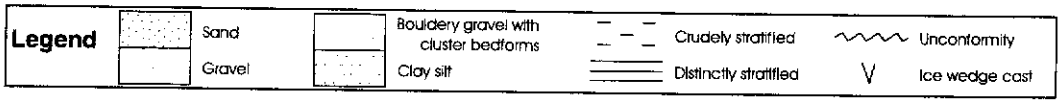
Grey ganular gravel - max size 3cm. Pebbles sloping NNE. Contact rises to SSW.

Rusty orange, poorly sorted, matrix filled gravel. Max clast size 15cm, average 3cm. Round to subangular clasts. Imbrication to SSW. Metamorphic clasts, micaceous matrix. Red clay skins on pebbles.

Yellow brown, dominantly clast supported very coarse, matrix filled sand. Subrounded to subangular pebbles (1-10cm). Silt on tops, rotted bottoms of pebbles. Pebble lithology includes: Quartzite, quartz vein, quartz porphyry, and Carmacks andesite.

Alternating clast and matrix supported layers of very coarse sand to pebbles. Av. pebble size 3cm. Silt cappings on pebbes. Few broken clasts, but no weathered pebbles. Subrounded to subangular clasts. Crude bedding.





Station 94-12

4 km NW of mouth of unnamed tributary, 6 km W of mouth of Sixtymile R.

Unit Description

Light olive brown massive dry loess, < 5% local angular rock chips, to 3cm.

Thin orange-brown band of more competent silt.

Grey muddy diamicton, increasing rock fragments, subangular 0.2-2cm unsorted pebbles. Crumbly and dry. Mottled texture. Horizontal layer.

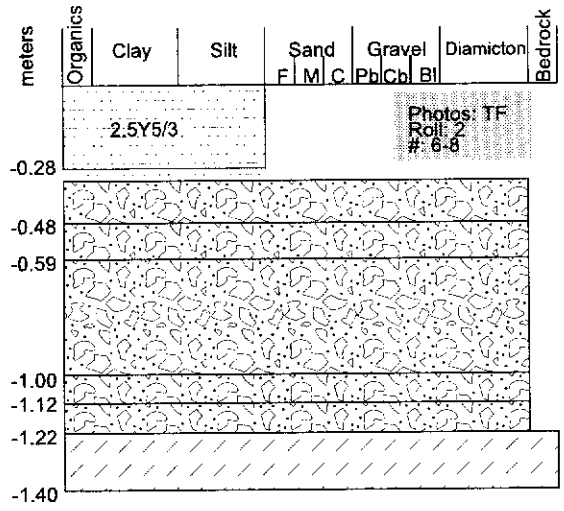
Orange brown matrix supported diamicton. < 10% rock fragments. Clasts 0.2-4cm.

Dark grey muddy diamicton. 20% clasts 0.1-3.5cm. Sharp contact with upper unit. Stratification dipping 7° SW. Clacite vein fragments.

Poorly sorted, massive, matrix supported diamicton. < 10% clasts - 0.5-1.5cm. Subhorizontal, wavy upper contact.

Dark grey muddy diamicton. Upper contact dips 7° NW.

Broken angular subcrop, gradational with dark muddy matrix, gritty consolidated pebbly sandstone greenish grey mica bearing outside surfaces. Same colour as dark brown muddy diamicton.



Station 94-13

2 km SW of mouth of unnamed tributary, 3 km N of mouth of Sixtymile R.

Unit Description

Fine sand/coarse silt. Massive brown loess.

Light grey sandy gravel with angular rock fragments and pebbles (to 3cm). Polished pebbles.

Rusty, well sorted, cryoturbated sandy gravel.

Grey sandy, micaceous matrix supported gravel. Pebbles to 3cm. Schist fragments are rotted. Undulating and sharp upper and lower contacts.

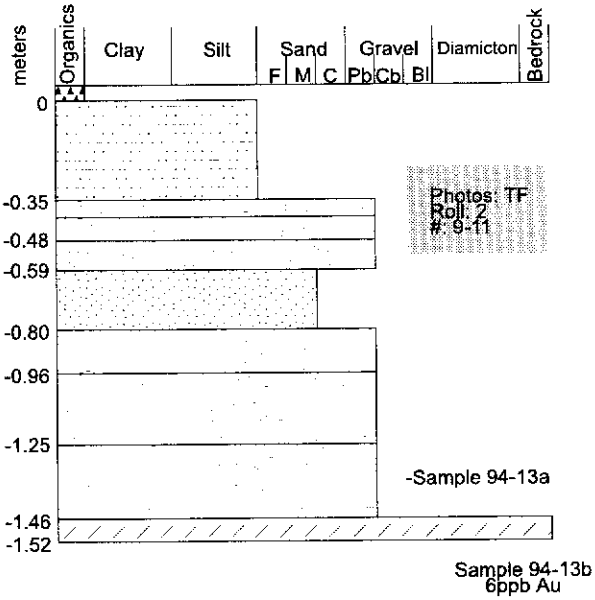
Rusty orange, medium, well sorted stratified dry sand.

Muddy, matrix supported grey gravel. Gradational upper and lower contacts. 3mm pebbles in a lens.

Pale brown, muscovite rich, subrounded, poorly sorted pebble gravel. Clast supported with coarse to medium matrix. Pebbles to 4cm.

Coarse subrounded, flaggy, pebble gravel. Pebbles to 8cm, rotted schist clasts. Clast supported with thin sand lenses. Max cobble size 20cm.

Dark green, flaggy, broken chlorite-muscovite-quartz schist. Local limonite & hematite staining.



Station 94-14

Yukon R., E side, 8 km N of mouth of Sixtymile R.

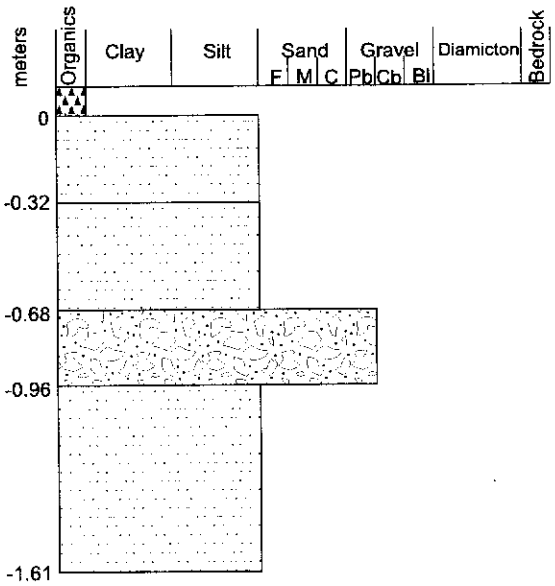
Unit Description

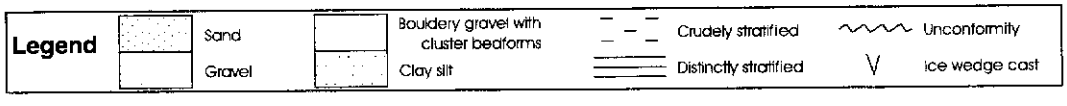
Reddish brown silty loess.

Yellowish brown loess. Coarse dry silt with subangular pebbles up to 5cm. Ventifacts?

Reddish brown granular sand matrix with angular schist fragments - broken bedrock up to 6cm.

Pale greyish brown/beige coarse sitl. Homogeneous texture, massive. No rock fragments.





Station 94-15

Sixtymile R., W side,
9 km W of mouth

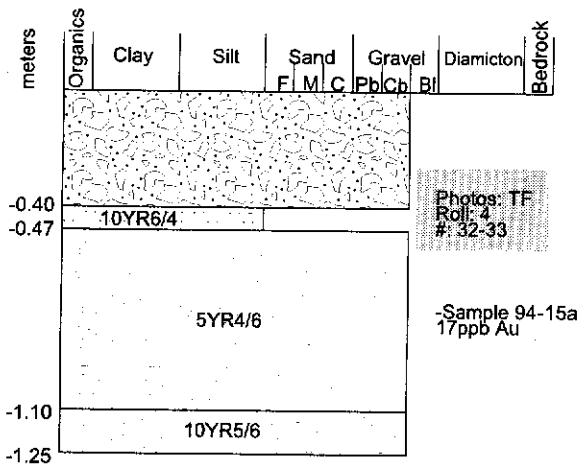
Unit Description

Bulldozerite.

Tan coloured fine sand/coarse silt loess. No soil developed.

Clay skin coated, subrounded, yellowish red, clast supported pebble gravel. Medium sand matrix. Average pebbles size 3-4cm, 10cm max. Flat pebbles subhorizontal.

Yellowish brown clast supported subrounded gravel. Medium sand matrix. Clay skins on tops. Pebbles imbricated flow from 44°, at plunge of 20° to 25°.



Depth to bedrock estimated at 4 meters.

Station 94-16

Sixtymile R., W side,
9.5 km W of mouth

Unit Description

Hardened disturbed medium brown silt with some pebbles, <20%.

Orange brown, clast supported, matrix filled pebble gravel. Subrounded to subangular, up to 6cm pebbles. Some clay skins on tops. Flat imbricated pebbles. SE flow - 22° @ 330°. Some rotted pebbles. Coarse to granular sand.

Yellow brown, openwork pebble gravel. Rare cobbles to 15cm. Many rotted and/or fractured pebbles. Interclast spaces filled with clean small pebbles and granules. Clean gravel, but not well sorted. Some clay skins on tops. Loose, porous gravel. Distinct upper and lower contacts.

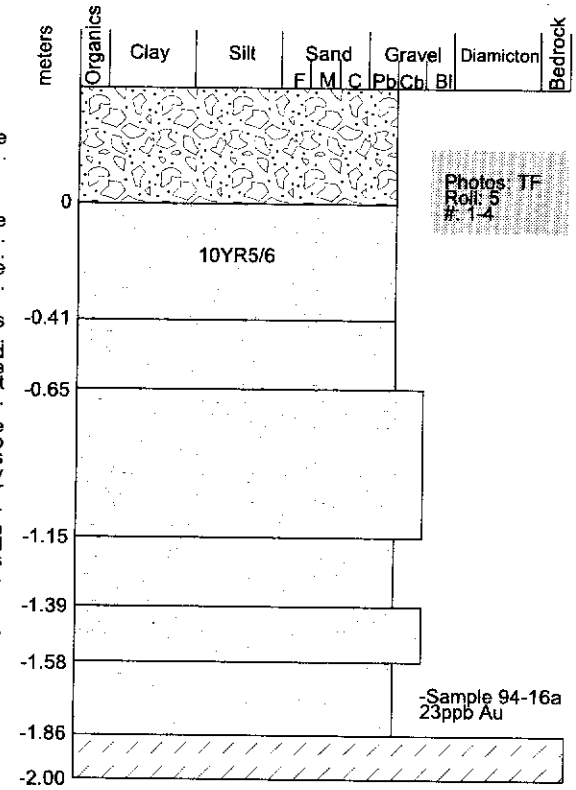
Yellowish brown clast supported, matrix filled cobble and pebble gravel. Subround to round cobbles to 24cm. Some imbrication - 20°@ 360°. Matrix is coarse sand. Clay skin on top of clasts - particularly cobbles. Pebbles locally fractured. Planar upper contact.

Yellowish brown openwork pebble gravel - similar to above openwork, but smaller pebbles. Small pebbles comprise most clasts. 20-30% larger pebbles to 6cm. Some rotted clasts, and clay skins on tops. Distinct, but not sharp contacts.

Clast supported cobble gravel. Cobbles up to 19cm. Remainder of gravel consists of pebbles and granules forming openwork. Imbrication implying sourthern flow.

Yellowish brown clast supported pebble gravel. Sand matrix filled.

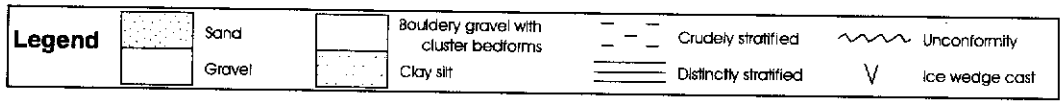
Rusty biotite schist. Deep reddish brown leached zone 5cm into overlying gravel.



Sample 94-16b
1 colour in 1 pail
9ppb Au

Sample 94-16c
8ppb Au

Depth of samples unknown



Station 94-18

Unnamed tributary 5 km S of Sixtymile R., 12 km SW of mouth

Unit Description

Orange sandy, clast supported, matrix filled, fine gravel. 4cm subangular pebbles. Coarse washed sand matrix. Abundant muscovite. Subhorizontal bedding.

Well sorted, fine horizonally bedded grey sand. Abrupt horizontal contact with overlying gravel.

Yellowish reddish, clast supported, matrix filled pebble gravel. Coarse sand matrix. Subrounded to subangular clasts. Cohesiveless gravel due to coarse matrix. Sharp upper and lower contacts.

Pale medium brown cobble and boulder gravel. Boulders to 40cm. Subangular to subrounded clasts. Sandy pebble matrix. Clast supported. Some variable imbrication, flow from NE, dipping 23°. Boulders generally granitic, but some schist and quartz clasts. Silt skins on tops. Convex top contact, and concave bottom contact. Contacts are sharp. Channel deposit.

Yellowish brown sandy, clast supported pebble gravel. Variable matrix. Subangular to subrounded clasts. Layer appears transitional with overlying boulder layer. Silt skins on tops. Distinct contacts.

Irregular wispy laminations of deep brown silt and orange brown sand. Very micaceous. Sharp, but wavy irregular lower contact.

Brown, clast supported brown cobble gravel. Sandy matrix. Subanguluar to subrounded clasts.

Deep orangy brown pebble and cobble layer. Strongly oxidized layer. Clast supported, sand matrix filled but local pockets of openwork. Clasts up to 15cm. Silt skins on tops. Subrounded to subangular clasts. Lithologies consists of granites and schists. Contacts marked by sharp colour change, clasts chemically altered, but physically intact, except for fracturing of schists.

Clast supported, poorly sorted, medium brown pebble and cobble gravel with some boulders. Sandy fine pebble gravel matrix. Max boulder size 50cm. Subanular to rounded clasts. Some fracturing of clasts, and some rusty clasts. Silt skins on tops. Imbrication 25° @ 054°. Similar lithology as above, but includes some carbonate clasts.

Dark brown, coarse pebbly sand. Pebbles to 5cm. 50/50 pebbles and matrix. Subangular to subrounded pebbles Sharp upper contact, diffuse lower contact.

Openwork coarse pebble gravel with pebbles to 6cm.

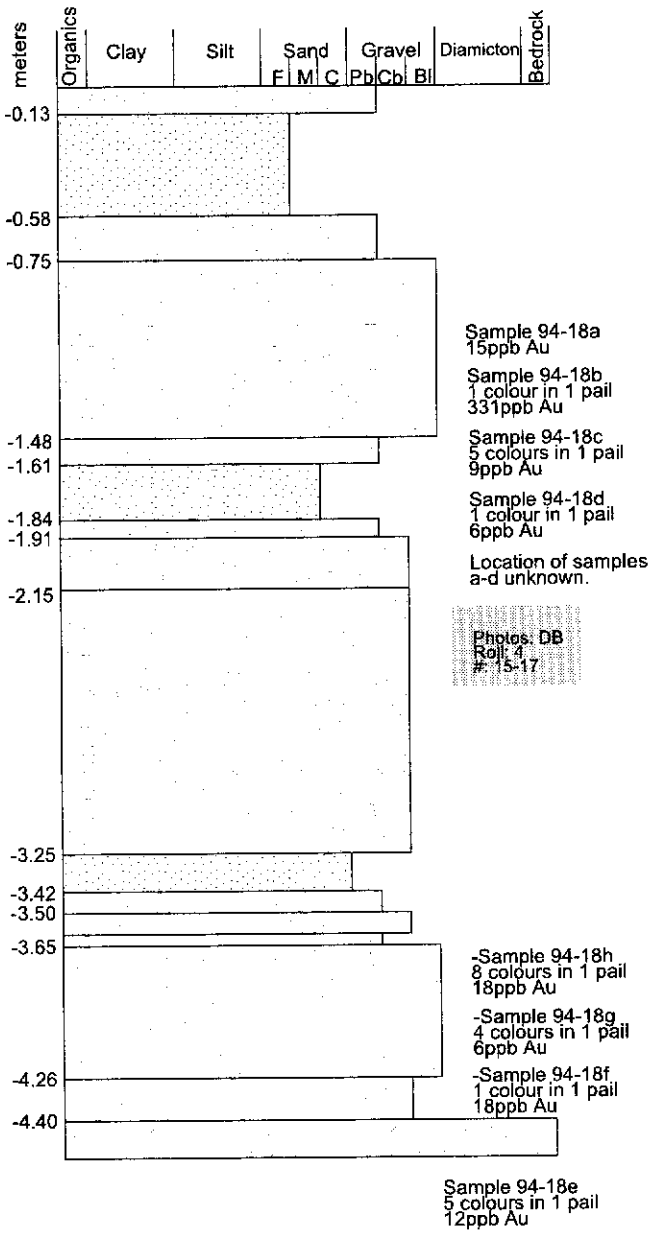
Clast supported pebble and cobble gravel. Sand matrix filling cobbles to 10cm.

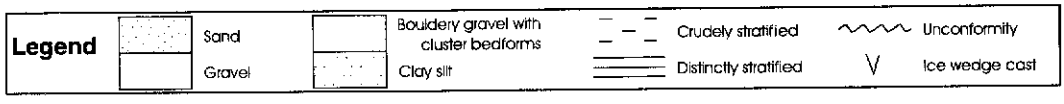
Openwork gravel same as above. Irregular contacts and variable thickness.

Boulder & cobble gravel. Boulders to 30cm. Angular to subangular clasts. Silt skins on tops. Irregular contacts, undulating upper contact, concave lower contact. Imbrications parallel a tight channel & change over a short distance.

Clast supported cobble gravel. Clasts to 15cm. Coarse sand matrix. Subrounded to subangular clasts.

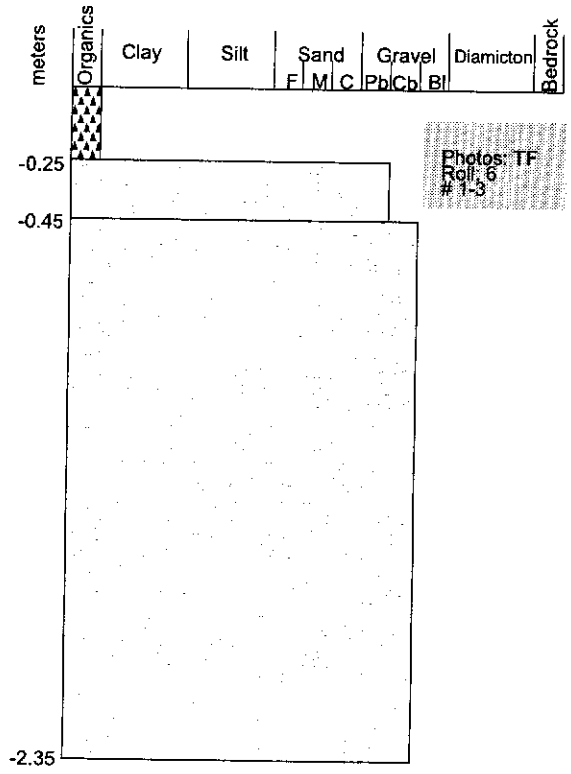
Micaceous quartzite and quartz muscovite schist bedrock.





Station 94-19

Unnamed tributary
2 km S of Sixtymile R.,
8 km SW of mouth



Unit Description

Black muck

Orange pea gravel

Bouldery cobble gravel.

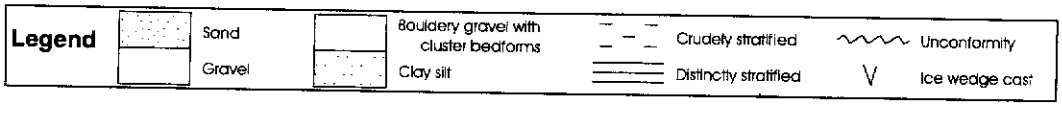
Sample locations unknown

Sample 94-19a
6 colours in 1 pail
12ppb Au

Sample 94-19b
10 colours in 1 pail
7430ppb Au

Sample 94-19c
22 colours in 1 pail
358ppb Au

Sample 94-19d
38 colours in 1 pail
160 ppb Au



Station 94-20

Unnamed tributary 2 km S of Sixtymile R., 8 km SW of mouth

Unit Description

Cobbly, clast supported gravel. Very little matrix of coarse sand. Rotted schists. Wavy horizontal bedding. Low angle downstream imbrication. Slight silt skins on tops, clean bottoms. 30cm max clast size. Subrounded clasts.

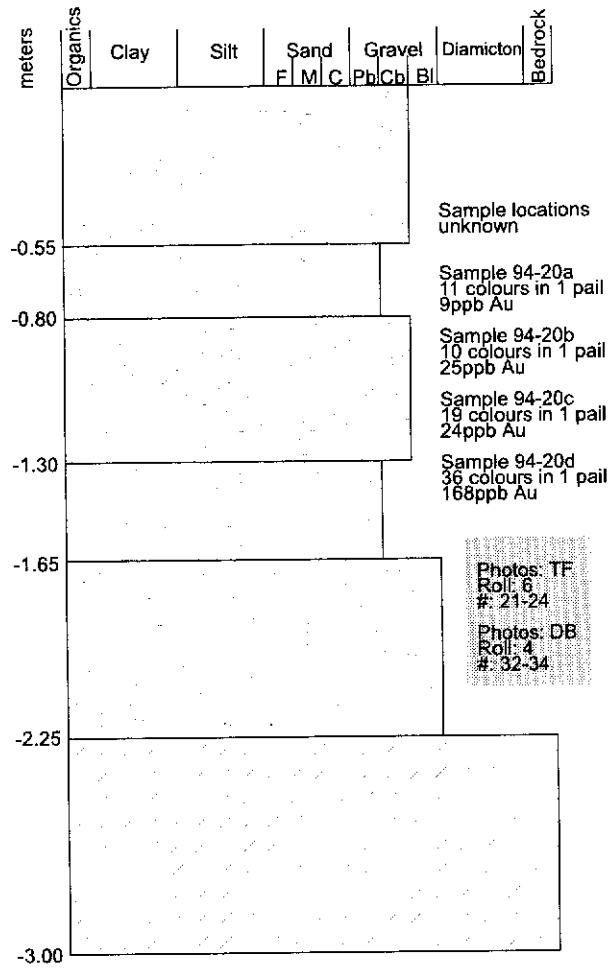
Cobbly pebble gravel. 14cm max clast size. Clast supported - almost openwork. Very coarse sand matrix. Subangular to subrounded clasts.

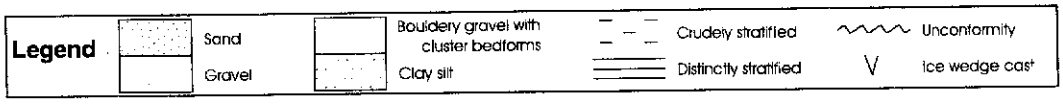
Cobble gravel with very coarse sand matrix filling. Very sandy. Subangular to subrounded clasts.

Black sooty, closely packed openwork with local graded 2-4cm gravel lenses. Stacked sloping towards the west. Manganese oxide layer at 1.5m depth.

Boulder gravel to bedrock. Clast supported, subangular. Some rotted schists. 35cm max clast size. Lithologies include: quartzite, schist, grey volcanics (Carmacks), epidote-chlorite-quartz veins.

Altered green chlorite [schist] bedrock with red hematite coatings.





Station 94-21

Sixtymile R., E side, 14 km NW of mouth

Unit Description

Pale pinkish brown/tan loess. Very dry, <10% angular pebbles. No apparent ventifacts. Sharp lower contact.

Reddish brown, altered (pre-Reid) gravel with clay skins on tops and some sides of pebbles. Barely clast supported. Pebbles to 6cm. Subrounded pebbles haveing decayed to various degrees, except for quartz pebbles. Very coarse micaceous sand matrix. Clay mixed in with sand creating soil texture. Very reddish matrix - darker red in top 50cm of unit.

Brown, clast supported, cobble gravel with cobbles up to 12cm. Imbrication with flow to south. Well defined upper wavy contact. Weaker clay skins, more silt skins. Matrix is coarse to very coarse micaceous sand. Some rotated cobbles. Looser packing than overlying layer - lacks the muddy matrix cohesiveness. More yellowish brown in colour. Subangular to subrounded, weathered mica schists and unweathered quartz rich clasts. Lower contact is gradational.

Clast supported, matrix filled pebble gravels to 7cm with silt skins. Yellowish orange brown colour. Matrix is medium to coarse sand and granules. Subhorizontal contacts dipping slightly north. Distinct rotted quartz-mica schist. Many intact quartz rich pebbles.

Cobble gravel, clast supported with cobbles up to 14cm. Yellowish brown colour. Silt skins. Spotty, rotted mica-rich clasts. Tightly packed grave matrix is medium to coarse sand. Distinct contacts. Subrounded to angular clasts.

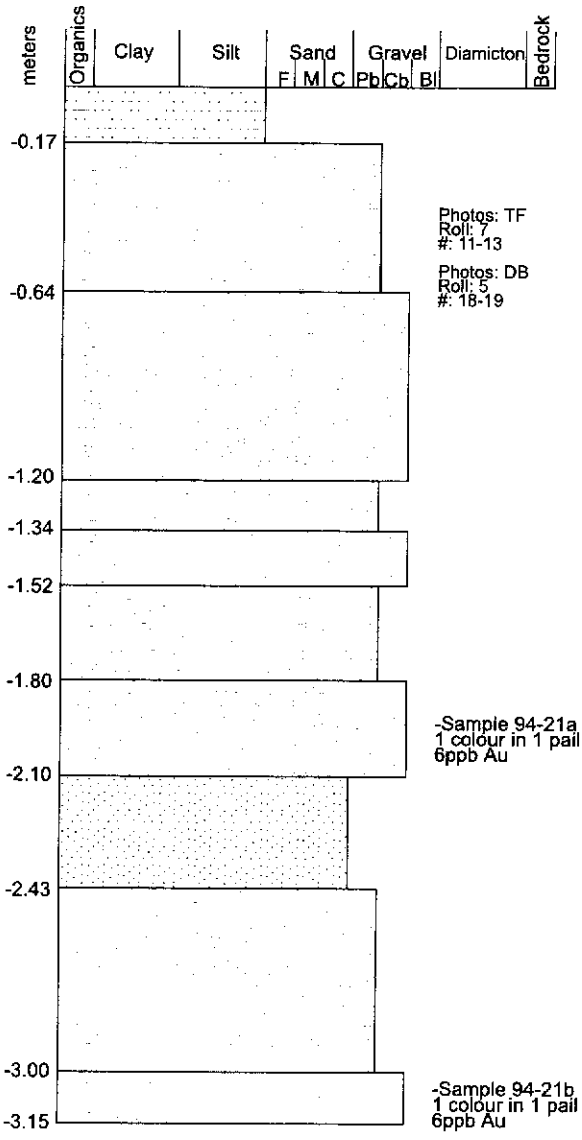
Clast supported, matrix filled pebble gravel. Max clast size 5cm, average 3cm. Cleaner and looser than overlying gravels. Includes fine pebble openwork interbeds. Yellowish brown colour. Few rotted clasts, but mainly competent pebbles. Very little silt on tops. Medium to very coarse mica rich sand matrix. Local weak stacking with flow to the south. Lower contact is distinct.

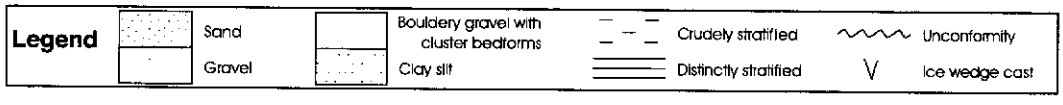
Matrix filled, clast supported cobble gravel. Cobbles are flat lying - silt on tops. Coarse to very coarse sand matrix with muscovite. Max clast size is 14cm. Lag deposit. Orangy brown micaceous clasts are rotted, others rocks are not.

Yellowish brown, very coarse and very loose pebbly sand. Matrix supported with 10% pebbles up to 6cm. Pebbles are clean on tops and bottoms. Unit caves easily. Pebbles are subrounded to rounded. Distinct upper & sharp lower contacts.

Loose openwork pebble gravel. Local silt skins on tops. Clasts up to 9cm. Orange-brown colour. Pebbles are subangular with many flat metamorphic clasts - none are weathered. Some coarse sand. Horizontal sharp continuous upper contact & horizontal lower contact.

Cobble gravel with many angular clasts. Max size 20cm.





Station 94-22

Sixtymile R., W side, 14 km NW of mouth

Unit Description

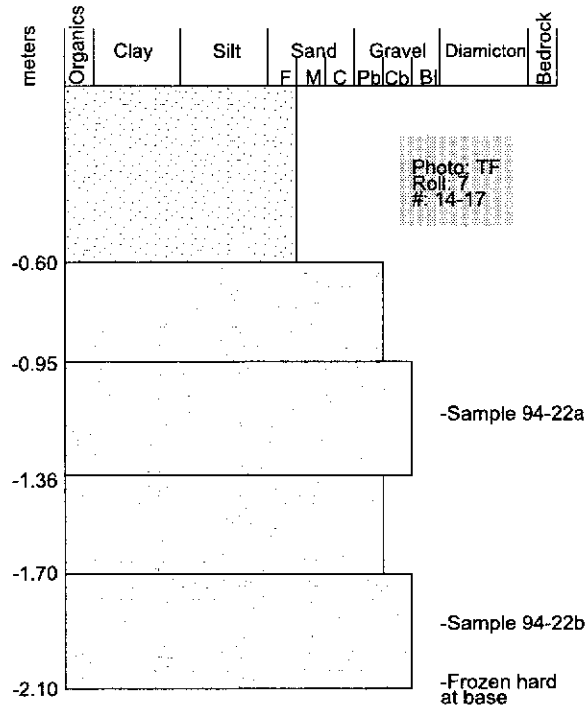
Light brown bedded silty sand. Laminations on centimeter scale. Buried thin organic and charcoal. Subhorizontal lower contact dipping 10° towards river.

Medium orange brown, clast supported. Cobbles to 17cm. Matrix is very coarse sand to granules. Poor sorting. Thin silt caps. Rotted mica rich clasts. Subangular to rounded clasts. Distinct upper contact, and gradational lower contact. Imbrication flow to the east with 20° dip.

Loose medium orange brown, clast supported cobble gravel. Coarse sand to granule mattic. Max clast size 20cm. Imbrication 7° dip with flow from north. Most clasts are flat lying. Silt caps. Gradational upper and lower contacts.

Loose medium brown clast supported, matrix filled pebble gravel. Pebbles to 6cm. Very coarse sand matrix. Minor silt caps. Mica rich clasts are rotted. Lower contact is distinct and subhorizontal. Rounded to subrounded clasts. Well sorted matrix.

Medium brown, clast supported, matrix filled cobble gravel. Max clast size 18cm. Sub to well rounded. Coarse sand matrix. Some silt caps on larger clasts. Stacked with 30° dip to west. Clasts unaltered, unfragmented, smoe quatz rich and micaeous are rotted.



Station 94-23

Sixtymile R., NE side, 19 km NW of mouth

Unit Description

Light brown loess. Very dry, with some pebbles at base. Unstatified, massive, compact texture.

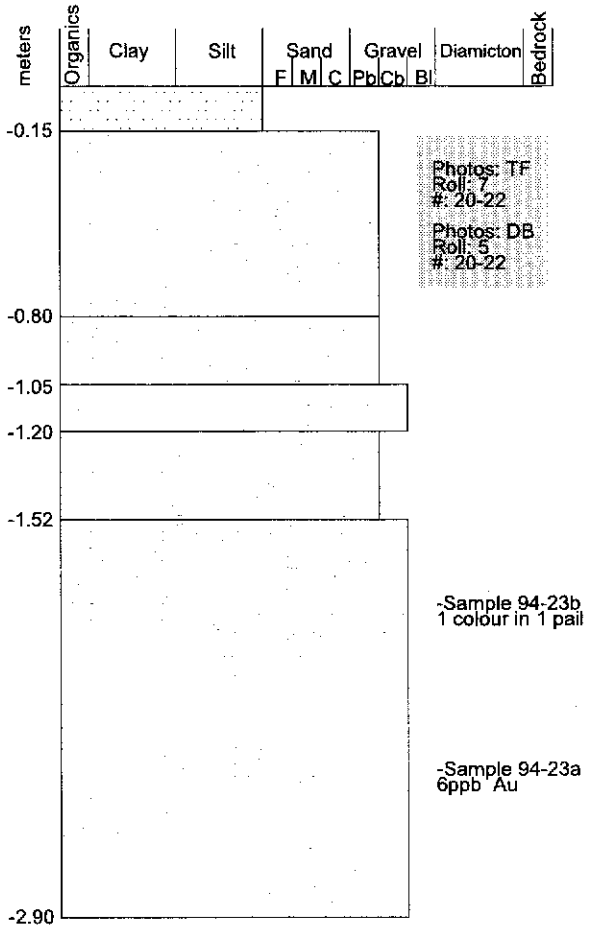
Yellowish brown clast supported, matrix filled, pebble gravel. Clay skins on all sides of clasts. Some soil development. Thick silt skins on tops. Rotted schists Limonitic altered pebbes, and breakable volcanics. Many fracture pebbles. Subhorizontal platy texture. Largest clast 6cm, average 2cm. Compact, dry texture.

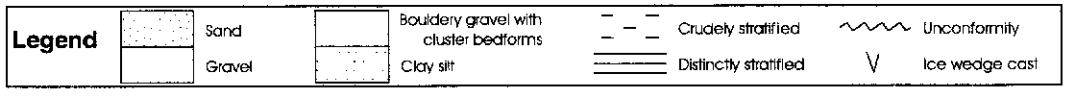
Clast supported, matrix filled, subrounded to subangular pebble gravel. Silt skins on tops. Dominantly fine sand matrix, minor coars sand. Imbrication with flow towards 250°, dipping 25°. Distinct upper contact. Max clast size 8cm; clasts generally intact & unaltered.

Clast supported, matix filled cobble gravel. Thick silt skins on tops, abundant volcanic clasts; stacking parallel to layer above. Max cobble size 20cm.

Yellowish brown, clast supported, matrix filled pebble gravel. Coarse sand matrix. Pebbles to 8cm. Clay skins on tops. Distinct contacts by colour.

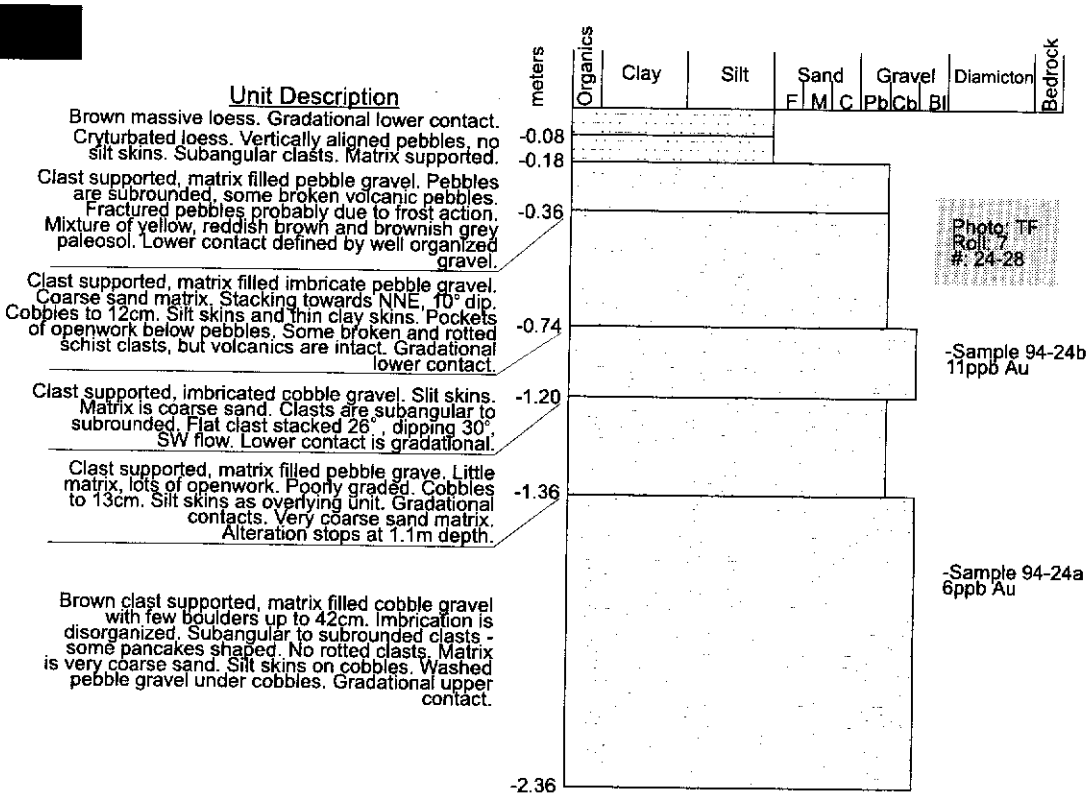
Clast supported matrix filled cobble gravel. Less orange than overlying layer. Silt skins on tops. Many, pancake shaped cobbles. Shattered volcanics; some openwork under cobbles. Lenses of pebble gravel. Max cobble size 25cm. Some rusty, limonitic rotted clasts. Some rotated clasts. Quartz mica-biotite schists rotted. Quartzites unaltered, some augen gneiss, very few quartz pebbles.





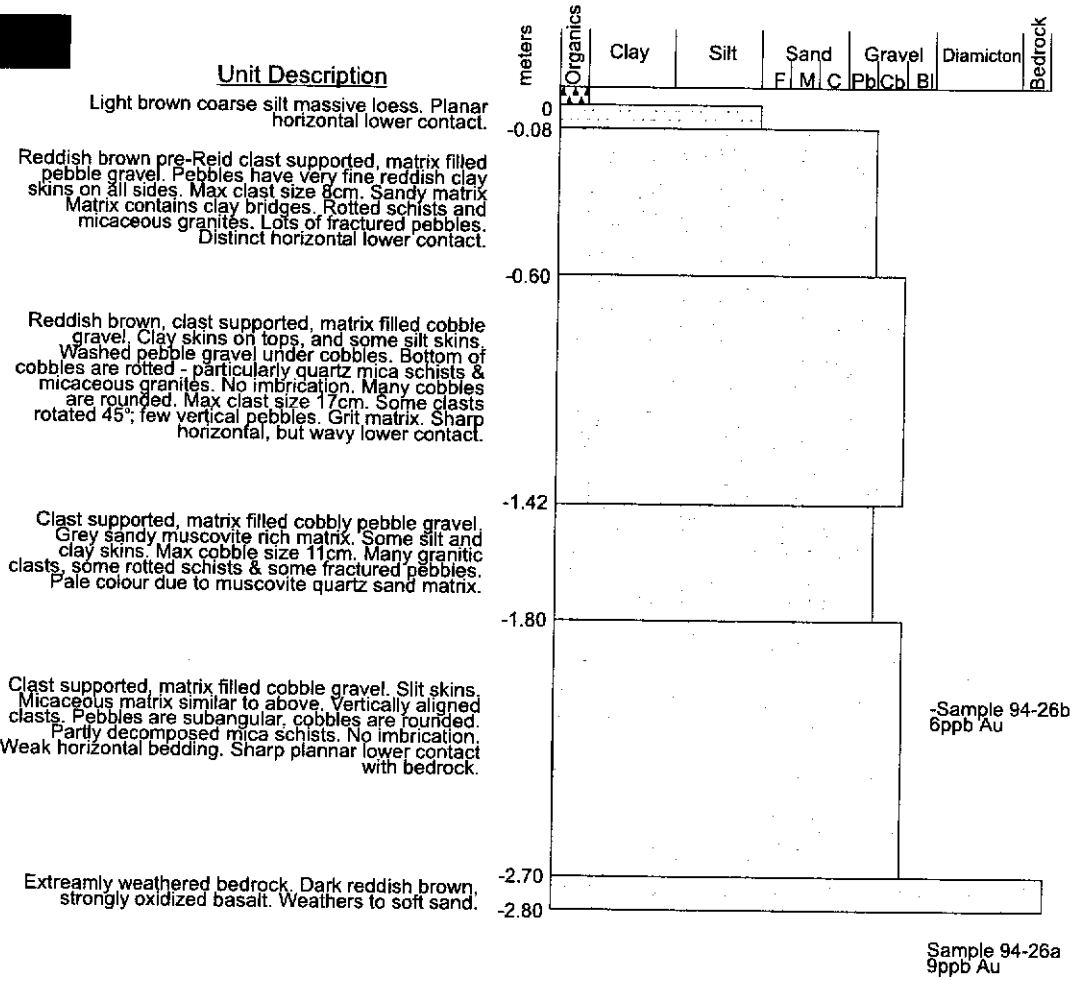
Station 94-24

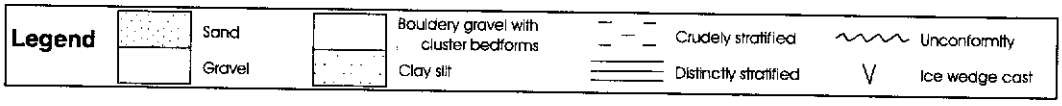
Sixtymile R., NE side, 20 km NW of mouth



Station 94-25

Sixtymile R., W side, 27 km NW of mouth, 1 km S of Matson Cr. mouth





Station 94-26

Unit Description

Pale brown massive, dry silt.

Reddish brown weathered, rotten, clast supported pebble gravel. Subrounded to subangular clasts. Max clast size 7cm. Clasts disorganized. Diffuse horizontal lower contact.

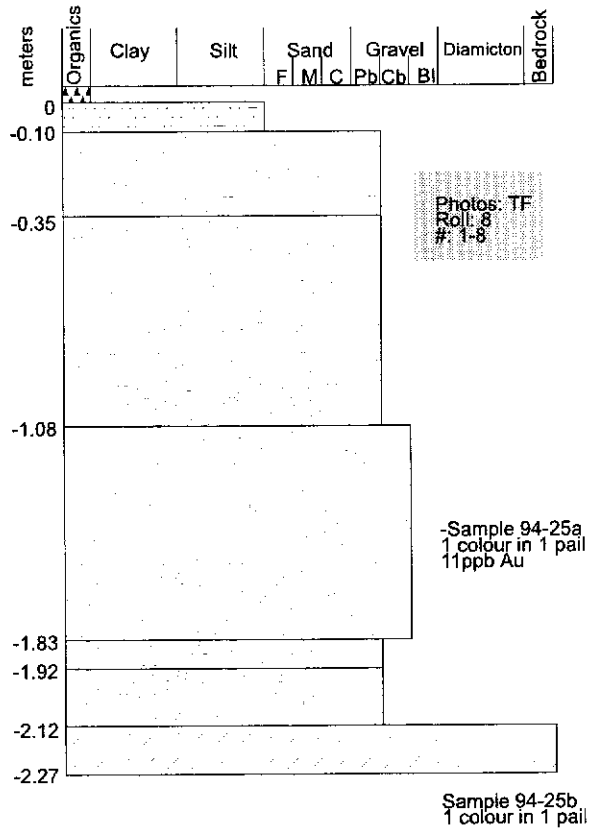
Brown, clast supported, cobbly pebble gravel. Very weathered - many rotted clasts. Max clast size 25cm. Poorly sorted medium sand matrix. Largest cobbles rotated vertical. Silt on clast tops. Imbricate flow to 130°, dipping 28°. Lower contact distinct cobble lag. Subrounded to angular clasts.

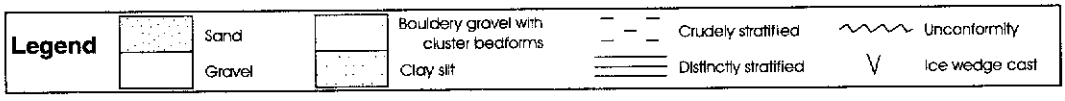
Very coarse, clast supported cobble gravel. Boulder to 30cm. Silt skins. Very coarse sand-grit matrix. Imbricated flat cobbles, dipping 15°, flow to 195°. Most clasts are intact, less rotted than above units. Poorly stratifited , openwork under some cobbles. Sharp lower contact.

Openwork of fine pebble gravel. Clasts to 6cm. Carbonate precipitate on bottoms. No rotted clasts, but some fractured. Coarse silt skins on tops. Imbrication dips 10° to SW. Yellowish brown colour.

Clast supported, brown cobbly pebble gravel. Matrix filled with medium-coarse sand. Max clast size 20cm. Silt skins. Some stacking to 45°, dipping 25° - flow SW. Rotted micaceous clasts. Sharp upper and lower contacts.

Fractured, angular, oxidized dark brown basalt.





Appendix 3

CONTENTS

Station 95-04

Unnamed tributary W of Sixtymile R., 6 km SE of Mt. Tyrrell

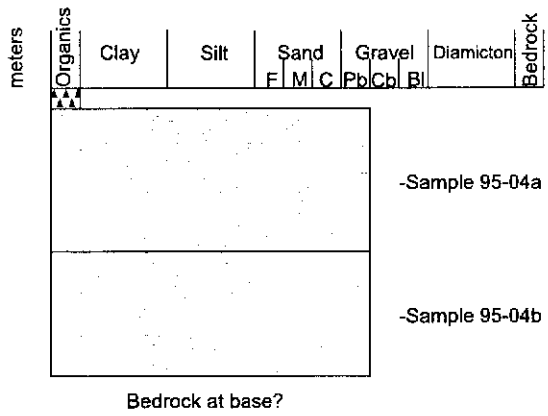
Unit Description

Loose, medium brown, matrix supported pebble gravel. 50-75% sand in matrix, 40% pebbles. Round to subrounded clasts. Max b-axis size 4cm.

Medium gray, matrix supported, damp clay rich gravel. More angular than subangular clasts. Max clast size 12cm. Sand 5%, Silt 75%, clay 20%.

Photos: TF Roll: 1 #: 16

Photos: JT Roll: 1 #: 6-8



Station 95-05

Reindeer Cr., 6 km SE of mouth

Unit Description

Typically pink hued massive silt loess. Soil horizon.

Yellow loess. Sharp planar basal contact.

Brown, matrix supported gravelly sand. Carbonate coatings below pebbles. 10cm max clast size. Silt cappings, subangular clasts.

Well sorted, muscovite sand with silt. Sharp upper and lower contacts.

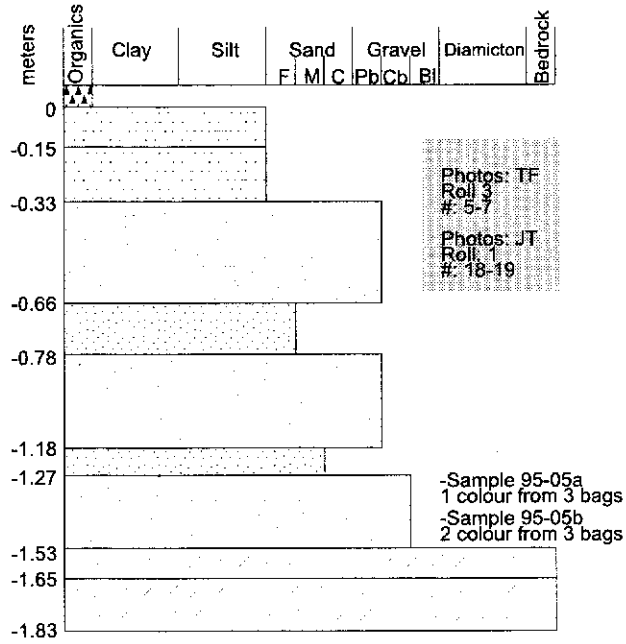
Grey, sandy gravel. Upper portion is matrix supported, lower portion is clast supported. Average clast size 5cm. Unit is undulating lens.

Lens of grey, well sorted, micaceous medium sand overlying coarse sand. No pebbles, but sense of flow to west.

Rusty orange brown cobbly weathered clast supported gravel with very coarse sand matrix. Subhorizontal pancake cobbles. Largest clast 28cm. White quartzites. Silt caps, clean bases.

Grey-green micaceous rottedschist. Sharp planar upper and lower contacts.

Weather, decomposed mica-quartz schist. Orange brown colour with angular chips and blocks.



Photos: TF Roll: 3 #: 5-7

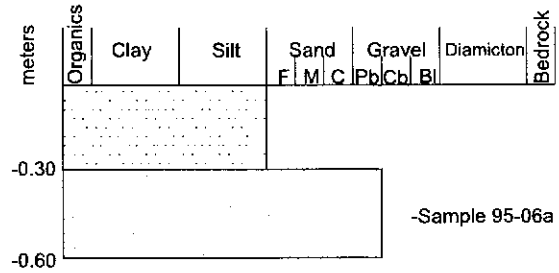
Photos: JT Roll: 1 #: 18-19

Station 95-06

Unit Description

Loess

Brown clast supported pebble gravel. Sandy matrix. Subangular pebbles to 8cm. Some silt skins.



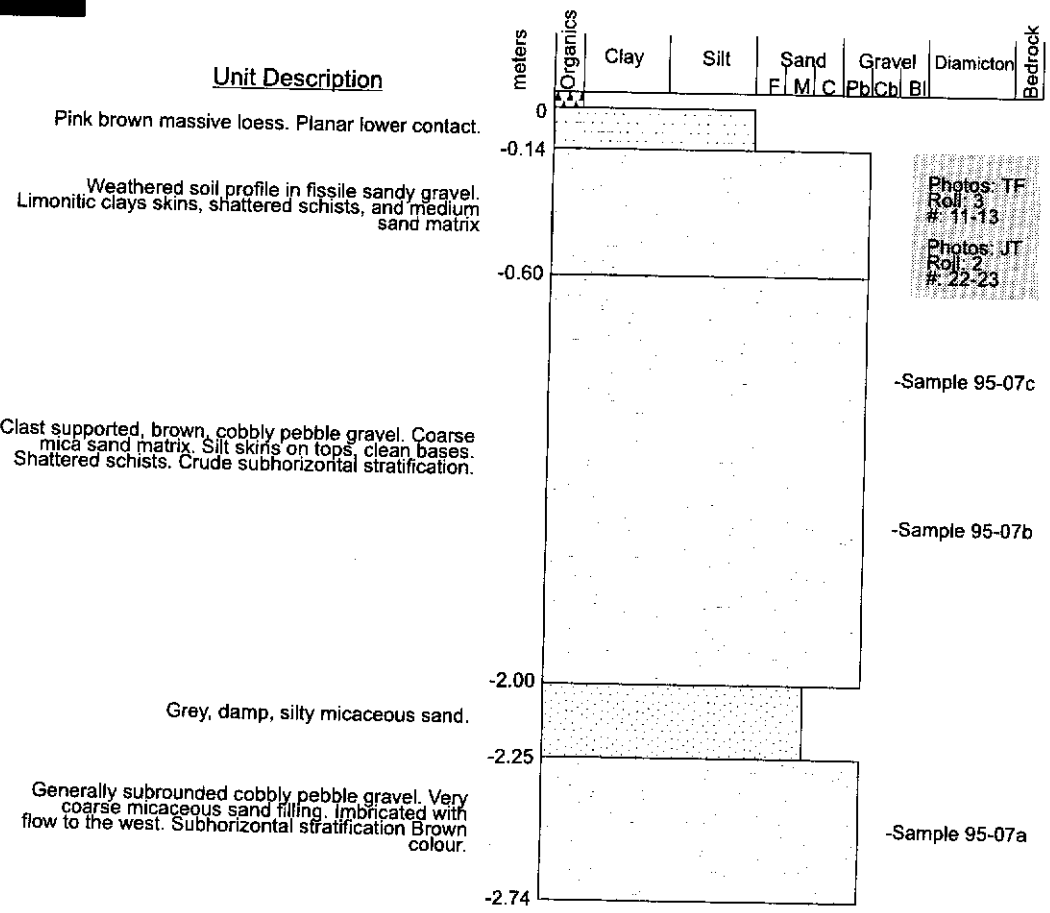
Photos: TF Roll: 3 #: 9

Photos: JT Roll: 2 #: 20-21

Legend: Sand; Gravel; Bouldery gravel with cluster bedforms; Clay silt; Crudely stratified; Distinctly stratified; Unconformity; Ice wedge cast

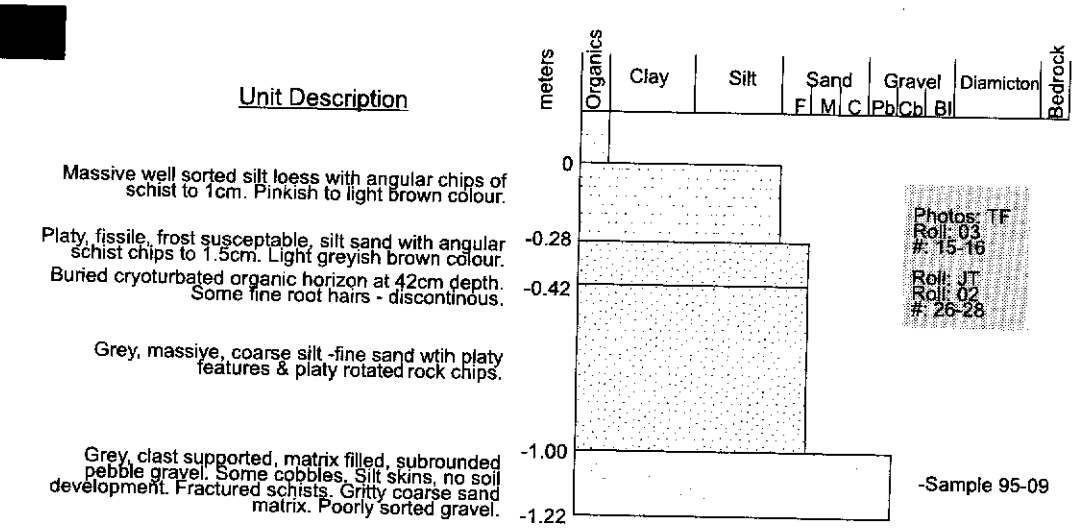
Station 95-07

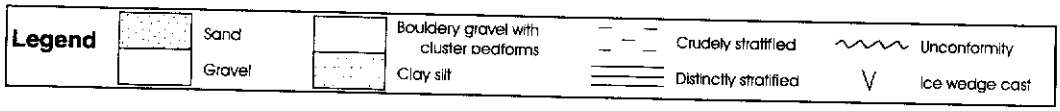
Rosebute Cr., 4 km E of mouth



Station 95-09

Rosebute Cr., 5 km E of mouth





Station 95-10

Unit Description

Clast supported pebble gravel. Sand matrix. Well rounded clasts. Varied lithologies. Lenticular bedding.

Brown, well laminated, well sorted, fine sand with pebbles.

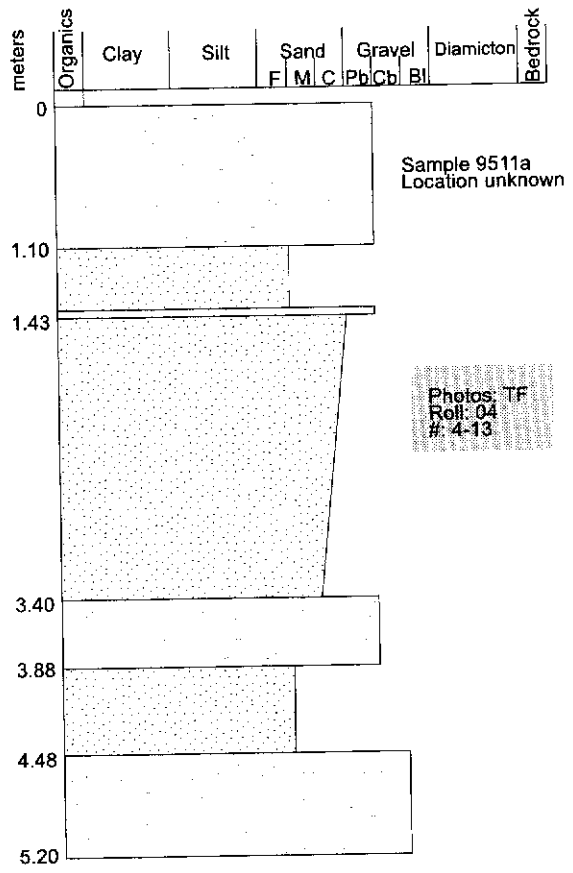
Clast supported pebble gravel bed. Clasts 2cm.

Brown layered, coarsening upward, sand. No pebbles. Mottled grey rusty patches.

Subrounded, stacked rusty gravel. Rotated pebbles. Muscovite & quartz sand matrix. Gravel is matrix filled & clast supported. Quartz schist clasts.

Grey, damp, micaceous fine silty sand.

Cobbly gravel.



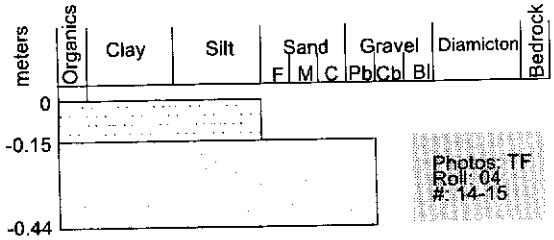
Station 95-11

2 km SE of Stewart R., 18 km NE of mouth of Valley Cr. (cf. 93-09)

Unit Description

Loess

Red coloured pre-Reid gravel. Well rounded pebbles to 12cm.



Pebble Lithologies
Volcanic greenstone, foliated quartz feldspar pegmatite, decomposed angular schist fragments.

Station 95-12

2 km E of Stewart R., 4 km E of Valley Cr. (cf. 93-14)

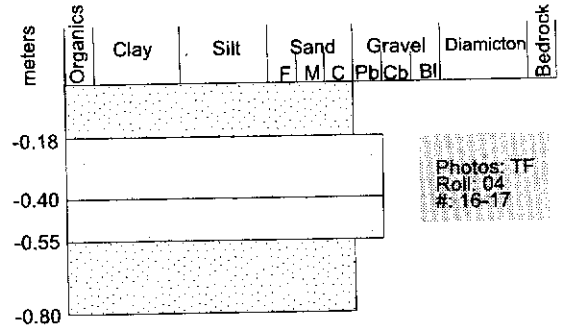
Unit Description

Very coarse sand

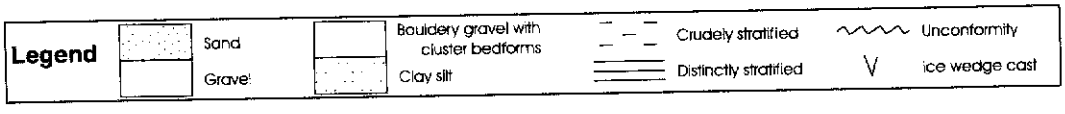
Pea gravel. Loose, clast supported, wells sorted gravel. Clean pebbles, no clay skins. Striated black chert - faceted pebble found.

Pebble gravel, 1-2cm clasts

Pebbly sand.



Pebble Lithologies
Chert, quartz, quartz-feldspar schist, hornblende andesite.



Station 95-13

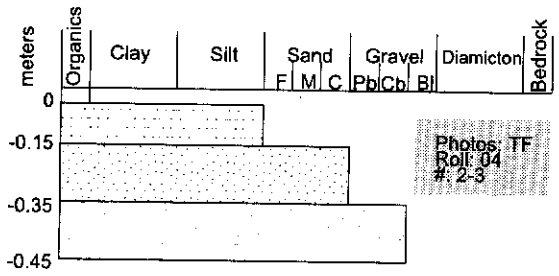
3 km S of Stewart R., 4 km S of mouth of Valley Cr. (cf. 93-16)

Unit Description

Tan coloured massive well sorted dry silt - loess. Some root hairs.

Mixed loess and pebbly sand.

Strong red brown pre-Reid gravel. Largest cobble 14cm.



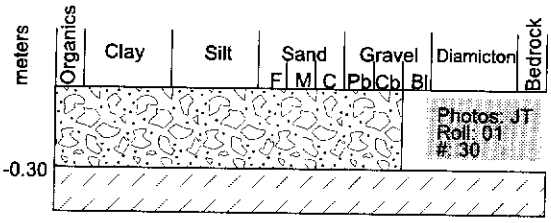
Station 95-14

Unnamed tributary 3 km W of Yukon R., 17.5 km N of mouth of Sixtymile R.

Unit Description

12-14cm angular rock fragements. Not gravel.

Mafic volcanic - glassy black matrix with white feldspar laths(?) 0.2-0.5mm in size.



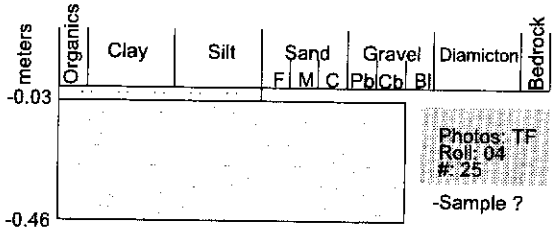
Station 95-15

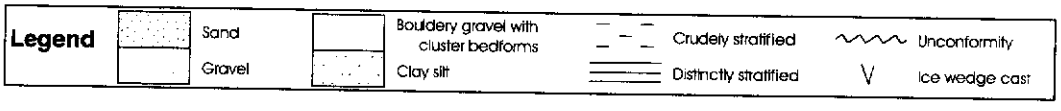
Yukon R., W side, 14 km N of mouth of Sixtymile R.

Unit Description

Loess

Brown pre-Reid gravel. Clayskins.





Appendix 4

CONTENTS

Heavy (high-density) minerals extracted from gravel samples.

STEWART RIVER PLACER PROJECT

Table 4. *Heavy mineral content (%) — 1996 Samples (SM Sample Suite). See Table 2 for notes and abbreviations.*

Sample number	Sample description	Facies	Sample location	Yield[1]	Gold[2]	Mag	Grnt	Ilm	Py Gth	Str	Kyn	Spn	Rtl	Epd	Zir	Blk Min	Lt Min	Rk Frag
SM9601	Red gravel from gravel ridge		SM96-01	L		Tr[3]	5-10	Tr	5-10	1-2	Tr	1-2	Tr			1-2	70-80	5-10
SM9602	Red gravel from Barker Creek		SM96-03	L		Tr	40-80	Tr		1-2	Tr					2-5	2-5	2-5
SM9604	Gravel from unit 5	5	SM96-06	L-M		Tr	15-30	2-10	2-5	2-5		1-2		1-2	Tr	5-15	10-20	15-25
SM9605	Gravel from unit 7	7	SM96-06	M		Tr	25-45	2-10		1-2	Tr	2-5	Tr	1-2		5-10	5-10	5-10
SM9606	Lower 50 cm of unit 15	15	SM96-06	L		Tr	5-10	5-10								10-20	10-30	50-60
SM9607	From upper half of outwash - unit 16	16	SM96-06	L		2-5	10-30	5-10		Tr			Tr			5-10	20-30	10-20
SM9611	Lowermost outwash gravel - unit 16	16	SM96-06	L		2-5	15-30	5-10		5		2-3	1-2			5-10	20-30	10-20
SM9614	Clayey lowest units - units 2 & 17	2 and 17	SM96-08	H		10-15	45-70	2-5		2-3	5		Tr			2-5	2-5	2-5
SM9615	Rusty unit 3	3	SM96-08	H	1 gr	10-15	45-70	2-5		2-3	5		Tr			2-5	2-5	2-5
SM9616	Pebble gravel - unit 7	7	SM96-08	H	1 gr	Tr	60-80	2-5		2-3	5		Tr			2-5	5-10	5-10
SM9617	Rusty pebble gravel - unit 14	14	SM96-08	H		Tr	60-80	2-5		2-3	5		Tr	1-2		2-5	5-10	5-10
SM9618	Uppermost yellow gravel - unit 15	15	SM96-08	H		Tr	75-90	5-10		1	Tr		Tr			2-5	2-5	2-5
SM9623	Lowermost gravel - unit 1	1	SM96-07	M		Tr	50-80	2-5			2-5					2-5	2-5	5-10
SM9624	Rusty, well sorted, gap-graded gravel - unit 6	6	SM96-07	H		Tr	50-80	2-5			2-5					2-5	2-5	5-10
SM9625	Unit 12	12	SM96-07	M		Tr	50-80	2-5			2-5					2-5	2-5	5-10
SM9626	Gravel at bedrock contact - unit 17	17	SM96-08	H	2 gr	10-20	40-60	20-40								5-10	2-5	5-10
SM9628	Rusty gravel overlying bedrock		SM96-10	H	1 gr	5-10	40-60									5-10	2-5	5-10
SM9630	Colluvium from terrace d/s of Quartz Creek		SM96-11	M		2-5	1-2	1-2	80-90			Tr	Tr			1-2	2-5	5-15
SM9631	Crude gravel from same terrace		SM96-12	M		15-20	Tr	1-2	70-80				Tr-1			5-10	5-10	5-10
SM9632	Gravel on bedrock terrace		SM96-14	H			90-95	2-5				Tr				1-2	1-2	1-2
SM9633	Gravel cap over bedrock		SM96-15	H		Tr	15-25	40-60	Tr			Tr	Tr	5-10		1-2	1-2	1-2
SM9634	Gravel from soil pit	IIBm2	SM96-21	M-H		35-50		20-40							Tr	5-10	5-10	2-5
SM9635	Gravel from terrace	IIBm2	SM96-21	M-L		20-30	2-10	10-25	Tr							50-60	2-5	5-10
SM9636	Gravel from terrace at mouth of Stewart R.	IIC	SM96-22	M-L		20-40	20-30	5-10	15-25				Tr	Tr		2-5	2-5	2-5
SM9638	Gravel from terrace pit	C-gravel	SM96-29	H		2-3	5-15	70-85				1-2		Tr-1		2-5	2-5	2-5
SM9640	Gravel from pit	C-gravel	SM96-27	H	1 gr	60-75	5-20	25-30							1-2	5-10	5-10	5-10
SM9641	Soil pit	BC	SM96-17	L		15-35										2-5	10-20	30-50
SM9642	Cat-push gravel on terrace		SM96-18	M		40-60	5-15	10-25				1-2	Tr		Tr	2-5	5-10	5-10
SM9643	Sandy soil	?	SM96-20	L		65-80	Tr		1						2-10	1-2	1	2-5
SM9645	Soil pit		SM96-33	M		80-90		5-15				Tr-1			Tr-1	1-2	1	2-5
SM9647	Gravel	3	SM96-13a	M-H		15-25	5-10		Tr							5-10	30-50	5-10
SM9650	Gravel	2	SM96-13b	H		15-30		10-30		Tr				Tr		10-20	5-10	10-30
SM9651	Gravel from paleo(?)-Yukon R. terrace	C-gravel	SM96-44	M-L		40-50		30-50	1							2-3	2-5	2-5
SM9652	Gravel from lower Yukon R. terrace	BC-gravel	SM96-45	L		25-35	5-15	15-25		Tr				Tr		5-10	15-25	5-10
SM9654	Outwash gravel		SM96-46	M		25-35	5-10	20-30	Tr		Tr		Tr		1-2	10-20	15-25	10-20
SM9655	Gravel	1	SM96-05	M-H		2-5	25-45	20-40		Tr	1		Tr	Tr	1	5-10	10-25	5-10
SM9656	Upper gravel	5	SM96-05	H		2-5	75-95	2-5							Tr			2-5
SM9657	Lowest gravel	7	SM96-05	H		15-25	35-65	15-25			1		Tr		Tr	5-10	5-10	10-20
SM9658	Gravel from low placer bench		SM96-47	H		50-65	5-10	20-30							1	2-5	5-10	2-5

STEWART RIVER PLACER PROJECT

Table 5. *Heavy mineral content (%) – FP Sample Suite and SJ Sample Suite*

Sample Number	Creek Mouth	Easting	Northing	Yield	Gold	Mag	Grnt	Ilm	Py	Str	Kyn	Spn	Rtl	Epd	Zir	Blk Min	Lt Min	Rk Frag
FP96-01[4]	Baker Cr.	567400	7097500	L		5-15	1-2	1-2	Tr	5-10					Tr		60-80	
FP96-02	Caribou Cr.	565700	7093500	M		40-50	10-20	1-2	Tr	1-2						3-5	5-15	5
FP96-03		564200	7090100	M		30-40	10-20	1-2	Tr			Tr		Tr	Tr	10-20	1-20	15
FP96-04	Ensley Cr.	563200	7086000	M		5-10	30-40	2-5		15-20			1-21		Tr	5-10	5-10	5-10
FP96-05	Jim Cr.	562800	7079500	L-M		Tr	25-40	Tr		2-5						15-25	25-40	5-15
FP96-06	Reindeer Cr.	565300	7065600	M-H		5-10	40-60	2-3		2-5	Tr	1-2	1-2			5-10	15-25	5
FP96-07		563700	7063300	M		10-20	40-70	1-2		1-2			1-2		Tr	2-5	10-30	5
FP96-08		562100	7060900	H		20-30	20-25	2-5	Tr	1-2						<5	10-30	5-10
FP96-09		562500	7056600	H		45-55	25-30	5-10		1-2						10-20	5-10	5
FP96-10		562700	7055300	L		60-80	2-3	5-10							Tr	5-10	5-10	
FP96-11	Lucky Joe Cr.	563500	7050000	H	1 gr.	60-70	25-35	5-10		Tr					Tr	2-5	2-5	
FP96-12		564800	7044500	H		70-80	10-20	2-5							Tr	1-2	1-2	
FP96-13	Rosebute Cr.	565100	7042300	M-H		65-70	10-20									1-2	1-2	
SJ96-01		564800	7095200	H		50-65	2-5	5-20	1	Tr					Tr	1-3	1-3	1
SJ96-03	Garner Cr.	562000	7088500	H		10-25	15	70-90	Tr						Tr			
SJ96-04		562000	7080700	H		55-70	5-15	20-40	Tr						Tr			
SJ96-05	Galena Cr.	560700	7074300	H		15-35	1-3	30-60										
SJ96-06		561600	7070800	M		15-25	5-10	20-40										
SJ96-07		563500	7065800	M		2-10	2-10	5-15								5-10	5-10	40-60
SJ96-08		560800	7062400	H		10-15	50-60		2-10				Tr	Tr	Tr	5-10	5-10	5-10
SJ96-10		561700	7054100	H		30-50	2-5	10-30							Tr	2-5	5-10	5-20
SJ96-11		562200	7053100	H		40-60	5-15	15-30							Tr	5-10	5-10	15-10

[1]Yield of heavy minerals (estimate only): High (H) = 200 milligrams or greater, Medium (M) = 50 to 200 milligrams, Low (L) = less than 50 milligrams recovery.
[2]Gold: The column shows the total number of individual gold grains counted in each sample.
[3]Tr indicates trace amounts.
[4]Sample FP96-01 contains trace galena cleavage fragments.

Mag: ..... Magnetite
Grnt: ..... Garnet
Rtl: ..... Rutile
Str: ..... Starolite
Kyn: ..... Kyanite
Spn: ..... Sphene
Rk Frag: .. Rock fragments
Zir: ..... Zircon
Blk Min: .... Black or dark mineral grains, unidentified
Lt Min: ..... Light mineral grains, unidentified
Py/Gth: .... Pyrite and/or Goethite
Ilm: ..... Ilmenite
Epd: ..... Epidote

Canada

YUKON GEOLOGY PROGRAM

Yukon Government

141° 00'
64° 00'
138° 00'
63° 00'

115 O/13 Garner Creek

115 N/9 Matson Creek

115 O/12 Ogilvie

STEWART RIVER
YUKON TERRITORY
115 N/O
Scale 1:250,000

5 0 5 10 15 20 25

Contour Interval 500 feet
NAD 1927, UTM zone 7

Field sites and Mineral Occurrences

- Field study site
- Heavy Mineral Sample site
- Hardrock Mineral Occurrence
- Powerline

Mineral occurrences: Yukon Minfile, 1994, DIAND

Topographic base produced by
SURVEYS AND MAPPING BRANCH
Department of Natural Resources, Canada

Figure 2. Stewart River Placer Project compilation map.

This map accompanies Open File 1998-1: Morison, S.R., Mougeot, C. and Walton, L., 1998. Surficial geology and sedimentology of Garner, Ogilvie and Matson Creek map areas, western Yukon Territory (115 O/13, 115 O/12 and 115 N/9- east half), Explortation and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, 87p.