Wahto

UNITED STATES GOVERNMENT

memorandum

Alaska Area Native Health Service
Box 7-741, Anchorage, Alaska 99510

DATE: November 18, 1981

REPLY TO ATTN OF: A-EHB

SUBJECT: Chefornak Village Subsurface Exploration

TO: Director, EHB

THRU: Chief, SFS

OBJECTIVE:

The Chefornak village subsurface exploration was completed October 8, 1981, and accomplished by Mr. Dave Wahto.

FINDINGS AND ACCOMPLISHMENTS:

The purpose of the trip was to determine the suitability of the area for a washeteria to be added to the existing pumphouse and the addition of a storage garage. Two borings were done near the existing pumphouse and two holes punched in the approximate location of the proposed garage. The location of all four test holes are shown on the attached site maps and the boring logs are also attached.

All holes were drilled down with a three inch split spoon and a 140 pound hammer. The borings had depths of ten feet 11-inches, 11 feet, eight feet six inches, and ten feet six inches for Holes 1, 2, 3, and 4 respectively.

RECOMMENDATIONS AND/OR CONCLUSIONS:

The site near the pumphouse shows a high organic top layer to approximately five feet with moistures greater than 50 percent. A black carbonaceous silt interbedded with sand layers continues down to approximately 11 feet with moistures around 50 percent. No frozen ground or permafrost was detected throughout the sampling. At approximately 11 feet in both borings, rock was found. Though the rock could not be driven through to determine the thickness, adequate bedrock can be assumed for a solid foundation base. Rock outcroppings around this area show the rock to be an igneous volcanic material, probably an intrusive formation with low permeabilities like gabbro.

Piles should be driven down to bedrock to support the proposed washeteria. The rock surface can be assumed stable enough to support the full weight to be placed upon it. The top five feet of organic should be assumed too unstable to support any of the weight.

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10
(REV. 7-76)
GSA FPMR (41 CFR) 101-11.6
5010-112

The garage site's two borings vary greatly from the washeteria's log. Permafrost starts at two feet of depth with a silty organic layer covering the frozen ground. A gray to brown silt continues down to at least 11 feet. Ice wedges and ice lenses are dominate throughout the entire depth, but seem to decrease below about seven feet. The top organic mat has a very high moisture content.

For a heavy weighted structure in this area, deeper borings should be planned and piles installed. Since only a garage is proposed, mud sills can be used. If gravel exists, a gravel pad under the structure would greatly improve its stability. The garage should be an unheated building if possible since the active layer is only two feet deep and large amounts of ice exists beneath the ground surface. If a choice exists, the plot south of the road (test Hole #4) seems to be a better site for the building, than does the north side (test Hole #3). For design of the mud sills, a bearing capacity calculation sheet is attached.

Timothy McLaughlin, P.E.
Sr. Asst. Engineer Officer
Soils Engineer

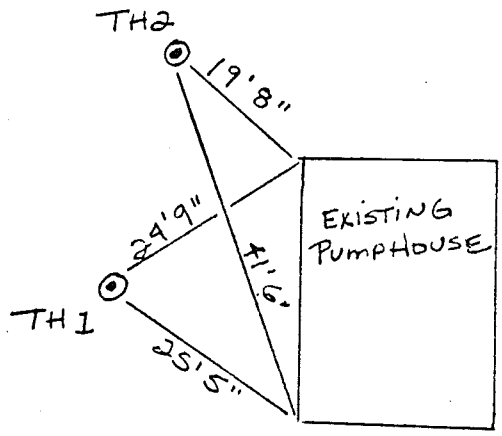
ad

Attachment

cc: Reid Bond
John Hamilton
John DeLapp
Dave Wahto

Trim

CHEFORNAK SITE PLAN



NOTE:
NOT TO SCALE

RIVER

N

BIA SCHOOL

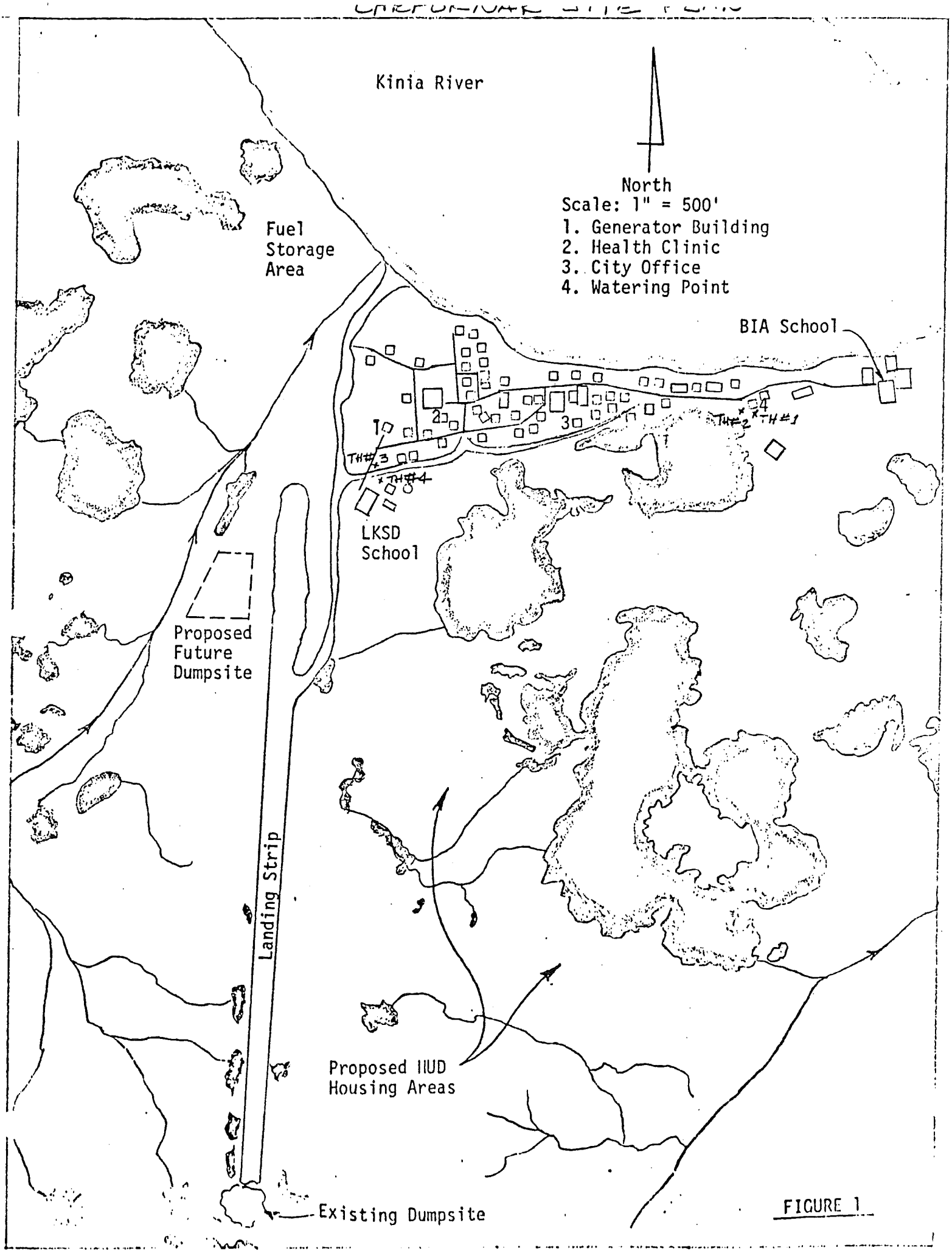

Kinia River
North
Scale: 1" = 500'
1. Generator Building
2. Health Clinic
3. City Office
4. Watering Point
Fuel Storage Area
BIA School
LKSD School
Proposed Future Dumpsite
Landing Strip
Proposed HUD Housing Areas
Existing Dumpsite

FIGURE 1

CHEFORNAK VILLAGE

TEST HOLE # 1

10/29/81
TAM

10/7/81 TUNDRA

6" HEAVY GRASS MAT

HEAVY ORGANICS WITH A TRACE OF SILT

2'

SILTY ORGANIC MATERIAL

5'

1"-2" INTERBEDDED SILT AND SAND LAYER

SILTY ORGANIC MATERIAL

6'

BLACK CARBONACEOUS SILT MOISTURE > 50%

LAB RESULTS, W = 43.7%

ROCK AT 10'11". COULD NOT RETAIN SAMPLE OR DRIVE BEYOND WITH 3" SPLIT SPOON.

LAB RESULTS, W = 42.9%

10'11"

BOTTOM OF HOLE

WATER TABLE NOT ENCOUNTED

Tam

CHEFORNAK VILLAGE
TEST HOLE #2

10/7/81 HEAVY GRASS MAT

XX XXX

ORGANICS WITH A TRACE OF SILT

2'

SILTY ORGANICS

LAB RESULTS, ω = 56.4%

5'

BLACK CARBONACEOUS SILT MOISTURE > 50%

LAB RESULTS, ω = 50.4%

LAB RESULTS, ω = 44.2%

11'

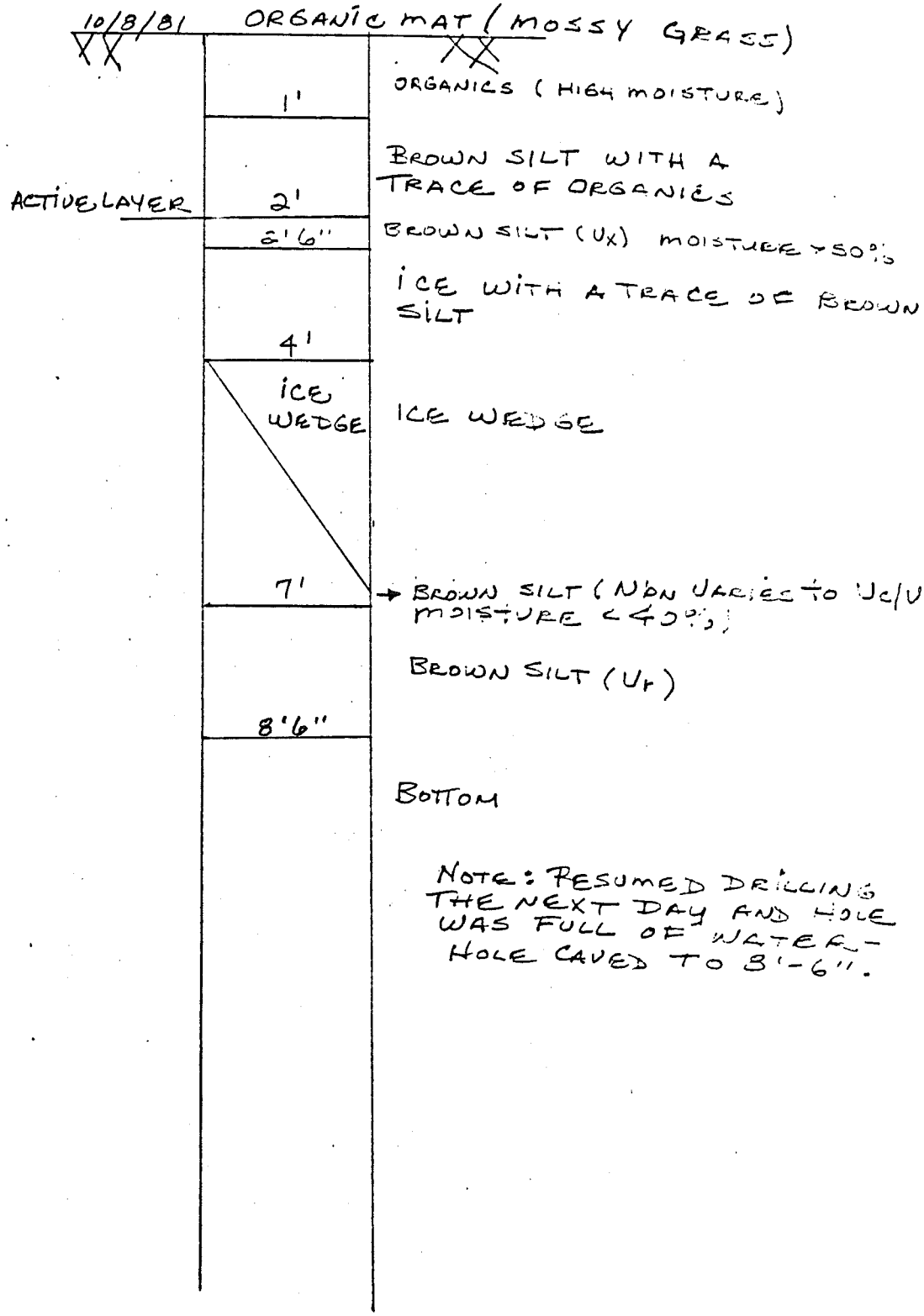
ROCK AT 11'

BOTTOM OF HOLE

WATER TABLE NOT ENCOUNTERED

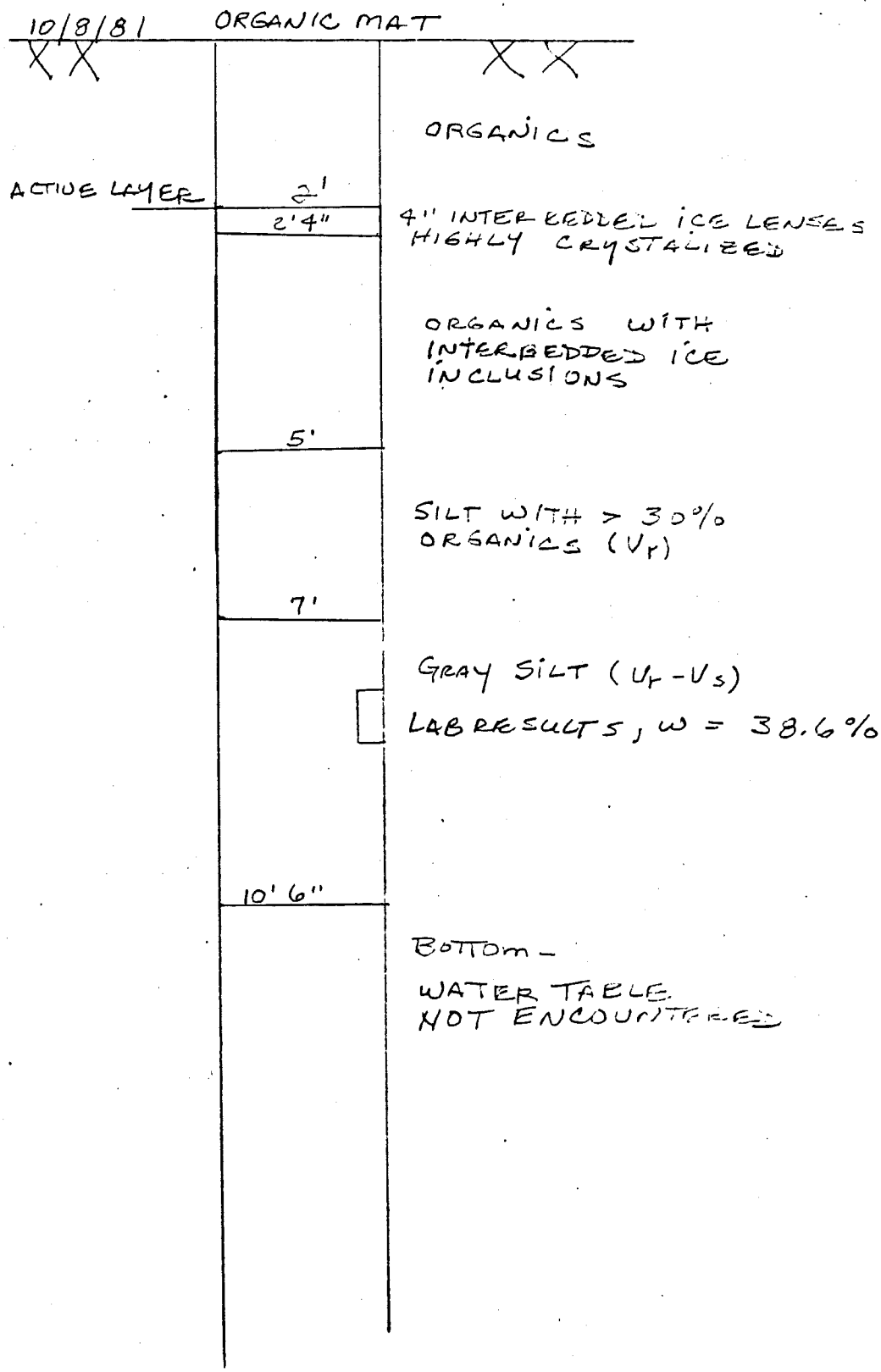
TAM

CHEFORNAK PROPOSED GARAGE SITE - TH #3



NOTE: RESUMED DRILLING THE NEXT DAY AND HOLE WAS FULL OF WATER - HOLE CAVED TO 8'-6".

CHEFORNAK PROPOSED
GARAGE SITE - TH #4



PROJECT NO. 151017
CLIENT: US PHS/ANH
PROJECT NAME CHEFORNAK

R & M CONSULTANTS, INC.

SUMMARY OF LABORATORY TEST DATA

DATE 11-6-81

PARTY NO. _____ PAGE NO. _____

LAB NO.	BORING NO.	SAMPLE NO.	DEPTH	1 1/2"	1"	3/4"	1/2"	3/8"	4	10	40	200	.02	.005	.002	FINE SPG	L.L.	P.I.	WET DENSITY	DRY DENSITY	MOISTURE CONTENT	CLASS
1	1		7.0'-7.5'																		43.7	
1	2		10.0'-10.5'																		42.9	
2	1		4.5'-5'		100	93	80	75	69	64	56	46.2									56.4	
2	2		6.5'-7'																		50.4	
2	3		8.5'-9					SM													44.2	
								SILTY SAND														
1	1		8.5'-10																		38.6	

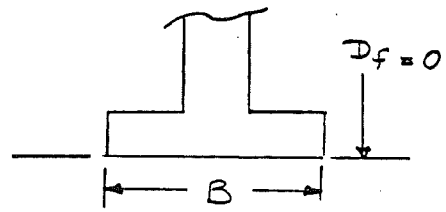
MARKS: _____

NOTE: SIEVE ANALYSIS = PERCENT PASSING

Liza R Sims
APPROVED

CHEFORNAK VILLAGE GARAGE

11/9/51
TAM



$q_d = \gamma D_f N_q + c N_c + \frac{1}{2} \gamma B N_\gamma$

ASSUME NO COHESION (NO CLAY) AND THE STRUCTURE ON TOP OF THE GROUND : $c = 0$, $D_f = 0$

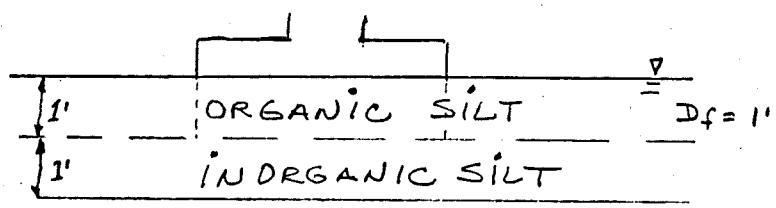
$q_d = \frac{1}{2} \gamma B N_\gamma$: ASSUME $\phi_s = 27°$ (SILT)

$\phi_o = 15°$ (ORGANIC

$N_{\gamma_s} = 9$

$N_{\gamma_o} = .5$

FOR WORSE CASE, ASSUME BOTH THE FOOT OF ORGANIC AND INORGANIC SILT TO BE SATURATED IN WATER.



ASSUME $\gamma = 98$ lb/cf (ORGANIC)

$\gamma = 135$ lb/cf (SILT)

$\gamma' = \gamma - \gamma_w$

$\gamma' = 36$ lb/cf (ORGANIC)

$\gamma' = 73$ lb/cf (SILT)

$q_d = \frac{1}{2}(36)\, B\, (.5) = \underline{\underline{9B}}$ (IF NO EXCAVATION IS DONE) IN lb/sf

11/9/81
TAM

IF THE MUD SILL PUSHES DOWN THE FIRST FOOT OF ORGANICS TO THE INORGANIC SILT LAYER THEN: $D_f = 1'$

$$q_d = 73(1)(12) + \tfrac{1}{2}(73)(9)\,B$$

$$q_d = \underline{\underline{876 + 329\,B}} \quad [lb/sf]$$