SUBSURFACE SOIL INVESTIGATION
PROPOSED LAKESIDE HOTEL
HOMER, ALASKA

For

Neal & Company Construction
P.O. Box 393
Homer, Alaska 99603

By

R & M CONSULTANTS, INC.
Anchorage, Alaska

October 6, 1977

October 6, 1977 R&M No. 752169

Mr. Tony Neal
Neal & Company Construction
P.O. Box 393
Homer, Alaska 99603

Re: Subsurface Soil Investigation, Proposed Lakeside Hotel, Homer, Alaska.

Dear Mr. Neal:

We are submitting herewith three copies of our report on the subsurface soils investigation performed for the subject project. The work has been performed in accordance with your request of August 26, 1977. The information presented herein reflects our interpretation of your exploration requirements for this project site.

Should you have any questions with regard to our investigation or this report, please contact us at your earliest convenience.

Very truly yours,

R & M CONSULTANTS, INC.

James W. Rooney
Vice President

JWR/rds

Table of Contents

SUBSURFACE SOIL INVESTIGATION

PROPOSED LAKESIDE HOTEL

HOMER, ALASKA

I. Introduction

The subsurface soil investigation for the proposed Lakeside Hotel which is to be constructed just east of Ben Walters Avenue and north of Beluga Lake in Homer, Alaska has been completed. This study of site and subsurface soil conditions was performed in accordance with instructions from Mr. Bob Brant of Neal & Company on August 26, 1977. On site boring and sampling operations were conducted between August 27 and 31, 1977, under the supervision of R & M Consultants, Inc.

It is our understanding that the proposed structure will be a four story hotel/apartment building. Other property improvements would include driveways and a parking area. Moderate foundation loads are anticipated. Base on the proposed final grade elevation, a cut and fill condition and a retaining wall is anticipated. The approximate location of the proposed structure is shown on the Location Diagram, Drawing A-01.

The purpose of this report is to:

1. Present the apparent subsurface soil and groundwater conditions encountered at the site utilizing field and laboratory data.

2. Present recommendations regarding foundation design, utility installations, pavement and construction considerations.

II. Regional Setting and Site Conditions

The site is located just north of Beluga Lake and east of Lake Street in Homer, Alaska. Ground elevation contours obtained from a preliminary site plan provided by Mr. James Allen, the structural engineer for this project, show the area gently sloping from the north to the south. Localized high spots and depressions exist throughout the terrain. The present topography of the proposed site is felt to have resulted from erosion and redeposition of an uplifted marine deposit. Vegetation on the site consisted of tall spruce and birch. Willow and alder brush were also present.

This site lies in Seismic Zone 4 as defined by the Uniform Building Code. At this time, no analysis of soil-structure response to seismic loading has been performed.

III. Field Investigation

Seven test holes, Test Holes 1 through 7, were drilled on the subject site at the approximate locations shown on the Location Diagram, Drawing A-01. The position of the test holes was determined with a cloth tape by the field geologist and Mr. Brant, at the time of drilling. To date, the test holes have not been tied horizontally or vertically to an existing survey monument. As agreed upon with Mr. Brant, Neal & Company will accomplish this at a future date. The test holes were drilled to depths ranging from 30.5 to 50.5 feet beneath the existing ground surface. Individual boring depths are presented in Table I and on the Test Hole Logs, Drawings B-03 through B-08.

Soil boring and sampling operations were performed with a track mounted CME-55 rotary type hydraulic drilling unit. The test holes were advanced using continuous flight, 8-inch O.D., hollow-stem augers; representative samples were obtained from the returns off the auger flights and by means of a split-spoon sampling procedure conducted in accordance with ASTM Specification D-1586-64T. For this latter procedure, a split-spoon sampler (1.4 inch I.D.) is driven into undisturbed natural soil with a 140-pound drop-hammer having a 30-inch free fall. The penetration resistance (as measured by the blow count) for this sampling technique gives an indication of the relative density of the in situ, unfrozen soil. The blow count values obtained are shown on the test hole drawings. In addition, undisturbed representative samples were obtained by means of a thin-walled tube sampling procedure conducted in accordance with ASTM Specification D-1587-67. After visual classifications in the field, all soil samples were returned to the R&M laboratory for further examination and testing.

IV. Laboratory testing

A laboratory testing program was initiated for the purpose of evaluating general site soil index properties. Laboratory determination of water content, organic content, soil particle grain size distribution, and

Atterberg Limits was performed in accordance with current ASTM Specifications. The information obtained from these tests was used to aid in the determination and prediction of foundation behavior at the site. Results of the laboratory testing program are presented on Drawings C-01 and C-02.

V. Subsurface Soil Conditions

The subsurface soil profile encountered was stratified and heterogeneous. In general, brown organic sandy silt (top soil) was found to overlie gray and brown silty sand. Beneath the silty sand, a silty clayey soil which contained varying percentages of sand and gravel was encountered to the bottom of the test borings. Attention is directed to the individual boring logs for a detailed representation of the soil profiles encountered. Table I presents a summary of the depth and thickness of the three major soil strata.

The surficial organic material had a minimum thickness of 1.5 feet in Test Holes 1, 3, and 5 and a maximum thickness of 2.5 feet in Test Hole 4. Varying percentages of sand and silt were also present in the top soil layer. The brown and gray sandy silty soils which were encountered directly beneath the surficial material extended to a minimum depth of 7 feet in Test Hole 4 and a maximum depth of 19 feet in Test Hole 3. Generally, these soils were very moist or wet and medium dense. Overconsolidated, moderately plastic gray clayey soil which contained varying amounts of silt and sand was next encountered and existed to the bottom of all the test borings. Occasional layers of silty sand were detected within this strata. In addition, thin seams or fragments of coal were encountered throughout this strata in all the test borings.

TABLE 1

DEPTH AND THICKNESS OF THE PRIMARY

SUBSURFACE SOILS*

Strata	Surficial Organic Material		Predominently Silty Sandy Soil		Predominently Clayey Soil	
Test Hole	Depth	Thickness	Depth	Thickness	Depth	Thickness
1	0-1.5	1.5	1.5-8.0	6.5	8-30.5**	22.5
2	0-2.0	2.0	2.0-12.5	10.5	12.5-40.5**	28.0
3	0-1.5	1.5	1.5-19.0	17.5	19.0-30.5**	11.5
4	0-2.5	2.5	2.5-7.0	4.5	7.0-31.3**	14.8
5	0-2.0	2.0	2.0-16.5	14.5	16.5-50.5**	34.0
6	0-1.5	1.5	1.5-8.5	7.0	8.5-31.0**	22.5
7	0-2.0	2.0				

*All measurements are in feet

**Total depth of boring

VI. Groundwater Conditions

With the exception of Test Hole 7, groundwater was observed during drilling operations in each test boring. The depths at which groundwater was first observed are shown on the test boring logs and summarized in Table II. In some test holes, groundwater was observed at more than one depth. The boring logs indicate all depths at which groundwater was observed.

TABLE II

DEPTH TO GROUNDWATER

Test Hole	Depth to First Encounter of Groundwater While Drilling (ft)
1	3.5
2	4.5
3	4.5
4	4.5
5	4.5
6	22.0
7	None

We feel that the near surface groundwater conditions encountered represent a perched water condition and not a long term hydrostatic water table. Thus, future near surface groundwater conditions at the site should be expected to fluctuate in depth and areal extent as a result of natural variations in hydrologic conditions and alteration of local hydrology due to site development. In addition to these factors, we expect the deep subsurface groundwater conditions encountered during drilling to be somewhat influenced by the existing water level of Beluga Lake. A discussion of possible construction and post-construction groundwater problems is presented in Section VII-E.

VII. Conclusions and Recommendations

Presented in the following paragraphs is a discussion regarding site development, geotechnical design parameters, interpretation of foundation requirements, and comments relating to construction procedures for the four story hotel planned to be built on this Site. We understand construction work on the proposed building is planned to commence next spring. The approximate location of the proposed building is shown on Drawing A-01.

A. Foundation Analysis

Preliminary design drawings prepared by Cole & Thompson, Architects and provided by Mr. James Allen, Structural Engineer, show that a cut and fill condition will exist beneath the proposed structure. In addition, a retaining wall for one side of the bottom floor will be employed. Existing and proposed final grade of the structure are shown on Drawing A-02. Based on the subsurface soil conditions encountered during drilling, we feel that a conventional shallow foundation system, employing bearing walls, spread footings and a slab on grade can be utilized to provide foundation support for the proposed building. We assume that the structure will remain heated and provide conductive heat to the foundation during winter months.

Per local building codes, all exterior footings should be placed a minimum of 3.5 feet below final exterior grade. If desired, rigid insulation, when properly placed, can be used to insure that seasonal frost penetration is minimized. Interior footings should be placed a minimum of 24 inches below final interior grade in order to utilize the soil bearing capacity recommended in this report. The recommended soil bearing pressure is based on the assumption that all footings and the slab-on-grade bear on undistrubed natural soil or on compacted fill material placed in accordance with overexcavation and backfill requirements presented in Section VII-C.

For footings placed on the undisturbed natural sandy silty soils or properly compacted fill material which in turns bears on the underlying sandy silty soil, a total load soil bearing pressure of 3000 psf can be utilized in design provided the accompanying recommendations outlined in this report are followed. If this soil bearing pressure and the other recommendations presented herein are employed, total settlement should not exceed one inch. Differential settlement could equal approximately 3/4 of the total amount.

B. Foundation Walls and Retaining Structures (Lateral Earth Pressures)

For design purposes at this site, the following "ultimate" lateral earth pressures (LEP) are considered appropriate for nonyielding foundation walls backfilled with NFS granular material:

1. Active earth pressures resulting from an equivalent fluid pressure (EFP) of 60 pcf.
2. The <u>more critical of either</u>: a) A hydrostatic water pressure increment of 27 pfc;

   -or-

   b) A seismic pressure distribution, which may be assumed for design to vary linearly from zero at the base of the footing to a maximum at the ground surface equal to 40 pcf times the height of the wall in feet (Ha).
3. Passive earth pressures resulting from an EFP of 150 pcf.
4. Uniform surcharge pressures equal to 0.45 times the design maximum areal surcharge anticipated to occure in the area immediately adjacent to the retaining walls.
5. Appropriate pressure distributions accounting for any significant point loads anticipated to occur near the retaining wall, which will be in addition to design surcharges.

For design purposes, the LEP force resultant can be considered to act at the following heights above the bottom of the wall footing: seismic force resultant acts at 0.67 Ha; active and hydrostatic force resultant acts at Ha/3; surcharge force resultant acts at Ha/2; and passive force resultant acts at Hp/3 above the bottom of the footings.

For cantilevered walls, all forces should be considered to act horizontally. Except for lateral pressures due to a point load, all pressure distributions and resultant forces are shown on Drawing-A02.

Walls need not ordinarily be designed for the simultaneous occurrence of all five factors above. For example, it is extremely unlikely that items (1), (2), (4), and (5) would ever occur simultaneously. Therefore, an appropriate combination of values might constitute the final design pressure values.

Retaining walls not acting as foundation walls, not designed for hydrostatic pressures, and which are free to deflect and yield, can be designed for the following ultimate values:

1. An active EFP of 40 pcf.
2. A passive EFP of 350 pcf.
3. A surcharge pressure coefficient of 0.30 instead of 0.45.
4. A "seismic EFP" of 20 pcf instead of 40 pcf.

Point load pressures would be the same for non-deflecting walls. All other comments and recommendations presented herein pertain to both deflecting and nondeflecting retaining walls.

To prevent unwanted, excessive wall movement, "overcompaction" of backfill behind retaining walls should be avoided. Only light compaction equipment should be used immediately behind retaining walls.

The above LEP values are predicated on the existence of an NFS backfill extending behind both the interior and exterior of retaining walls and foundation walls a minimum distance of 30 inches, or the distance between the wall and an imaginary plane inclined at 30° from the vertical emanating from the lower edge of footing to the ground surface, whichever is greater (see Drawing A-02). These dimensions are expected to reduce potential frost pressure effects against retaining walls to a negligible value.

C. Excavation and Backfill Recommendations

It should be emphasized that no protions of the foundation system or fill supporting foundation components should bear on loose or disturbed soil or soil containing organic material (peat, debris, or any other type of deleterious material). When any of the above mentioned types of soil are encountered, excavation should continue to a depth until undisturbed competent bearing soil is reached. The excavated area should then be backfilled according to the recommendations contained in the following paragraphs.

To assure adequate bearing support and minimize differential settlement, excavation within the area of the proposed building will probably be necessary to an average depth of 2.5 feet beneath the existing groundsurface in order to remove the surficial organic material and underlying soft sandy silty soil. The approximate minimum depths of excavation below the ground surface anticipated at each test hole are listed in Table III.

TABLE III

APPROXIMATE MINIMUM DEPTH OF EXCAVATION

BELOW THE EXISTING GROUND SURFACE FOR FOOTINGS

AND THE SLAB-ON-GRADE

Test Hole	Footings And Slab-On-Grade (ft)
1	3.5
2	4.5
3	1.5
4	2.5
5	2.0
6	1.5
7	2.0

The minimum excavation depths listed in Table III represent an interpretation of soil conditions at the test boring locations. Although indicative of the actual excavation depths which will be required for foundation construction, limited deviation from these values can be expected to occur at other locations within the project site. Exact excavation depths necessary to remove the undesireable material beneath the proposed building should be verified by a qualified geotechnical engineer during excavation operations.

Wherever an overexcavation and backfill technique is utilized for foundation footings, backfill should extend from the footings to the underlying natural competent soil bearing surface at a projected minimum slope of 1:2 (horizontal to vertical). All backfill placed below footings should be nonfrost susceptible, well graded sands and gravels which are free of organic material and debris and placed in lifts thin enough to acquire compaction to a minimum of 95 percent maximum density as determined in accordance with either ASTM Specification D-1157-70 or by the Corps of Engineers Providence Vibratory Method.

D. Pavement Consideration

Pavement design requirements are highly dependent upon the desired level of pavement structural and surface performance. We understand that a gravel roadway and parking area without a bituminous surface is initially planned for the subject site. The location and final grade elevations of the parking and roadway areas are not known at this time. Cutting of the existing slope should be anticipated if these areas are to be located north of the proposed structure. Roadway and parking areas located south of the structure will probably require the placement of fill material. In all cases, optimum pavement performance would best be obtained by removing all the surficial vegetation and organic material, debris and rubble from the planned soil subgrade area. To insure adequate bearing support for these areas, excavation of the soft brown very moist sandy silt soil which was encountered just below the surficial organic material is also recommended prior to placement of the sub-base material.

A free draining sub-base course should be provided for all exterior pavements. This sub-base coarse should consist of nonfrost susceptible granular material having a minimum thickness of 30 inches in the parking area and 36 inches in the main roadway areas. This material should be placed in lifts thin enough to allow compaction to a minimum of 95% maximum density as determined in accordance with either ASTM Specification D-1557-70 or the Corps of Engineers Providence Vibratory Method.

If economic considerations prevent complete removal of the soft brown sandy silty soils, we would then anticipate some localized settlement of the fill material due to consolidation of the soft underlying soil. Some movement of the fill material into the soft soils should also be expected. The placement of large quantities of fill material to regrade the road would likely initiate additional consolidation of the soft underlying soil.

In all cases, because of the frost susceptible nature of the Sub-grade soils, frost heave should be considered as probable. Consequently, annual maintenance of the roadway and parking areas is anticipated. Periodic regrading and placement of fill may be required during the first year following construction.

The quantity of surface water able to infiltrate pavement surfaces could be minimized by providing pavement grades that will ensure positive drainage. Use of chip sealing or ultimately an asphalt pavement surface course would also serve to reduce water infiltration.

E. Utilities

We anticipate that water distribution and sewage collection systems will be connected to available public service lines. As long as standard design and construction techniques are employed, such as proper bedding, sufficient depth of embedment to prevent freezing, etc. no unusual problems are foreseen. All sewer and water lines should be constructed in accordance with applicable codes. All backfill and compaction efforts for all trenches placed within the building limits and parking and roadway areas should follow those procedures previously outlined in Section VII-C.

F. Groundwater Considerations

Major construction difficulties relating to normal seasonal variation in groundwater movement and seepage into excavation during utility installation and foundation construction work are not anticipated. Conventional dewatering practices such as ditches, sumps and possibly pumping should be adequate for removal of groundwater during excavation procedures.

Post construction groundwater problems should not occur as long as:

1. All below-grade portions of the building are properly water and moisture proofed by using appropriate methods.
2. Surface grading is accomplished in a manner which will positively divert surface water runoff away from the structure.
3. Control of concentrated runoff is provided; for example from roof surfaces.

To reduce the possibility of post construction groundwater problems behind the retaining wall, we recommend the use of a perimeter subdrain.

G. Construction Considerations

Proper construction control should be exercised to assure that the natural soil surfaces upon which the fill material will rest are not disturbed during construction. Distrubance of the sandy and silty soil would be evidenced by a general loosening or structural alteration of the soil relative to its strength and structural character prior to construction.

Disturbance of this soil may require its removal; if so, the excavation should be properly backfilled and compacted as specified above.

Also, we recommend that all exterior slabs and pavements be separated from the structure using conventional expansion joint material. To further minimize the effect of potential frost heave and loss of subgrade support, we recommend the placement of a minimum of 2 feet of NFS material beneath all exterior slabs. If desired, rigid insulation, when properly placed could be used to further minimize seasonal frost penetration and potential frost heave effects. Particular care should be taken at door openings where greater heat loss may amplify such potential frost heave effects.

We also emphasize that seasonal frost may be found to a depth of 2 to 4 feet below the ground surface if construction is begun in the spring. Any frozen material existing within the building area should be removed during excavation operations; any overexcavation should be properly backfilled as specified above. Removal of frozen material is necessary to preclude possible consolidation resulting from subsequent thawing of the material.

VIII. Closure

The engineering recommendations presented in this report have been based on the pertinent design information listed herein. Alteration of this information, particularly the foundation design parameters and construction requirements, could substantially alter the foregoing engineering recommendations. We would, therefore, appreciate having the opportunity to review and evaluate any such design changes and, where necessary, present corresponding changes to our present recommendations. Additionally, because subsurface characteristics can change significantly within a given area, the possibility exists that important subsurface conditions not disclosed by this field investigation may be discovered during construction. Should this situation occur, the influence of the new information on the present recommendation should be evaluated without delay.

Because significant variation in the soil profile and possible variation in groundwater conditions between boring locations could be encountered, it is recommended that a qualified geotechnical engineer inspect the foundation excavations and backfill procedures during construction; this will permit verification that conditions are as anticipated in the design.

We appreciate the opportunity to perform this subsurface investigation. Should you require further information concerning the design and construction, futher laboratory testing, or the review of plans and specifications after they are prepared for the above project, please contact us.

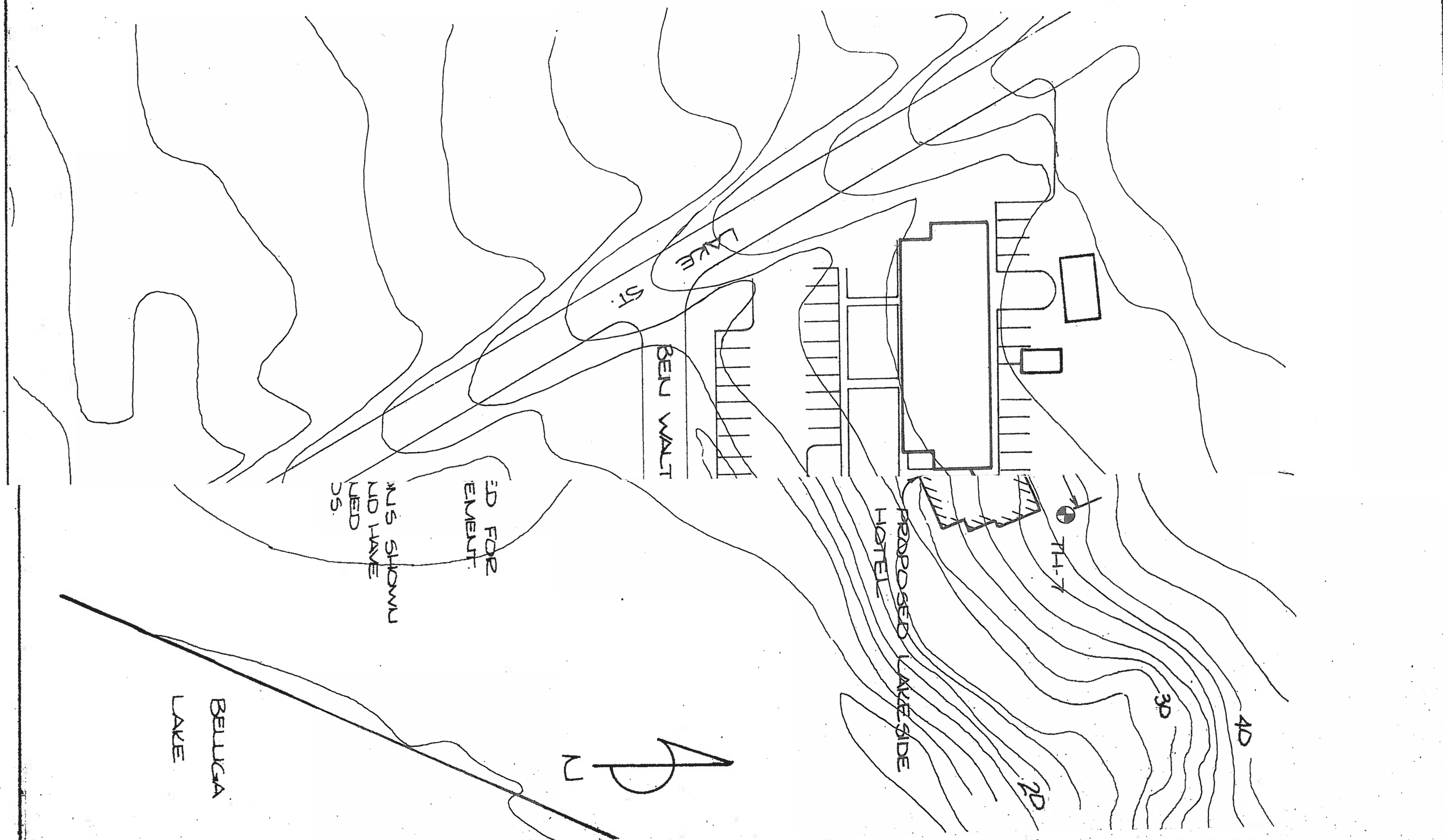
Very truly yours,

R & M CONSULTANTS, INC.

Donald E. Bruggers
Geotechnical Engineer

James W. Rooney
Vice-President

DEB:JWR/rds

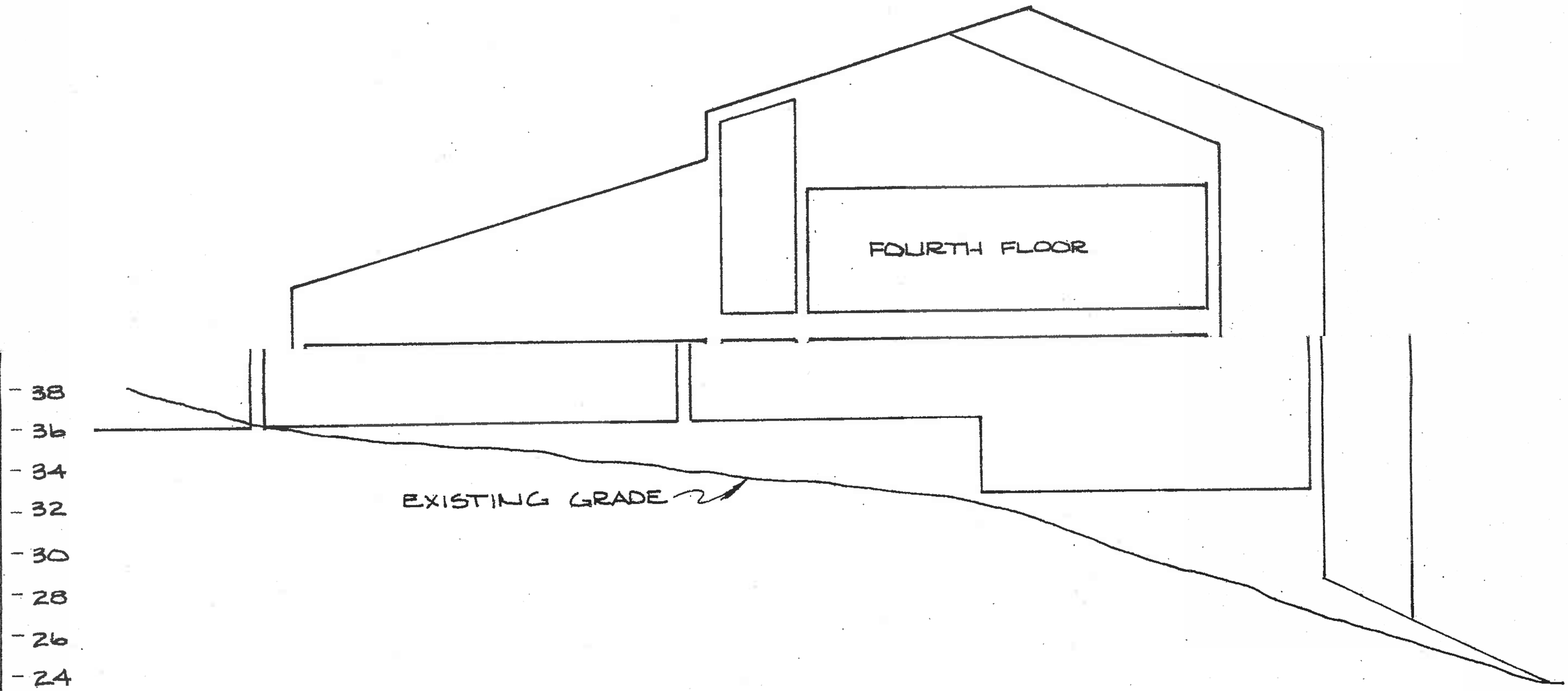


DES:	
CKD	
DWN:	MMR
CKD:	DEB
APPD:	

R&M
R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

LOCATION DIAGRAM
PROPOSED LAKESIDE HOTEL
NEAL & CO. HOMER, ALASKA

DWG NO.	A-01
SCALE:	N.T.S.
DATE:	9/28/77
PROJ. NO.	752169
GRID:	FILE:



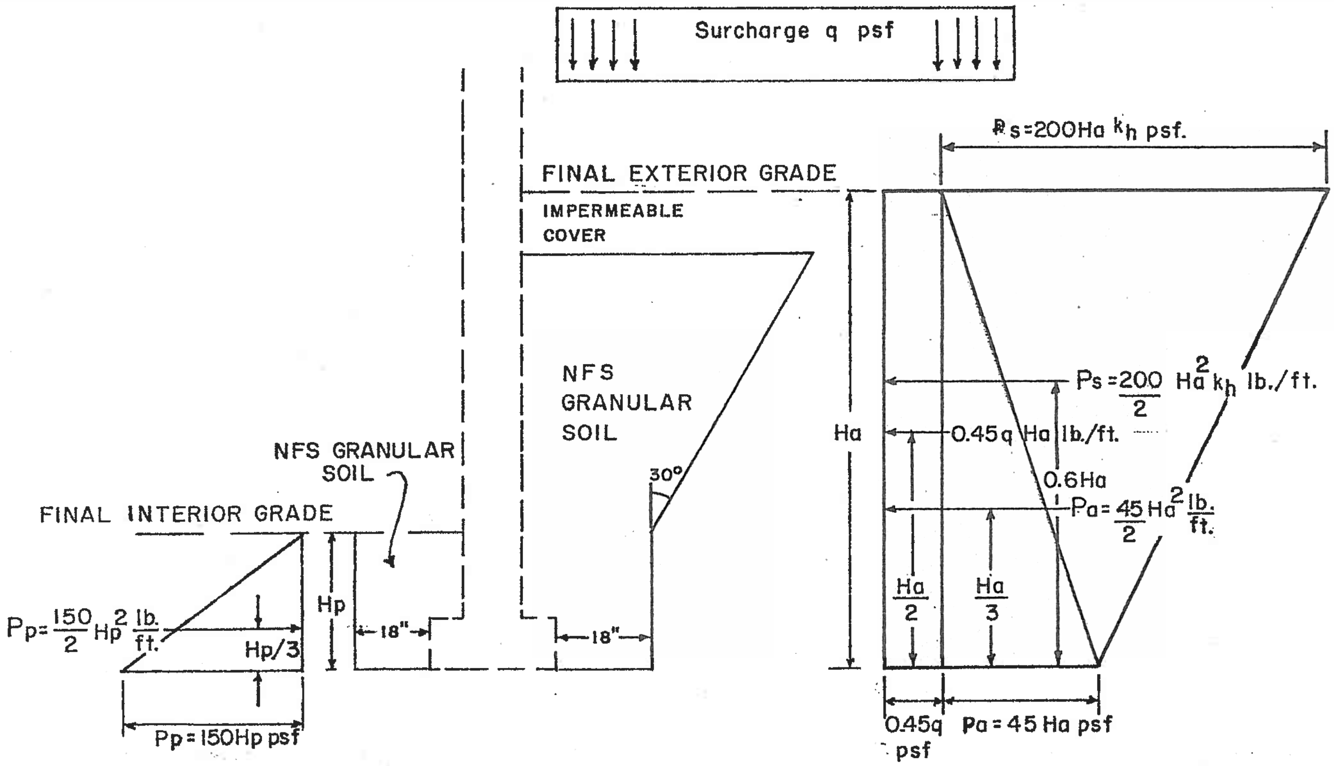
TYPICAL CROSS SECTION OF DINING ROOM AREA
SCALE 1" = 1/32"

DES:	
CKD:	
DWN:	MMR
CKD:	DEB
APPD:	

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TYPICAL CROSS SECTION
PROPOSED LAKESIDE HOTEL
NEAL & CO.
HOMER, ALASKA

DWG. NO. A-02
SCALE: AS SHOWN
DATE: 9/29/77
PROJ. NO. 752169
GRID: FILE:



SYMBOLS

q=Surcharge in psf

P_a=Active Earth Force

P_p=Passive Earth Force

P_s=Active Seismic Earth Force Increment

p_a=Active Earth Pressure

p_p=Passive Earth Pressure

p_s=Active Seismic Earth Pressure Increment

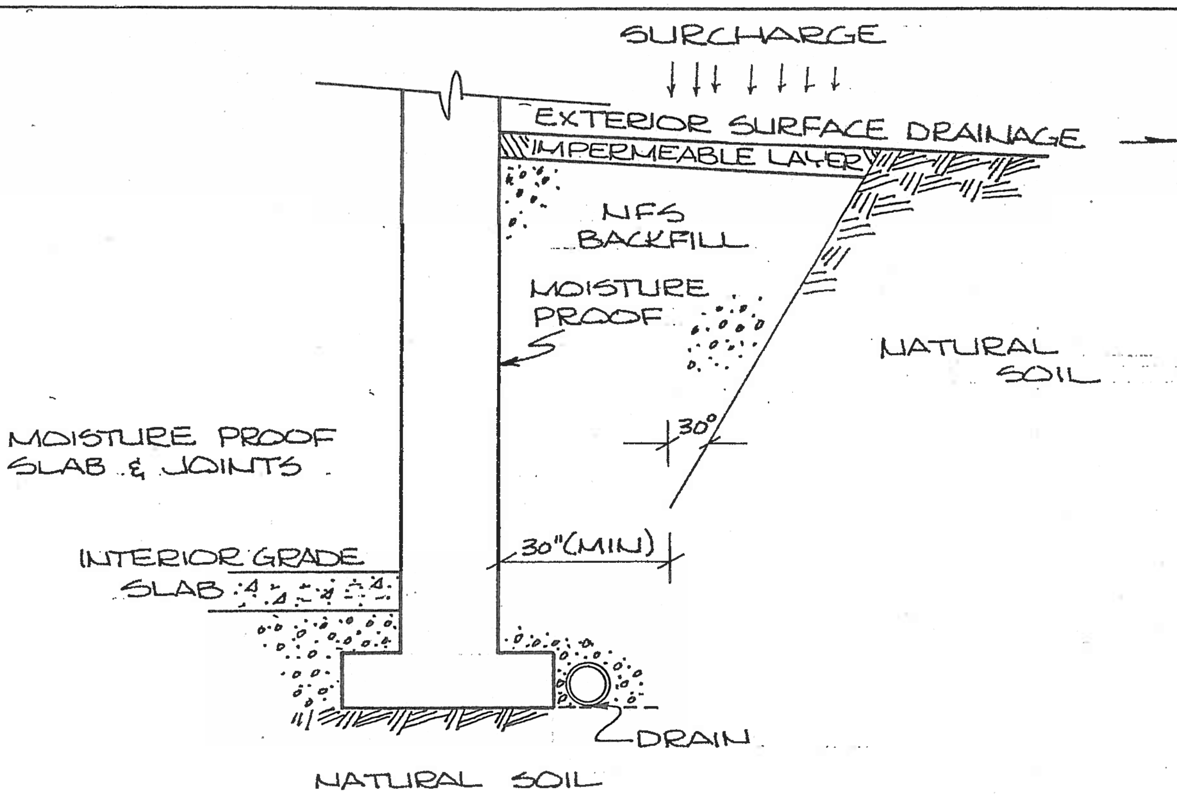
k_h=Maximum Horizontal Ground Acceleration Coefficient of Design Earthquake

ASSUMPTIONS

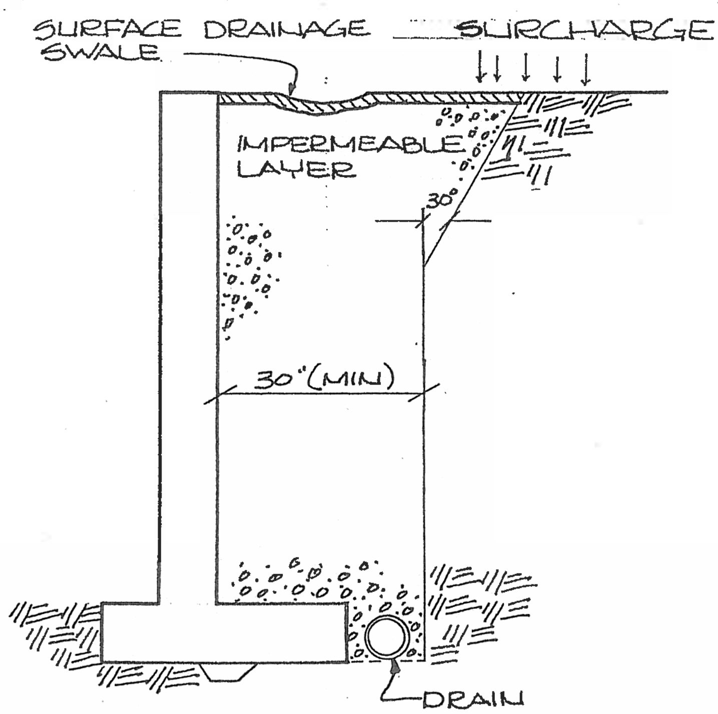
1) Semi-Rigid Perimeter Wall
2) All Backfill Compacted to Minimum 90% Maximum Density, in Accordance with ASTM Spec. 1557-67T.
3) No Hydrostatic Pressure Against Wall.

LATERAL EARTH PRESSURES

R&M Engineering & Geological Consultants Inc.
ANCHORAGE FAIRBANKS ALASKA JUNEAU



SCHEMATIC DIAGRAM FOR NON-YIELDING STRUCTURES (NTS)



SCHEMATIC DIAGRAM FOR DEFLECTING RETAINING STRUCTURES (NTS)

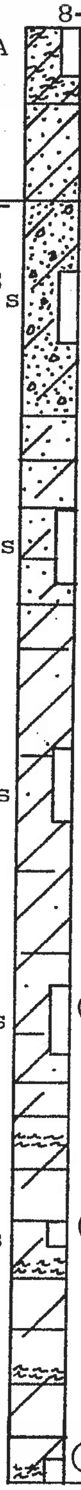
DWN. MMR	
CKD.	
DATE.	
SCALE.	

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

F.B.	
GRID.	
PROJ. NO.	
DWG. NO.	A-03

TH-1
8-27-77

0.0'



A

3.5' WD

① ORGANIC SANDY SILT
Brown, Very Wet, Soft
1.5'

SANDY SILT
Brown, Very Wet, Soft
3.5'

S_S ② 30, 14.6%
SAND W/SOME SILT AND GRAVEL
Brown, Very Wet, Medium Dense
8.0'

CLAY W/SOME SAND AND SILT

S_S ③ 27, 31.2%
Gray, Slightly Moist, Hard
12.0'

CLAYEY SILT W/TRACE SAND
Gray, Slightly Moist, Hard

S_S ④ 32, 20.6%

S_S ⑤ 55, 18.3%
22.0'

SILTY CLAY STRATIFIED W/LAYERS OF COAL

S_S ⑥ R
Gray-Black, Dry, Very Hard

S_S ⑦ R 30, 17.2%
30.5' T.D.

DWN.	VRZ
CKD.	DEB
DATE.	9-26-77

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TEST HOLE LOG
NEAL & COMPANY
PROPOSED LAKESIDE HOTEL

F.B.	
GRID.	
PROJ. NO.	752169

TH-2
8-27-77

0.0'

A

① ORGANIC SANDY SILT
Brown, Very Wet, Soft

2.0'

SILT W/SOME SAND
TRACE GRAVEL
Gray, Wet, Soft

4.5'

4.5' WD

SILTY SAND W/TRACE
GRAVEL

② 37

Brown, Very Wet, Dense

7.5'

SAND W/SOME SILT
Gray, Very Wet, Dense

③ 31,24.6%
Layers of Coal Present
Between 7.5 to 12.5'

12.5

CLAYEY SILT W/SOME
SAND, TRACE GRAVEL

④ 98, 18.7%

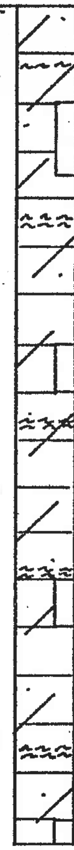
18.5'

SILTY CLAY W/TRACE
SAND
Gray, Slighty Moist, Hard

⑤ 39
Layers of Coal 18.5' to
40.5'

23.0'

23'WD



23'WD

23'Cont'd

SILTY CLAY W/TRACE
SAND AND LAYERS OF COAL

⑥ 37,30.5%
Gray, Black, Moist,
Hard to Very Hard

Coal Layers Appear To
Be Saturated

⑦ R

⑧ R

⑨ R

40.5' T.D.

DWN.	
CKD.	DEB
DATE.	9-27-77
SCALE	1"=4'

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TEST HOLE LOG
NEAL & COMPANY
PROPOSED LAKESIDE HOTEL
HOMER, ALASKA

F.B.	
GRID.	
PROJ.NO.	752169
DWG.NO.	B-04

TH-3
8-29-77

0.0'

A ① ORGANIC SILT W/ SOME SAND Brown, Moist, Soft 1.5'

SANDY GRAVEL W/SOME SILT Brown, Moist, Medium Dense 4.5'

4.5' W.D.

Ss ② 22 SAND W/SOME SILT Gray, Very Wet, Medium Dense to Dense

Ss ③ 22/6" ④ 26/6"*

Pockets Of Coal Between 4.5 and 30.5'

19.0'

Ts ⑤

SILTY CLAY W/SOME SAND, TRACE GRAVEL

Ss ⑥ 37,26.7% Gray, Moist, Hard

Saturated Sand Seam 22' to 23'

22' W.D.

Coal In Sample - 7

Ss ⑦ R**

26.5'

CLAYEY SILT Gray, Slightly Moist, Hard

Ss ⑧ R**15.9%

30.5' T.D.

*Sample Is Predominately Coal

**Refusal on Cobble or Coal

TH-4
8-29-77

0.0'

A ① ORGANIC SILT W/ SOME SAND, Brown Wet, Soft

2.5'

SILTY SAND W/TRACE GRAVEL, SOME COAL Gray, Wet, Medium Dense

4.5' WD

Ss ② 17

7.0

Occasional Cobbles 10 to 13.5'

Ss ③ R, 17.9% SILTY CLAY W/TRACE SAND, TRACE COAL, Gray, Moist, Hard

13.5'

SILTY SAND Gray, Very Wet, Dense

Ss ④ 46,17.2%

17.0'

SILT W/SOME CLAY AND LAYERS OF SANDY SILT Gray, Moist, Hard To Medium Dense

2.5"Ts ⑤ ⑤A

Occasional Layers Of Coal

2.5"Ts ⑥ ⑥A

⑦ 13/6"

Ss ⑧ R*

31.3' T.D.

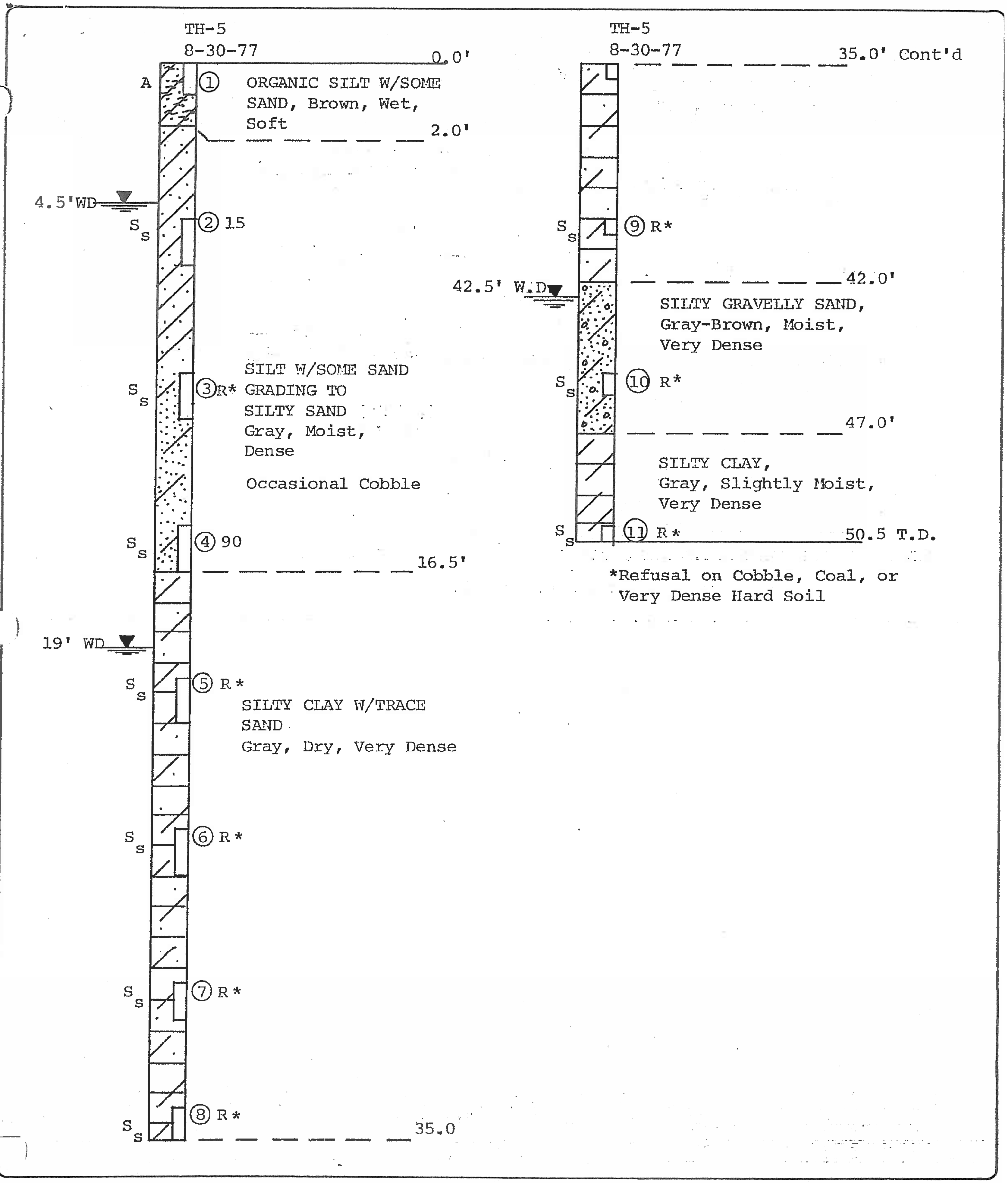
DWN.	VRZ
CKD.	DEB
DATE.	9-27-77

R&M

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TEST HOLE LOG
NEAL & COMPANY
PROPOSED LAKESIDE HOTEL
HOMER, ALASKA

F.B.	
GRID.	
PROJ.NO.	752169
DWG.NO.	B-05



DWN. VRZ CKD. DEB DATE. 9-27-77 SCALE 1"=4'	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	TEST HOLE LOG NEAL & COMPANY PROPOSED LAKESIDE HOTEL HOMER, ALASKA	F.B. GRID. PROJ.NO. 752169

TH-6
8-30-77

0.0'

A ① ORGANIC SILT W/SOME SAND, Brown, Very Moist, Med. Dense

1.5'

SILTY SAND W/SOME GRAVEL, TRACE COAL Brown, Very Moist, Medium Dense

S_s ② 19

8.5'

SILT W/SOME CLAY, TRACE TO SOME SAND, Gray, Slightly Moist Hard

S_s ③ 26

12.0'

SILT W/SOME SAND, TRACE CLAY, TRACE GRAVEL, Gray, Slightly Moist, Hard

S_s ④ 65

17.5'

CLAYEY SILT W/TRACE SAND, Gray, Slightly Moist, Hard,

S_s ⑤ 63

Sand Seam 21.5 To 22.5'

22'W.D.

S_s ⑥ 89

Layers Of Coal 17.5 To 31'

S_s

30'W.D.

⑦ R

31.0' T.D.

DWN.	VRZ
CKD.	DEB
DATE.	9-27-77
SCALE	

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TEST HOLE LOG
NEAL & COMPANY
PROPOSED LAKESIDE HOTEL
HOMER, ALASKA

F.B.	
GRID.	
PROJ. NO.	752169

TH-7
8-31-77 0.0'

(1) ORGANIC SILT W/SOME SAND Tan, Slightly Moist, Med. Dense 2.0
SANDY SILT W/POCKETS OF SILT AND SAND Brown-Blue Gray, Slightly Moist, Firm

(2)

(3) 0.5'

SAND
Gray, Moist, Medium Dense, Very Fine Grained 14.0'

(4) SILT W/SOME CLAY, TRACE SAND
Gray, Slightly Moist, Stiff
Brown, Clayey Silt W/ Wood Chips 17 to 17.5'
25.5 to 26'

(5) 55

(6)

30.0'

TH-7
8-31-77 30.0' Cont.

(7) R

SILTY CLAY W/TRACE SAND,
Gray, Dry, Very Hard

(8) R

(9) R 40.6 T.D.

No Groundwater Encountered While While Drilling.

DWN.	VRZ
CKD.	DEB
DATE.	9-27-77

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

TEST HOLE LOG
NEAL & COMPANY
PROPOSED LAKESIDE HOTEL
HOMER, ALASKA

F.B.	
GRID.	
PROJ.NO.	752169

PROJECT NO. 752169
Client Tony Neal Company
PROJECT NAME Lakeside Hotel

R&M

R & M CONSULTANTS, INC.

SUMMARY OF LABORATORY TEST DATA

DATE September 23, 1977
PARTY NO. ______ PAGE NO. C-01

B O.	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	2	5.0'-6.5'		100	96	92	87	79	70	48	15.3									14.6	
		3	10.0'-11.5'														47	28			31.2	
		4	15.0'-16.5'																		20.6	
		5	20.0'-21.5'																		18.3	
		7	30.0'-30.5'																		17.2	
	2	2	5.0'-6.5'				100	98	89	79	58	28.8										
		3	10.0'-11.5'				100	99	95	90	64	23.6									24.6	
		4	15.0'-16.5'																		18.7	
		5	20.0'-21.5'																		28.7	
		6	25.0'-26.5'														61	29			30.5	
	3	2	5.0'-6.5'						100	99	89	19.4										
		6	20.0'-21.5'							100	96	92.5	88.6	66.2	41.9		53	29			26.7	
		8	30.0'-30.5'																		15.9	
	4	2	5.0'-6.5'			100	92	91	84	73	53	24.6										
		3	10.0'-11.0'																		17.9	
		4	15.0'-16.5'														25	7			17.2	
		5	20.0'-21.0'																		19.5	

NOTE: SIEVE ANALYSIS = PERCENT PASSING

RKS: ______

Janice Cecere

PROJECT NO. 752169
Client Tony Neal Company
PROJECT NAME Lakeside Hotel

R&M
R & M CONSULTANTS, INC.

SUMMARY OF LABORATORY TEST DATA

DATE September 23, 1977
PARTY NO. ______ PAGE NO. C-02

AB O.	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	% ORGANIC BY WT.
	4	6	25.0'-26.0'																		13.3	
		7	30.0'-31.0'						100	96	92	51.1	37.2	21.0	13.6						15.7	
	5	2	5.0'-6.5'				100	97	92	88	79	51.8									23.5	6.57
		4	15.0'-16.5'	100	88	88	84	84	80	79	57	32.1									10.2	
		5	20.0'-21.5'																		16.3	
		6	25.0'-26.5'																		15.5	
		8	35.0'-35.5'																		11.2	
		11	50.0'-50.5'																		20.2	
	6	1	0.0'-1.0'		100	90	86	78	67	57	36	16.7										
		2	5.0'-6.5'					100	83	65	41	22.3									16.9	
		3	10.0'-11.5'																		21.5	
		5	20.0'-21.5'																		18.0	
		6	25.0'-26.5'																		11.7	
	7	1	0.0'-1.0'		100	97	96	93	88	83	73	45.3										
		8	35.0'-36.5'																		17.2	

ARKS: ______

NOTE: SIEVE ANALYSIS = PERCENT PASSING

Janice Cerna