90254

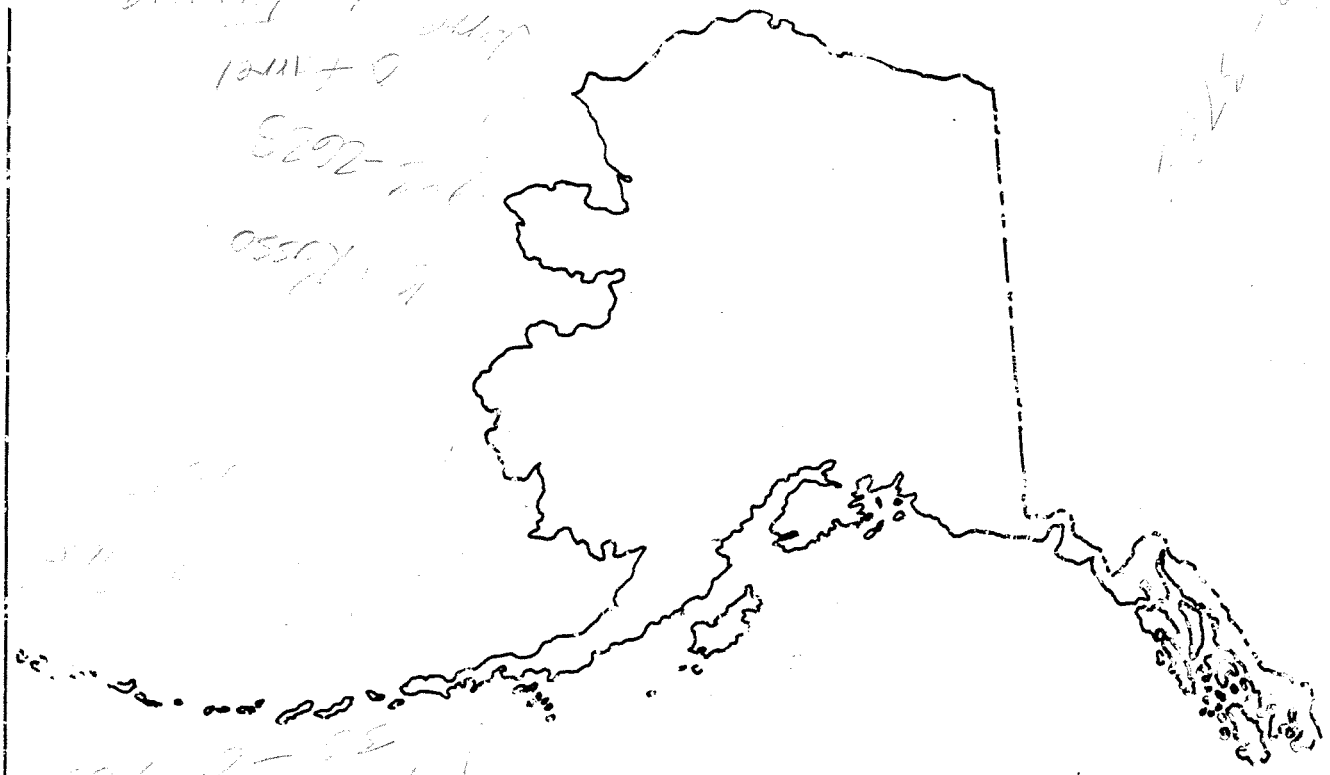
REPORT OF

FOUNDATIONS AND MATERIALS INVESTIGATIONS

DOUGLAS SMALL BOAT BASIN

21 MARCH 1961

Alaska



U.S. ARMY ENGINEER DISTRICT, ALASKA

CORPS OF ENGINEERS

Anchorage, Alaska

PND 3286

1392-61

FWJ ~~[illegible]~~ 1 cc with [illegible] report

Copy filed 27 apr 61

NPDEP 24 APR 1961

Mr. L. G. Nelson, General Manager, Alaska Division
A J Industries
Box 2419
Juneau, Alaska

Dear Mr. Nelson:

Thank you for the information you furnished in your letters of 14 and 17 April concerning availability of rock for the [illegible] small boat basin.

Pertinent portions of the information will be included in the construction contract specifications to permit the successful bidder to give proper consideration to this possible source of rock.

Sincerely yours,

FLOYD H. [illegible]
Captain, [illegible]
Executive

20 Apr 61
ENGR.
Heald
George
Melbo
EXECO
McCabe

Copies furnished:
NPDEM w/cy ltrs 14 & 17 Apr 61 Nke Plann Br

Mr. Straub/kr/SK 29113
ORIG: Engineering Div.

PND 3287

TELEPHONE HOLLYWOOD 2-3253

AG INDUSTRIES INC.

GENERAL OFFICES • 6327 SANTA MONICA BLVD.
Los Angeles 38, California.

From OFFICE at
JUNEAU, ALASKA
Box 2419

Ref.NPAGP-P

April 14,1961

U.S.Army Engineers District,Alaska
Corps of Engineers
P.O.Box 7002
Anchorage,Alaska
Attention Col.C.Hanburger

Dear Mr.Hanburger:

Thank you very much for your letter of April 1, 1961 regarding rock for the construction of the Douglas Small Boat Basin.

The roads to the rock piles that have been excavated in the past are on rock and sand fill material,making good transportation for heavy hauling,however a small amount of maintenance by the contractor with the material at hand would assure a good road surface during all kinds of weather.

There are some sand tailings flats seaward and adjoining the rock piles within the range of the tides that could be used for beaching barges,that are to be loaded with rock at low tide or in some places possibly a floating barge could be loaded from a rig operated on the rock piles.

The rocks consist mostly of hard greenstone,gabbro and schist with an average specific gravity of about the 2.70 range. The individual rocks range in size up to a maximum of what a man can lift.However these larger rocks are not abundant.The stock pile show some segregation of sizes as the larger rocks tended to roll down the sloping talus slopes after discharge from the high stacking conveyors.This segregated material along the outer edges will be loaded,but the cost would be higher than the run-of-run material.

I question the advisability of attempting to get 1500 cubic yards of 150-300 pound material to be used as armor stone because there are not many pieces of this size.

In our mill all the rock was passed thru a jaw crusher set at 8 inches; this means that some dimension of every piece of rock will be less than 8 inches.

We get fifty cents per cubic yard for the rock and will accept the yardage as determined by the government inspectors on the project.

Selection of excavation areas and the location of new roads would be subject to our approval.Road maintenance present and future would be taken care of by the contractor according to his requirements.

Very truly yours,

[illegible], Alaska Division

TELEPHONE HOLLYWOOD 2-3253

AJ INDUSTRIES INC.

GENERAL OFFICES • 6327 SANTA MONICA BLVD.
Los Angeles 38, California.

From OFFICE at
JUNEAU, ALASKA
Box 2419

Juneau, Alaska
April 17, 1961

Ref. NPAGP-P
U.S. Army Engineer District, Alaska
Corps of Engineers
P.O. Box 7002
Anchorage, Alaska

Attention Col. C. Hanburger

Dear Mr. Hanburger:

To clarify my letter to you of April 14, 1961 and not to have any misunderstanding, the price of our rock from our rock dump is on a (as is, where is) basis; it is up to the contractor to do his own loading, onto auto trucks, barges or other conveyances.

Very truly yours

Gen. Manager, Alaska Division

PND 3289

REPORT OF

FOUNDATIONS AND MATERIALS INVESTIGATIONS

DOUGLAS SMALL BOAT BASIN

PREPARED BY

FOUNDATIONS AND MATERIALS BRANCH

21 MARCH 1961

REPORT OF
FOUNDATIONS AND MATERIALS INVESTIGATIONS
DOUGLAS SMALL BOAT BASIN

1. REFERENCE: House Document No. ~~34~~ 286 2nd 85th Congress, ~~1st~~ 2nd Session, and Rivers and Harbors Act of 1958.

2. SCOPE OF REPORT: This report covers subsurface conditions at the proposed Douglas Small Boat Basin. The proposed project, which includes construction of a protecting jetty and possibly a pile breakwater, is authorized as set forth in paragraph 1 above. The report is based on forty drill holes put down at the project site, examination of the surrounding land areas, and examination of potential sources of borrow material.

3. LOCATION AND ACCESSIBILITY: The proposed facilities are to be located on the southwesterly shore of Gastineau Channel in a tidal basin at the southern end of the city of Douglas, between Douglas Island to the southwest and Juneau Isle (locally called Mayflower Island) to the northeast. A rock-fill causeway about one-fourth mile long, connecting Juneau Isle and the U. S. Bureau of Mines buildings located on it to Douglas Island, lies immediately to the southeast of the site area. The area is accessible by water through Gastineau Channel, and is accessible by land over the local road system centering at Juneau.

4. GENERAL GEOLOGY OF REGION: The project site lies in an area where glaciated mountain land masses rise abruptly out of the sea and the coast line is irregular, with many arms, inlets, and offshore islands. The Coast Range Mountains lie immediately behind the cities of Douglas and Juneau, on opposite sides of

Gastineau Channel, and there is no coastal plain between the mountains and the water. The rocks of the region consist of highly metamorphosed slate and volcanic rocks, mostly greenstone, of probable Cretaceous age. Granitic and syenitic intrusive rocks occur in the area, one such occurrence forming the main part of Juneau Isle. The region has been extensively glaciated, with numerous glaciers still in existence, and glacial scouring has caused the formation of fjords ~~and open~~ forming sea channels, such as Gastineau Channel. Varying amounts of glacial drift material occur in the valleys, and can be expected to occur in those portions of the valleys now below sea level.

5. CLIMATOLOGY: No comprehensive records of climatic conditions are available for the Douglas area. Meager records are available for the city of Juneau, and somewhat more complete records are available for the Juneau Airport, but these records do not necessarily reflect the weather conditions for Douglas. Winter temperatures in Douglas are ordinarily a few degrees lower than in Juneau, and wind conditions at Douglas are completely different from those encountered at the Juneau Airport, especially douring the winter when the northeasterly winds occur. The Douglas area is in the full sweep of the northeasterly "Taku" winds, and individuals who have resided in the area any length of time have reported such wind damage as 2 x 4 planks being driven into buildings, corrugated sheet iron roofing being blown across Gastineau Channel, and boats being blown out of the water.

In December 1960 the northeasterly wind was estimated to blow for a short period of time with a velocity of 75 mph. A Coast Guard boat is reported to have recorded wind velocities in excess of 100 mph several years ago in the immediate area of the project site, and the cannery buildings on the Douglas dock, immediately adjacent to the site, have been blown off on three different occasions. Strong southeasterly winds sweep the project site area, and the effects are particularly noted at high tide when the causeway to Juneau Isle does not act as a windbreak. Precipitation in the site area is comparable to that at Juneau, amounting to approximately 90 inches per year. Local residents have reported heavy ice conditions in the site area, conditions which are probably aggravated by the shallowness of the tidal basin in which the project is to be located.

6. SUBSURFACE INVESTIGATIONS: Forty drill holes (DH- 1 to 40 incl) were put down 13 - 22 December 1960 and 6 - 21 January 1961 at the project site. The holes were drilled by standpiping, in which casing is driven through unconsolidated material and the material penetrated is flushed out of the casing by jet-wash rods. Twenty-eight of the holes were carried to refusal on the top of rock, and twelve holes were completed at depths several feet below the project grade elevation (Elev -12.0 ft MLLW) without encountering refusal. Locations of the drill holes are shown on the accompanying map (Plate 1), and logs of the holes are included in the report. A total of thirteen drive samples were

obtained from holes DH-4, 5, 6, 7, and 36 in order that mechanical analyses could be made, and the MA curves are included in the report. Wash samples only were obtained from the other drill holes; these samples were taken for purposes of comparison and corroboration. Two bulk samples of soil material (Samples 6 and 7) were taken at the ground surface in the site area for laboratory identification and determination of stability. The locations where the samples were taken are shown on Plate 1. A number of tests were made in holes DH-36 and DH-37 with a vane borer in an attempt to determine in-place shear strengths of the different types of soils encountered. Details of the tests are set forth in Table 1. One rock sample was taken for laboratory identification and soundness testing from the northwestern point of Juneau Isle at a possible armor-stone borrow source. Twelve photographs were taken of the site area, and are included in the report. Special attention is called to photo No. 11, showing effects of a wind which occurred during the course of the field explorations.

7. SUBSURFACE CONDITIONS AT THE SITE:

a. Topography - The ground surface in that portion of the tidal basin where the proposed project is to be located ranges in elevation from 7 or 8 ft MLLW to -2 or -3 ft MLLW, with an average slope of approximately 2 percent to the northeast. Juneau Isle rises abruptly out of the water immediately to the northeast of the project site, the surface standing at a slope

of approximately 1 on 1. The causeway connecting the U. S. Bureau of Mines facilities on Juneau Isle with Douglas Island lies immediately to the southeast of the project area, with a top elevation of 23 ft MLLW. A dike composed of a sand core with rock facing has recently been constructed along the southwesterly edge of the project area, about 600 feet from Juneau Isle and at an approximate right angle to the causeway, the purpose of the dike being to inclose a triangular disposal area for the project between the causeway and Douglas Island and to serve as a retainer to prevent the disposal material from gravitating back into the site area. The top elevation of the dike averages around 22.5 feet MLLW, essentially the same as that of the causeway. The project area is covered with water under normal tide conditions.

b. Geology - Overburden material in the site area consists of deposits of silt, sandy silt, and silty sand, which underlie the entire basin area and extend down to the underlying bedrock at elevations ranging from -7 feet MLLW to less than -20 feet MLLW. Two somewhat different types of overburden material were encountered in the test drilling. The type immediately underlying the ground surface throughout the greater portion of the site area is a fairly loose material of a dark gray color consisting essentially of silty sand with minor amounts of fine sand. This material is composed of the mill tailings from the old Treadwell mines, which are located on the shore of Douglas Island just a short distance southeast of the site area.

The tailings were originally pumped out on the beach in an attempt to seal off fractures that were permitting sea-water migration into the underground workings of the mines. Wave actions and shore currents have caused a northwesterly migration of some of the tailings material, causing this material to be deposited in the site area, filling a navigable channel that the old residents of the area claim existed at one time between Juneau Isle and Douglas Island. This fairly loose silty sandy material was found to occur down to elevations lower than -20 feet MLLW in the easterly corner of the site area, adjacent to the causeway, but elsewhere in the site area, where present at all, it reaches thicknesses of only ten feet or less. Laboratory tests of a bulk sample of the material taken at ground surface (Sample No. 6, Plate 1) proved it to be silty sand capable of attaining an angle of repose under water of 1 on 3 and a dry angle of repose of 36 degrees. In the field it was noted that a slight hydrostatic pressure developed in the material when the tide receded at the location of Sample No. 6, causing the material to flow like water. It was also noted that the upper surface of this type of material was always found to occur at very slight slopes, never exceeding 2 or 3 percent. In-place shear strength tests were made in the material with a vane borer during the drilling of hole DH-37 (see Plate 1). The shear strength was found to average about 1,500 lb per sq ft, but there is a marked decrease in shear strength value with

increasing depth. Details of the tests made in hole DH-37 are given in Table 1.

A lighter gray, fairly compact soil consisting of silt and sandy silt underlies the silty sand throughout the site area, and extends up to the ground surface in the westerly portion of the site area, where the silty sand derived from the mill tailings was not deposited. The silt extends down to the underlying rock, and is the type of material to be found at the project grade elevation (Elev -12.0 ft MLLW) throughout the greater part of the project area. Numerous shell fragments were found to occur in the lowermost few feet of the deposit, immediately overlying rock. A bulk sample of the material was taken at ground surface (Sample No. 7, Plate 1), and was determined in the laboratory to be a sandy silt capable of standing at steep slopes. In-place shear strength tests were made in the material with a vane borer during the drilling of hole DH-36 (see Plate1). The shear strength was found to average about 1,400 lb per sq ft. Details of the tests made in hole DH-36 are given in Table 1.

Rock underlies the overburden deposits throughout the site area, and was encountered in twenty-eight of the forty test holes drilled. No samples of the rock were obtained from the drill holes, but indications are from the regional geology that the rock underlying most of the project site consists of hard, sound greenstone and slate. Juneau Isle consists of a gneissic granite intrustive, and the rock underlying the portion of the site

adjacent to Juneau Isle may consist largely of this same type. The top of the rock insofar as can be determined from the subsurface investigations is shown by rock contours on Plate 1. The relationship of the overburden and rock formations to each other and to the project excavation elevation is shown on Plate 2, Geologic Sections.

c. Excavation Problems - The greater part of the excavation for the proposed basin will be common excavation in the unconsolidated sandy silt and silty sand that comprise the overburden. The upper surface of the underlying rock extends above the excavation grade line (Elev -12 ft MLLW) in the northerly corner of the proposed basin, in the adjacent entrance channel area, and along the southwest edge of the basin (see Plates 1 and 2), and a certain amount of rock excavation, involving drilling and blasting, will have to be performed in those portions of the project area. The silty sand deposit from the mill tailings is known from both laboratory testing and field observations to be unstable, and it is not expected to stand at slopes excavated steeper than 1 on 10 or 1 on 12 without being protected by a rock coating. Under violent wave action unprotected slopes will flatten to around 1 on 20 or less. With a complete protective coating such as rock fill and armor stone, excavated slopes in this material will stand as steep as 1 on 3. The limits of the proposed basin should be located at such distances from the causeway and the dike

so as to allow for these relatively flat side slopes, otherwise there is a strong possibility that basin excavation will bring about flowage of the silty sand out from under the causeway and the dike, with consequent undermining and loss of these structures. A water line from Douglas to the Bureau of Mines facilities on Juneau Isle traverses the site area, running underground about 25 feet out from the toe of the causeway (a boxed section of this line is shown in Photo No. 4), and will have to be taken into account in excavating. Two wooden pilings occur in the site area, and remnant stubs of old pilings may be scattered about beneath the ground surface. Long-time residents report that a sawmill was located at one time just back from the western corner of the area, with many slabs of wood being piled near the corner of the project site. Some of these slabs may have drifted out and now lie buried in the sand and mud. However, wood was encountered in only one drill hole (DH-4), at a depth of 16 feet. Metallic items were not encountered during drilling, except that lengths of casing were lost in DH-6 and DH-9, and are still in the ground. However, buried scrap iron and even old boat hulls may be expected to occur. The proposed disposal area southwest of the dike is drained by three culverts through the dike. As the tide recedes after having filled the area with water, a large volume of water emits from the culverts with considerable velocity, carrying considerable quantities of soil out into the project area (see Photo No. 10 - the coarse gravel shown washed out during construction

of the dike and is not part of the natural soil material of the area). If the area back of the dike is used as a disposal area, precautions will have to be taken to prevent the spoil material from being washed back out through the culverts into the excavation.

8. PROTECTION AGAINST SEVERE WEATHER CONDITIONS: In order to gain maximum protection from the strong winds prevalent in the region, the project should be located as close as possible to Juneau Isle. During high tides and strong southeasterly winds, waves and even driftwood are blown over the top of the causeway, and as an added protection against wind and waves, consideration should be given to raising the causeway at least 5 or 6 feet.

9. CONSTRUCTION MATERIALS: Broken rock suitable for jetty core material, rock facing on excavated side slopes, and causeway fill can be obtained in any quantity desired from the Alaska-Juneau Mining Co. rock dump, which is almost directly across Gastineau Channel from the site area. Rock from this source is not of sufficient size to be suitable as armor stone, as the U. S. Bureau of Mines has found that this material would not hold up on the causeway against heavy wave action unless covered with large size rip-rap. The nearest potential source of armor stone is the northwest end of Juneau Isle, where gneissic granite is exposed. A rock sample was collected from this locality, and the results of the laboratory examination of the sample are included in the report.

A relatively limited amount of suitable armor stone could be quarried from this source. However, arrangements would have to be made with the U. S. Bureau of Mines before any rock could be removed. No other armor stone sources that are readily approachable and workable are known in the immediate area.

10. BREAKWATER AT DOUGLAS DOCK: Several options for a breakwater on the dock side of the entrance channel have been considered, the most feasible and economic appearing to be the one to plank up against the pilings of the dock. This proposition was discussed with the Mayor of Douglas and he believed it to be practical. He stated that the pilings in the dock had good penetration and that the pilings and bracings are all creosoted. He thought there might be two or three pilings that should probably be replaced and minor additional internal bracing done. A lattice type or spaced planking type of construction rather than closed planking would be best, as it would break up waves about as well and offer much less wind resistance. During the exploration work it was found the main waves entering the basin from the direction of this proposed breakwater were caused by boats traveling up and down Gastineau Channel.

TABLE 1

DOUGLAS SMALL BOAT BASIN

RESULTS OF VANE BORER TESTS FOR IN-PLACE

SHEAR STRENGTH OF SOILS

Drill Hole No.	Depth of Test - Ft	Size of Vane Borer	Torque In. - Lbs.	Shear Strength Lb/Sq. Ft.
DH-36	6.0 - 6.5	2" x 3.5"	250	1290
"	8.5 - 9.0	"	300	1550
"	13.0 - 13.5	"	250	1290
DH-37	5.5 - 6.0	"	300	1550
"	10.5 - 11.0	"	450	2330
"	15.5 - 16.0	"	200	1030
"	20.5 - 21.0	"	150	780

Study of Soils Stability
for
Geology Section
Alaska District, Corps of Engineers

DE Lab No. 1468-61 10 Feb 61

Project - Douglas Small Boat Harbor.

Samples were submitted from Drill Holes 6, 7, and 36, each hole being sampled from the surface to a depth of from 12 to 19 feet. The samples grouped into two distinct types: (1) Fine sand from Drill Holes 6 and 7 having from 8 to 25 percent silt and exhibiting very little wet cohesion. (2) Silty soil from Drill Hole 36 with relatively high wet cohesion. The stability of these soils was observed when subjected to various water actions. Results are as follows.

Sandy Soil (Drill Holes 6 and 7) This soil is very pervious becoming saturated almost immediately and conversely, drains very rapidly thus causing blowouts to form on steep slopes or riverlets on shallower slopes.

Model studies of an embankment located in the active tidal zone indicate a rapid deterioration of slopes steeper than 1 on 12 and under violent water action or concentrated stream flow the slopes were flattened to as much as 1 on 20. This sand is exceptionally unstable.

Silty Soil (Drill Hole 36) This soil is substantially more resistant to water erosion than the sandy soil due to its relatively high wet cohesion and imperviousness. Water migration through this soil is very slow therefore it should remain quite stable during cycles of high and low water. The stability of this silty soil is much harder to predict because the degree of consolidation of the inplace material is difficult to duplicate in the laboratory. Certain conclusions were reached however, regarding the type of deterioration which may be expected in the boat harbor.

This soil stands on very steep slopes with erosion occuring on the surface only, it has very little tendency to slide or blowout as in the case of the sandy soil, unless severely jarred. As the surface particles of soil are suspended due to water action the coarser sand (about 25%) will be deposited at the toe of the slope and the finer fraction (silts) will be transported out to sea or deposited in the deepest portion of the harbor in the form of a sludge. The rate of slope deterioration should be very slow.

Conclusion The sandy soils from the vicinity of Drill Holes 6 and 7 are by far the most unstable of the samples submitted. These sands will probably hold on a 1 on 12 if not subjected to violent wave actions or concentrated stream flow. If any unusal or adverse conditions occur this material could be flattened to as much as 1 on 20. Field observations are much more reliable than those made in the laboratory.

WILLARD M. KNOPPE
Chief, Testing Laboratory

PND 3303

REPORT ON ROCK
for
F&M BRANCH, GEOLOGY SECTION

1 February 1961

PROJECT: Douglas Small Boat Harbor

DE Lab File: No. 1468-61

Source: Geology Section Personnel.

Sample: Three hand-sized pieces of rock.

Sample Information: "Rock from Pt of Mayflower Is near USMM #1, Douglas SBH, Sample #20."

Request: Rock identification and soundness.

Result of examination:

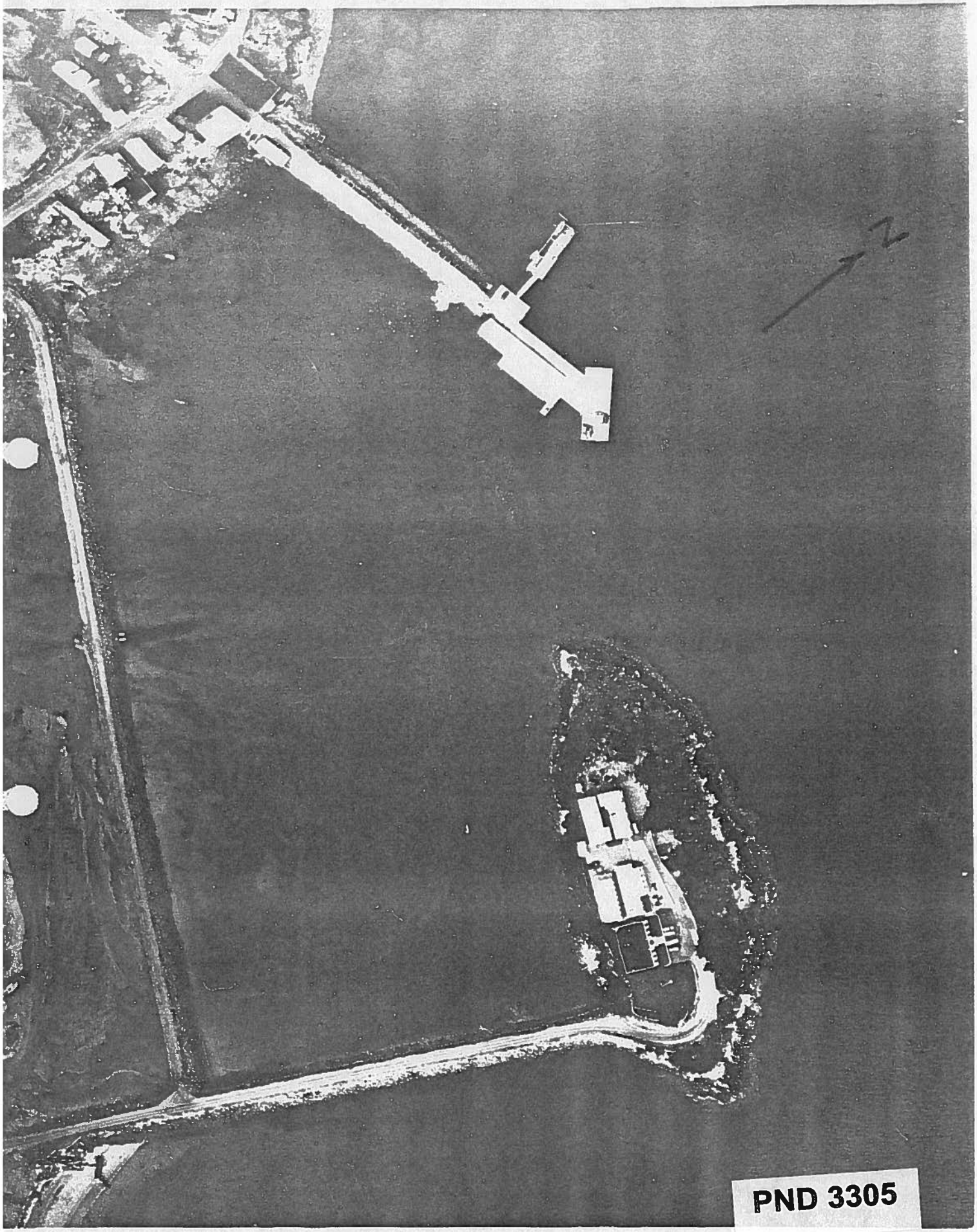
Megascopic description. The rock is hard, generally sound, fairly tough, moderately heavy, medium grained amd medium mottled light and dark gray. Stringers, veins and nodules of white calcite are moderately prominent. The samples show a definite but not well-developed gneissic banding. The primary minerals noted are quartz, feldspar, a greenish gray ferromagnesium mineral which may be hornblende and very minor biotite. All of these minerals are relatively fresh and unaltered. Some oxidation weathering at the surface has occured where the rock has been exposed to marine conditions. Some remains of barnacle attachment were observed. Calcite appears to have been derived from some external source and deposited in the rock.

Identification: Granitic gneiss.

W. M. KNOPPE
Chief Testing Section

FEW/mck

PND 3304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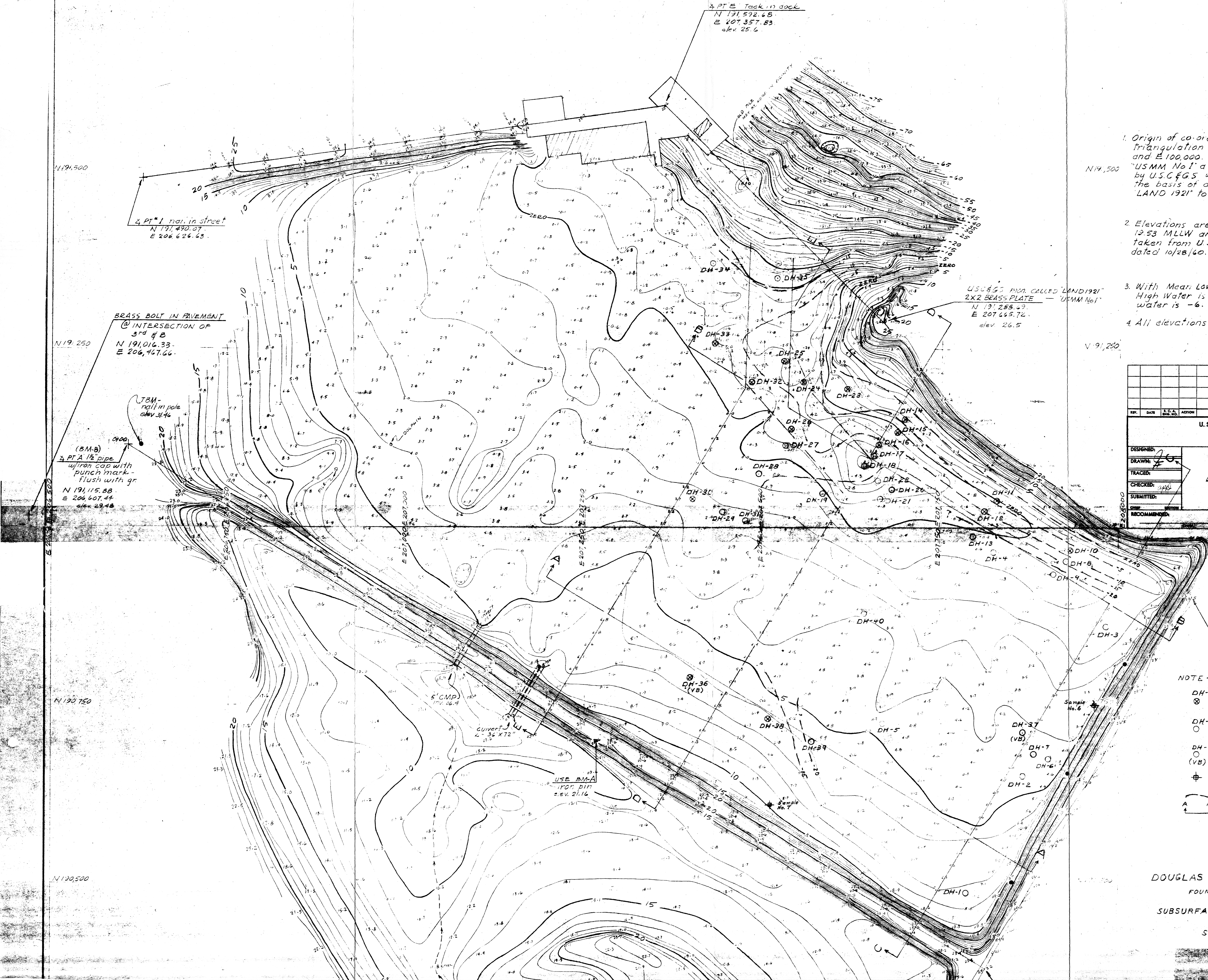
PND 3305



N 191,500

1. Origin of co-ordinates is U.S.C&GS third order triangulation station "BRIDGE 1936" as N 100,000 and E 100,000. Control in immediate area is "USMM No 1" a 2" x 2" brass plate called "LAND 1921" by U.S.C&GS with orientation to grid north on the basis of a bearing of N 13° 21' 18" W from "LAND 1921" to "TRAM 1921".

2. Elevations are derived from "Bench Mark No 1" as 19.53 MLLW and "Bench Mark No 2" as 17.86 MLLW taken from U.S.C.&G.S. Southeast Alaska - 142, dated 10/28/60.

3. With Mean Lower Low Water as 0.00. Mean Higher High Water is 16.40; and estimated lowest water is -6.

4. All elevations are plus unless otherwise indicated

N 191,250

REV.	DATE	E.C.A. ENG. NO.	ACTION	DESCRIPTION	BY	APPD.

U. S. ARMY ENGINEER DISTRICT, ALASKA
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN:
TRACED:
CHECKED:
SUBMITTED:
RECOMMENDED:
APPROVED:
DATE

SMALL BOAT HARBOR
DOUGLAS, ALASKA

NOTE -

DH- ⊗ Churn drill hole encountering rock above excavation grade elevation.

DH- ○ Churn drill hole not encountering rock above excavation grade elevation.

DH- ○ (VB) Churn drill hole in which vane borer was used to test in-place shear strength.

⌖ Location of bulk soil sample taken at ground surface.

Rock contour line

A — A Line of geologic section (Plate 2)

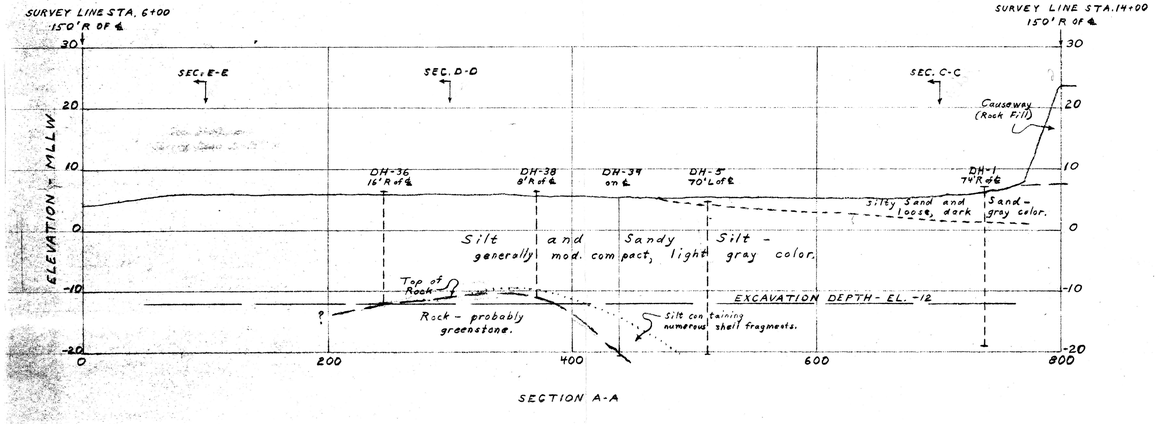
DOUGLAS SMALL BOAT BASIN
FOUNDATION INVESTIGATIONS

SUBSURFACE EXPLORATION PLAN

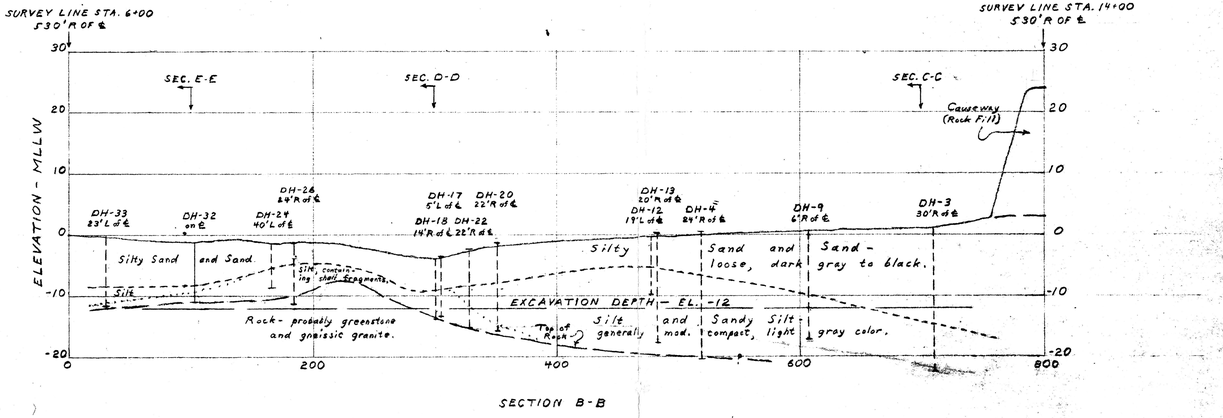
Scale - 1" = 50"

PLATE 1

PND 3306



SECTION A-A



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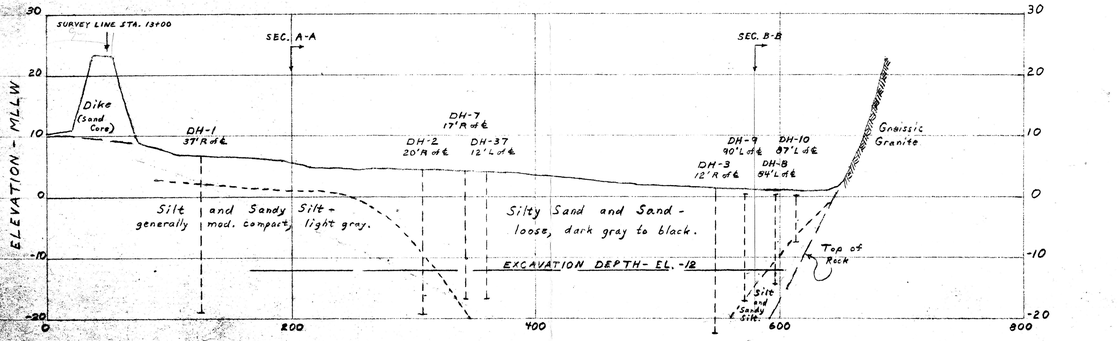

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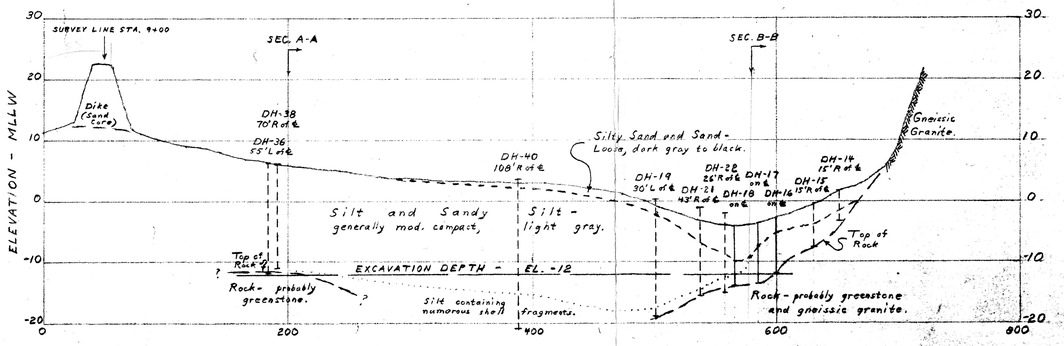
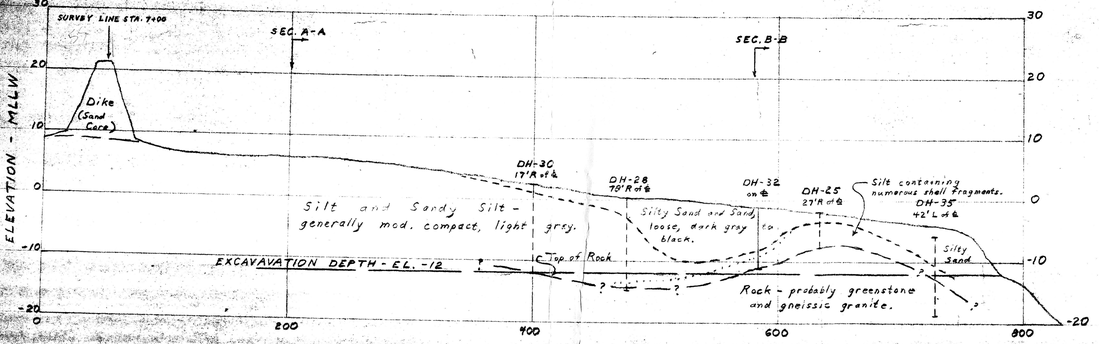


SECTION D-D



SECTION E-E

DOUGLAS SMALL BOAT BASIN

FOUNDATION INVESTIGATIONS

GEOLOGIC SECTIONS

Horiz. Scale - 1" = 50'
Vert. Scale - 1" = 10'

PND 3307

PLATE 2

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 190,486 E. 207,784
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-1 PERMANENT: DH-1
NAME OF DRILLER: Clark
WEATHER: Snow Squalls
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~SHORK~~ DRILL [X]
DEPTH TO: -
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 26'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER *:
DATE HOLE STARTED: 13 Dec 1960 COMPLETED:
EL. TOP OF HOLE: 7.1
Geologist: Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: John Knopp Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2' – 4			SM	Silty Sand		Dark Gray, Med to Fine Grained
6 – 8 – 10 – 12 – 14 – 16 – 18 – 20			SP-SM	Silty Sand		Light Gray, Compact
22 – 24 – 26'			ML	Sandy Silt		Gray - Compact Casing hard to drive below 21 ft depth
				*Subsurface water fluctuates with tide.		

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-1

PND 3308

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,650 E. 207,865

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-2 PERMANENT: DH-2

NAME OF DRILLER: Clark

WEATHER: Rain Showers

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO: -

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 24'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: 1

TYPE OF SAMPLES: Wash

DEPTH TO GROUND-WATER: *

STARTED: DATE HOLE COMPLETED: 14 Dec 60

EL. TOP OF HOLE: 4.8'

Geologist: VELIKANJE R.S.V.

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Krogfoss Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8						
10						
12						
14		1	SP/SM	Silty sand (Wash sample)		
16						
18						
20						
22						Casing hard to drive below 21 ft. depth
24						

* Subsurface water fluctuates with tide.

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-2

PND 3309

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 190,861 E. 207,986
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-3 PERMANENT: DH-3
NAME OF DRILLER: Clark
WEATHER: Partly Cloudy
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [ ]
DEPTH TO: -
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 24'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~.
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: 2
TYPE OF SAMPLES: Wash
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: COMPLETED: 15 Dec 60
EL. TOP OF HOLE: 1.5
Geologist: VELIKANJE R.S.V.
Chief, Geology Section:
Chief, Foundations & Materials Branch: Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4		2	SM	Silty sand (Wash sample)		Very dark gray
6						
8						
10						Casing can be driven easily.
12						
14						
16						Medium gray
18						
20						
22		3	SM	Silty sand (Wash sample)		
24						
				*Subsurface water fluctuates with tide.		

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-3

PND 3310

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 190,966 E. 207,824
DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS
HOLE NO. FIELD: DH-4 PERMANENT: DH-4
NAME OF DRILLER: Clark
WEATHER: Heavy fog - Cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]
DEPTH TO: -
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 21'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] ~~MSL~~
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: 2
TYPE OF SAMPLES: Wash and drive
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 16 Dec 60
DATE HOLE COMPLETED:
EL. TOP OF HOLE: 0.6'
Geologist: VELIKANJE R.S.C.
Chief, Geology Section:
Chief, Foundations & Materials Branch: [signature] Date: 18 March '61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8						
10			SM			Very dark gray. Color lightening somewhat below 7 ft. depth
12						
14						
16						Pieces of wood encountered at 16 - 17 ft. depth
18		4		Silty sand (Wash sample)		
20		5	ML	Silt (drive sample)		Bluish color
22				* Subsurface water fluctuates with tide.		

PND 3311

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-4

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,723 E. 207,668

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

FIELD HOLE NO.: DH-5	PERMANENT: DH-5	NAME OF DRILLER: Clark	WEATHER: Rain and Wind
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]	DEPTH TO: -	DEPTH DRILLED INTO: -	TOTAL DEPTH OF HOLE: 25'
SIZE AND TYPE OF BIT: EX Jet Wash	DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~	TYPE OF EQUIPMENT:	
TOTAL NO. OF SAMPLES: 2	TYPE OF SAMPLES: Drive	DEPTH TO GROUND-WATER: *	DATE HOLE STARTED: 21 Dec 60 COMPLETED: 22 Dec 60
EL. TOP OF HOLE: 4.8'	Geologist: VELIKANJE R.S.U.	Chief, Geology Section:	Chief, Foundations & Materials Branch: Wm Knoepfle Date: 17 March '61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			SP	Sand		Dark gray
4		8		Silty sand (Drive sample)		Compact - light gray
6						
8						
10						
12						
14			SM			Gray
16						
18						
20						
22			ML	Sandy silt (Drive sample)		
24		9				Light gray
26				*Subsurface water fluctuates with tide.		

NPA FORM DEC. 1959 19 (REV)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-5

PND 3312

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,674 E. 207,899

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-6 PERMANENT: DH-6

NAME OF DRILLER: Clark

WEATHER: Partly Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO: -

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 18'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: 3

TYPE OF SAMPLES: Drive

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: COMPLETED: 6 Jan 61

EL. TOP OF HOLE: 4.5'

Geologist: VELIKANJE R.S.V.

Chief, Geology Section:

Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2		10	SP/SM	Silty sand		
4						
6						
8		11	SM	Silty sand		
10						Gray
12						
14						
16		12	SM	Silty sand		
18						

* Subsurface water fluctuates with tide.

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-6

1892-60

PND 3313

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA **EXPLORATION LOG**	PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1 LOCATION (Coordinates or Station): N. 190,680 E. 207,879 DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-7 PERMANENT: DH-7	NAME OF DRILLER: Clark — WEATHER: Cloudy - Cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]	DEPTH TO: - — DEPTH DRILLED INTO: - — TOTAL DEPTH OF HOLE: 21.5'
SIZE AND TYPE OF BIT: EX Jet Wash — DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL.	TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: 3 — TYPE OF SAMPLES: Drive	DEPTH TO GROUND-WATER: * — DATE HOLE STARTED: — COMPLETED: 9 Jan 61
EL. TOP OF HOLE: 4.8 — Geologist: VELIKANJE R.S.V.	Chief, Geology Section: — Chief, Foundations & Materials Branch: [signature] Date: 17 March '61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
3–6		13	SP/SM	Silty sand		Dark Gray, Loose
9–13		14	SM	Silty sand		
17–19		15	ML	Sandy silt		Light gray, Compact

* Subsurface water fluctuates with tide.

PND 3314

NPA FORM 19 (REV.)
DEC. 1959

PROJECT Douglas Small Boat Basin — PERMANENT HOLE NO. DH-7

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,952 E. 207,925

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-8 PERMANENT: DH-8

NAME OF DRILLER: Clark

WEATHER: Cloudy - Cold

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~XXXX~~ DRILL [X]

DEPTH TO Rock: 14.5'

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 14.5'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSLX~~

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES: -

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 10 Jan 61 COMPLETED:

EL. TOP OF HOLE: 0.3

Geologist: R.S.V. VELIKANJE

Chief, Geology Section:

Chief, Foundations & Materials Branch: John Knoepfle Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
0			ML	Silt		Black mud, decomposed vegetation, etc.
2			SM	Silty sand		Med. gray
4						
6				Sandy silt		Black
8			ML			
10						Gray. Becomes noticeably compact below 14 ft. depth
12				Silt		
14						Some sand and shell fragments at 14 - 14.5 ft. depth.
16				Refusal on Rock at 14.5 ft.		

* Subsurface water fluctuates with tide.

PND 3315

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-8

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,935 E. 207,908

DRILLING AGENCY: ☐ OTHER ☒ CORPS OF ENGINEERS

HOLE NO. FIELD: DH-9 PERMANENT: DH-9

NAME OF DRILLER: Clark

WEATHER: Cloudy-Cold

TYPE OF HOLE: TEST PIT ☐ AUGER HOLE ☐ ~~XXXX~~ DRILL ☒

DEPTH TO: -

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 17.5'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: ☐ TBM. MLLW ☒ ~~MSXX~~

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES: -

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 10 Jan 1961 COMPLETED:

EL. TOP OF HOLE: 0.4'

Geologist: R.S.V. VELIKANJE

Chief, Geology Section:

Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8				Sandy silt		Black to dark gray
10			ML			
12						
14				Silt		Gray
16						
18				* Subsurface water fluctuates with tide.		

PND 3316

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-9

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 190,967 E. 207,932
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-10 PERMANENT: DH-10
NAME OF DRILLER: Clark
WEATHER: Cloudy - Cold breeze
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]
DEPTH TO: Rock 7.6'
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 7.6'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL.
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 11 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: 0.2
Geologist: VELIKANJE P.S.U.
Chief, Geology Section:
Chief, Foundations & Materials Branch: WM Knoepfle Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						Black - sea mud
4			ML	Sandy silt		
6						Gray, numerous shell fragments
8				Refusal on rock at 7.6 feet.		
				*Subsurface water fluctuates with tide.		

PND 3317

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-10

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,038 E. 207,829

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-11 PERMANENT: DH-11

NAME OF DRILLER: Clark

WEATHER: Thick Snow

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~XXXX~~ CHURN DRILL [X]

DEPTH TO Rock: 4.2'

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 4.2'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] ~~MSL~~ XXX

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES: -

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 11 Jan 1961 COMPLETED:

EL. TOP OF HOLE: 0.4'

Geologist: R.S.V. VELIKANJE

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knight Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
				Silt		Black muck
2			ML	Sandy silt		Dark gray, numerous shell fragments
4						
				Refusal on rock at 4.2 feet.		
6				* Subsurface water fluctuates with tide.		

PND 3318

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-11

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,023 E. 207,809
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-12 PERMANENT: DH-12
NAME OF DRILLER: Clark
WEATHER: Partly Cloudy
TYPE OF HOLE: [ ] TEST PIT [ ] AUGER HOLE [ ] DRIVEN [X] DRILL
DEPTH TO Rock: 9.3
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 9.3'
SIZE AND TYPE OF BIT: None
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL.
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES: -
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 11 Jan 61 COMPLETED:
EL. TOP OF HOLE: - 0.6'
Geologist: R.S.V. VELIKANJE
Chief, Geology Section:
Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2				Silt		Black muck
4			ML	Sandy silt		Gray
6						
8						
10				Refusal on rock at 9.3 feet.		
				* Subsurface water fluctuates with tide.		

PND 3319

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-12

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,987 E. 207,795

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-13 PERMANENT: DH-13

NAME OF DRILLER: Clark

WEATHER: Partly Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN DRILL~~ XXXXX [X]

DEPTH TO: -

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 18.0'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~ XX.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES: R.S.-

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 11 Jan 61 COMPLETED:

EL. TOP OF HOLE: 0.3'

Geologist: VELIKANJE

Chief, Geology Section:

Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						Black muck
8						
10			ML	Sandy silt		Gray
12						
14						Light gray
16						
18						

* Subsurface water fluctuates with tide.

PND 3320

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-13

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,152 E. 207,700

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-14 PERMANENT: DH-14

NAME OF DRILLER: Clark

WEATHER: Rain Showers

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~XXXX~~ DRILL [X]

DEPTH TO Rock: 5.0'

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 5.0'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] ~~XX~~ MSL.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES: -

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 12 Jan 61 COMPLETED:

EL. TOP OF HOLE: 1.8'

Geologist: VEL IKANJE R.S.O.

Chief, Geology Section:

Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			ML	Silt		Black muck
4				Sandy silt		Gray
6				Refusal on rock at 5.0 feet.		
				* Subsurface water fluctuates with tide.		

PND 3321

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-14

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,133 E. 207,688

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-15 PERMANENT: DH-15

NAME OF DRILLER: Clark

WEATHER: Rain Showers

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO Rock: 7.6'

DEPTH DRILLED INTO: -

TOTAL DEPTH OF HOLE: 7.6'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] MSL.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 12 Jan 61 COMPLETED:

EL. TOP OF HOLE: - 0.2'

Geologist: VELIKANJE R.S.U.

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knoepfle Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2				Silt		Black muck
4			ML	Sandy silt		Gray, Abundant shell fragments
6						
8				Refusal on rock at 7.6 feet.		
				* Subsurface water fluctuates with tide.		

PND 3322

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-15

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,116 E. 207,662

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-16 PERMANENT: DH-16

NAME OF DRILLER: Clark

WEATHER: Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] XXXX DRILL [X]

DEPTH TO Rock: 9.5'
DEPTH DRILLED INTO: -
TOTAL DEPTH OF HOLE: 9.5'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES: -
DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 12 Jan 61 COMPLETED:

EL. TOP OF HOLE: - 2.3'
Geologist: VELIKANJE R.S.V.
Chief, Geology Section:
Chief, Foundations & Materials Branch: WM Kropfer Date: 17 March '61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
0–3				Silt		Black muck
3–9.5			ML	Sandy silt		Gray Numerous shell fragments

Refusal on rock at 9.5 feet.

* Subsurface water fluctuates with tide.

PND 3323

NPA FORM 19 (REV.) DEC. 1959

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-16

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,100 E. 207,656

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-17 PERMANENT: DH-17

NAME OF DRILLER: Clark | WEATHER: Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO: Rock 10' | DEPTH DRILLED INTO: - - | TOTAL DEPTH OF HOLE: 10'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None | TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: * | STARTED: 12 Jan 61 | DATE HOLE COMPLETED:

EL. TOP OF HOLE: -3.4 | Geologist: Velikanje R.S.V. | Chief, Geology Section: | Chief, Foundations & Materials Branch: John Kondzela | Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2				Silt		Black Muck
4			ML	Sandy Silt		Gray-Darker Below 6.5', Numerous Shell Fragments
6						
8						
10						
				Refusal on Rock at 10 ft. *Subsurface water fluctuates with tide.		

PND 3324

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-17

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,085 E. 207,642

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-18 PERMANENT: DH-18

NAME OF DRILLER: Clark

WEATHER: Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH Rock 9.9'

DEPTH DRILLED INTO - -

TOTAL DEPTH OF HOLE 9.9'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [x] MSL.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER *

DATE HOLE STARTED 12 Jan 61 COMPLETED

EL. TOP OF HOLE -3.9'

Geologist R.S.V. Velikanje

Chief, Geology Section

Chief, Foundations & Materials Branch: John Knopfle Date 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2				Silt		Black Muck, changes to dark gray at 6 ft. depth
4						
6			ML			
8				Sandy Silt		Gray, numerous shell fragments
10						
				Refusal on Rock at 9.9 ft. *Subsurface water fluctuates with tide.		

PND 3325

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-18

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,047 E. 207,582

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-19 PERMANENT: DH-19

NAME OF DRILLER: Clark | WEATHER: Cloudy

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO Rock 18.9' | DEPTH DRILLED INTO - - | TOTAL DEPTH OF HOLE 18.9'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None | TYPE OF SAMPLES:

DEPTH TO GROUND-WATER *

DATE HOLE STARTED 12 Jan 61 COMPLETED

EL. TOP OF HOLE: 0.3

Geologist: Velikanje R.S.V.

Chief, Geology Section: -

Chief, Foundations & Materials Branch: Wm Bradfield Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						Black Muck
10			ML	Silt		Gray
16						A few shells at depth.
20				Refusal on Rock at 18.9 ft. *Subsurface water fluctuates with tide.		

PND 3326

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-19

1892-60

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT Douglas Small Boat Basin	SHEET 1 OF 1
	LOCATION (Coordinates or Station) N. 191,051 E. 207,679	
	DRILLING AGENCY [X] CORPS OF ENGINEERS [ ] OTHER	

HOLE NO. FIELD	DH-20	PERMANENT	DH-20	NAME OF DRILLER	Clark	WEATHER	Cloudy

TYPE OF HOLE	DEPTH TO	DEPTH DRILLED INTO	TOTAL DEPTH OF HOLE
TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]	Rock 14.5	- -	14.5

SIZE AND TYPE OF BIT	DATUM FOR ELEVATION SHOWN	TYPE OF EQUIPMENT
EX Jet Wash	[ ] TBM. MLLW [x] ~~MSL~~	

TOTAL NO. OF SAMPLES	TYPE OF SAMPLES	DEPTH TO GROUND-WATER	DATE HOLE STARTED	COMPLETED
None		*	12 Jan 61	

EL. TOP OF HOLE	Geologist	Chief, Geology Section	Chief, Foundations & Materials Branch	Date
-1.3	Velikanje R.S.V.		Wm Knoppe	17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						Black Muck
6						
8			ML	Silt		
10						Gray
12						Shell fragments near bottom of hole
14						
16				Refusal on Rock at 14.5 ft. *Subsurface water fluctuates with tide.		

PND 3327

NPA FORM 19 (REV.)
DEC. 1959

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-20

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,039 E. 207,665

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-21 PERMANENT: DH-21

NAME OF DRILLER: Clark

WEATHER: Rain & Snow

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [ ]

DEPTH TO: Rock 14.4'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 14.4'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 13 Jan 61

DATE HOLE COMPLETED:

EL. TOP OF HOLE: -1.0

Geologist: R.S.O. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knoepfe Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						Black to dark gray muck
4						
6						
8			ML	Silt		
10						Gray, changing to dark gray at 13.5 ft., shell fragments below 13.5 ft.
12						
14						
16						Refusal on Rock at 14.4 ft. * Subsurface water fluctuates with tide.

PND 3328

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-21

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,066 E. 207,661

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-22 PERMANENT: DH-22

NAME OF DRILLER: Clark

WEATHER: Snow & Rain

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO Rock: 13'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 13'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 16 Jan 61 COMPLETED:

EL. TOP OF HOLE: -2.1

Geologist: R.S.U. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knopfle Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						Black Muck
6						
8			ML	Silt		Dark gray, grading to lighter gray below 10 ft. Abundant shell fragments below 12 ft.
10						
12						
14				Refusal on Rock at 13 ft		*Subsurface water fluctuates with tide.

PND 3329

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-22

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,192 E. 207,617

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-23 PERMANENT: DH-23

NAME OF DRILLER: Clark

WEATHER: Wind, rain, and snow

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~DRIVE~~ DRILL [X]

DEPTH TO: Rock 3'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 3'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 16 Jan 61 COMPLETED:

EL. TOP OF HOLE: 1.2

Geologist: Velikanje R.S.V.

Chief, Geology Section:

Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			ML	Silt		Black Muck Light gray - Abundant shell fragments
4				Refusal on Rock at 3 ft. *Subsurface water fluctuates with tide.		

PND 3330

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-23

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,204 E. 207,556

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-24 PERMANENT: DH-24

NAME OF DRILLER: Clark

WEATHER: Wind & rain

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO Rock: 7.2'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 7.2'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 16 Jan 61 COMPLETED:

EL. TOP OF HOLE: -1.4

Geologist: R.S.O. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knofsky Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						Gray
4			ML	Silt		
6						Light gray - Numerous shell fragments
8				Refusal on Rock at 7.2 ft. *Subsurface water fluctuates with tide.		

PND 3331

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-24

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191, 233 E. 207,529

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-25 PERMANENT: DH-25

NAME OF DRILLER: Clark | WEATHER: Wind & rain

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO Rock: 5.9' | DEPTH DRILLED INTO: - - | TOTAL DEPTH OF HOLE: 5.9'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None | TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: * | DATE HOLE STARTED: 16 Jan 61 | COMPLETED:

EL. TOP OF HOLE: -1.6 | Geologist: R.S.U. Velikanje | Chief, Geology Section: | Chief, Foundations & Materials Branch: Wm Douglas 17 March 61 Date

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			ML	Silt		Gray - Abundant shell fragments
4						
6						
				Refusal on Rock at 5.9 ft. *Subsurface water fluctuates with tide.		

PND 3332

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-25

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,138 E. 207,538
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-26 PERMANENT: DH-26
NAME OF DRILLER: Clark
WEATHER: Rain & wind
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]
DEPTH TO: Rock 9.9'
DEPTH DRILLED INTO: - -
TOTAL DEPTH OF HOLE: 9.9'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 16 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: -1.4
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: WM Knowles Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						Black Muck
4						
6			ML	Silt		Gray - Abundant shell fragments
8						
10						
				Refusal on Rock at 9.9 ft. *Subsurface water fluctuates with tide.		

PND 3333

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-26

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,114 E. 207,531

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-27 PERMANENT: DH-27

NAME OF DRILLER: Clark

WEATHER: Clear-cold

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO Rock: 11.7'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 11.7'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM: MLLW [X] MSL [ ]

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 17 Jan 61 COMPLETED:

EL. TOP OF HOLE: -0.9

Geologist: Velikanje R.S.U.

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Kaufe Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4			ML	Silt		Black Muck
6						
8						
10				Sandy Silt		Light gray
12			SM	Silty Sand		Dark gray-Numerous shell fragments

Refusal on Rock at 11.7 ft.
*Subsurface water fluctuates with tide.

PND 3334

NPA FORM 19 (REV.) DEC. 1959

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-27

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,074 E. 207,491

DRILLING AGENCY: ☐ OTHER ☒ CORPS OF ENGINEERS

HOLE NO. FIELD DH-28 PERMANENT DH-28

NAME OF DRILLER: Clark

WEATHER: Clear & cold

TYPE OF HOLE: TEST PIT ☐ AUGER HOLE ☐ ~~CHURN~~ DRILL ☒

DEPTH TO Rock 15.0 | DEPTH DRILLED INTO - - | TOTAL DEPTH OF HOLE 15.0

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: ☐ TBM. MLLW ☒ ~~MSL~~

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 17 Jan 61 COMPLETED:

EL. TOP OF HOLE: 0.2

Geologist: Velikanje R.S.V.

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Knopfler Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2				Silt		Black Muck
4						
6			ML			Light gray
8						
10				Sandy Silt		
12						
14			SM	Silty Sand		Gray-Numerous shell fragments
16				Refusal on Rock at 15.0 ft. *Subsurface water fluctuates with tide.		

PND 3335

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-28

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,020 E. 207,442

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-29 PERMANENT: DH-29

NAME OF DRILLER: Clark

WEATHER: Clear & cold

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]

DEPTH TO Rock: 16.4'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 16.4'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL:

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 17 Jan 61 COMPLETED:

EL. TOP OF HOLE: -2.9

Geologist: R.S.V. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Tom Bradley Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
0			SM	Silty Sand		Gray
2						
4						
6						Light Gray - Some interbedded zones of darker gray silty sand. Contacts are gradational.
8						
10			ML	Sandy Silt		Abundant shell fragments below 15 ft. depth.
12						
14						
16						
18				Refusal on Rock at 16.4 ft. *Subsurface water fluctuates with tide.		

PND 3336

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-29

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,040 E. 207,400
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-30 PERMANENT: DH-30
NAME OF DRILLER: Clark
WEATHER: Clear & cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]
DEPTH To Rock: 14.5'
DEPTH DRILLED INTO: - -
TOTAL DEPTH OF HOLE: 14.5'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER *:
DATE HOLE STARTED: 17 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: 2.5
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
0			SM	Silty Sand		Dark Gray
2						
4						
6						Med. to light gray - Some interbedded sand zones.
8			ML	Sandy Silt		
10						
12						
14						
16				Refusal on Rock at 14.5 ft. *Subsurface water fluctuates with tide.		

PND 3337

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-30

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,008 E. 207,474
DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS
HOLE NO. FIELD: DH-31 PERMANENT: DH-31
NAME OF DRILLER: Clark
WEATHER: Clear & cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] DRILL [X]
DEPTH TO: Rock 15.2'
DEPTH DRILLED INTO: - -
TOTAL DEPTH OF HOLE: 15.2'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 17 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: 2.5
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: Tom Knoepfler Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8			SM	Silty Sand		Gray - Some shell fragments at depth
10						
12						
14						
16				Refusal on Rock at 15.2 ft. *Subsurface water fluctuates with tide.		

PND 3338

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-31

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,204 E. 207,481
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
NAME OF DRILLER: Clark
WEATHER: Rain
HOLE NO. FIELD: DH-32 PERMANENT: DH-32
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]
DEPTH TO: Rock 9.8'
DEPTH DRILLED INTO: - -
TOTAL DEPTH OF HOLE: 9.8'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER *:
DATE HOLE STARTED: 18 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: -1.2
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			SP	Sand		Dark gray - Some shell fragments.
4						
6						
8			ML	Sandy Silt		Gray
10			SP	Sand		Med. gray - Numerous shell fragments.
				Refusal on Rock at 9.8 ft. *Subsurface water fluctuates with tide.		

PND 3339

NPA FORM 19 (REV.) DEC. 1959

PROJECT Doublas Small Boat Basin PERMANENT HOLE NO. DH-32

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,257 E. 207,429
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO.: FIELD DH-33 PERMANENT DH-33
NAME OF DRILLER: Clark
WEATHER: Rain
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]
DEPTH TO Rock: 10.7'
DEPTH DRILLED INTO:
TOTAL DEPTH OF HOLE: 10.7'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 18 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: -0.9
Geologist: R.S.U. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: [signature] Date: 27 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4			SM	Silty Sand		Gray
6						
8						
10			ML	Sandy Silt		Light gray - Numerous shell fragments below 10 ft. depth
12				Refusal on Rock at 10.7 ft. *Subsurface water fluctuates with tide.		

PND 3340

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-33

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 191,372 E. 207,427
DRILLING AGENCY: ☐ OTHER ☒ CORPS OF ENGINEERS
HOLE NO. FIELD: DH-34 PERMANENT: DH-34
NAME OF DRILLER: Clark
WEATHER: Cloudy
TYPE OF HOLE: TEST PIT ☐ AUGER HOLE ☐ ~~CHURN~~ DRILL ☒
DEPTH TO: Rock 11.1
DEPTH DRILLED INTO: - -
TOTAL DEPTH OF HOLE: 11.1'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: ☐ TBM. MLLW ☒ ~~MSL~~.
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 18 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: -2.4
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: Wm Lovejoy Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6			SM	Silty Sand		Dark Gray
8						
10						
			ML	Sandy Silt		Light to med. gray
12				Refusal on Rock at 11.1 ft. *Top of hole is below low-tide water level.		

PND 3341

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-34

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 191,350 E. 207,518

DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER

HOLE NO. FIELD: DH-35 PERMANENT: DH-35

NAME OF DRILLER: Clark

WEATHER: Rain

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO:

DEPTH DRILLED INTO:

TOTAL DEPTH OF HOLE: 13.1'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None

TYPE OF SAMPLES:

DEPTH TO GROUND-WATER *:

DATE HOLE STARTED: 18 Jan 61 COMPLETED:

EL. TOP OF HOLE: -5.7

Geologist: R.S.V. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Wm Kaufpe Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6			SM	Silty Sand		Dark Gray
8						
10						
12			ML	Sandy Silt		Med. Gray - Abundant shell fragments
14				*Top of hole is below low-tide water level.		

57
13 E
19

PND 3342

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-35

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,785 E. 207,399

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-36 PERMANENT: DH-36

NAME OF DRILLER: Clark

WEATHER: Fog

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO Rock: 18.3'

DEPTH DRILLED INTO: - -

TOTAL DEPTH OF HOLE: 18.3'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: 4

TYPE OF SAMPLES: Drive

DEPTH TO GROUND-WATER: *

DATE HOLE STARTED: 19 Jan 61 COMPLETED:

EL. TOP OF HOLE: 6.4

Geologist: R.S.V. Velikanje

Chief, Geology Section:

Chief, Foundations & Materials Branch: Tom Kovojfe Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2		16	ML	Sandy Silt		
4						Gray Interbedded silt and sand layers, with silt predominant
6		17	ML	Sandy Silt		
8						
10		18	ML	Sandy Silt		
12						
14		19	ML	Sandy Silt		
16						Dark Gray
18						
20				Refusal on Rock at 18.3 ft. *Subsurface water fluctuates with tide.		

PND 3343

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-36

1800-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET: 1 OF 1
LOCATION (Coordinates or Station): N. 190,710 E. 207,865
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-37 PERMANENT: DH-37
NAME OF DRILLER: Clark
WEATHER: Clear & cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]
DEPTH TO:
DEPTH DRILLED INTO:
TOTAL DEPTH OF HOLE: 21.0'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~
TYPE OF EQUIPMENT: 2" Vane Shear
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 20 Jan 61 COMPLETED: 20 Jan 61
EL. TOP OF HOLE: 4.3
Geologist: R.S.O. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: Don Knoepfe Date: 17 March '61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8						
10						
12			SM	Silty Sand		Some interbedded zones of sandy silt
14						
16						
18						
20						
22				*Subsurface water fluctuates with tide.		

PND 3344

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-37

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin
SHEET 1 OF 1
LOCATION (Coordinates or Station): N. 190,730 E. 207,510
DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-38 PERMANENT: DH-38
NAME OF DRILLER: Clark
WEATHER: Clear
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] CHURN DRILL [X]
DEPTH TO: Rock 17.3'
DEPTH DRILLED INTO:
TOTAL DEPTH OF HOLE: 17.3'
SIZE AND TYPE OF BIT: EX Jet Wash
DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] MSL
TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None
TYPE OF SAMPLES:
DEPTH TO GROUND-WATER: *
DATE HOLE STARTED: 20 Jan 61
DATE HOLE COMPLETED:
EL. TOP OF HOLE: 6.3
Geologist: R.S.V. Velikanje
Chief, Geology Section:
Chief, Foundations & Materials Branch: Wm Trask Jr 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8						Light Gray
10						
12			ML	Sandy Silt		
14						
16						Med. Gray - Occasional shell fragments
18				Refusal on Rock at 17.3 ft. *Subsurface water fluctuates with tide.		

PND 3345

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-38

1892-60

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Douglas Small Boat Basin — SHEET 1 OF 1 LOCATION (Coordinates or Station): N. 190,697 E. 207,567 DRILLING AGENCY: [X] CORPS OF ENGINEERS [ ] OTHER
HOLE NO. FIELD: DH-39 PERMANENT: DH-39	NAME OF DRILLER: Clark — WEATHER: Clear & cold
TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]	DEPTH TO: — DEPTH DRILLED INTO: — TOTAL DEPTH OF HOLE: 26.3
SIZE AND TYPE OF BIT: EX Jet Wash — DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~	TYPE OF EQUIPMENT:
TOTAL NO. OF SAMPLES: None — TYPE OF SAMPLES: — DEPTH TO GROUND-WATER: *	DATE HOLE STARTED: 21 Jan 61 — COMPLETED:
EL. TOP OF HOLE: 5.8 — Geologist: R.S.V. Velikanje — Chief, Geology Section:	Chief, Foundations & Materials Branch: [signature] Date: 17 March 61

DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2						
4						
6						
8						
10						Med. Gray, compact
12				Sandy Silt		
14						
16						
18						
20						Shell fragments and increasing sand content below 20 ft. depth. Dark gray color.
22						
24						PND 3346
26						
28				*Subsurface water fluctuates with tide.		

NPA FORM 19 (REV.)
DEC. 1959

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-39

1892-60

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION
U.S. ARMY ENGINEER DISTRICT, ALASKA

EXPLORATION LOG

PROJECT: Douglas Small Boat Basin | SHEET 1 OF 1

LOCATION (Coordinates or Station): N. 190,879 E. 207,642

DRILLING AGENCY: [ ] OTHER [X] CORPS OF ENGINEERS

HOLE NO. FIELD: DH-40 PERMANENT: DH-40

NAME OF DRILLER: Clark | WEATHER: Clear & cold

TYPE OF HOLE: TEST PIT [ ] AUGER HOLE [ ] ~~CHURN~~ DRILL [X]

DEPTH TO Rock 24.6' | DEPTH DRILLED INTO | TOTAL DEPTH OF HOLE 24.6'

SIZE AND TYPE OF BIT: EX Jet Wash

DATUM FOR ELEVATION SHOWN: [ ] TBM. MLLW [X] ~~MSL~~.

TYPE OF EQUIPMENT:

TOTAL NO. OF SAMPLES: None | TYPE OF SAMPLES: | DEPTH TO GROUND-WATER *

DATE HOLE STARTED: 21 Jan 61 | COMPLETED:

EL. TOP OF HOLE: 3.7 | Geologist: Velikanje R.S.V. | Chief, Geology Section: | Chief, Foundations & Materials Branch: Lowell Knofsky | Date: 10 March 61

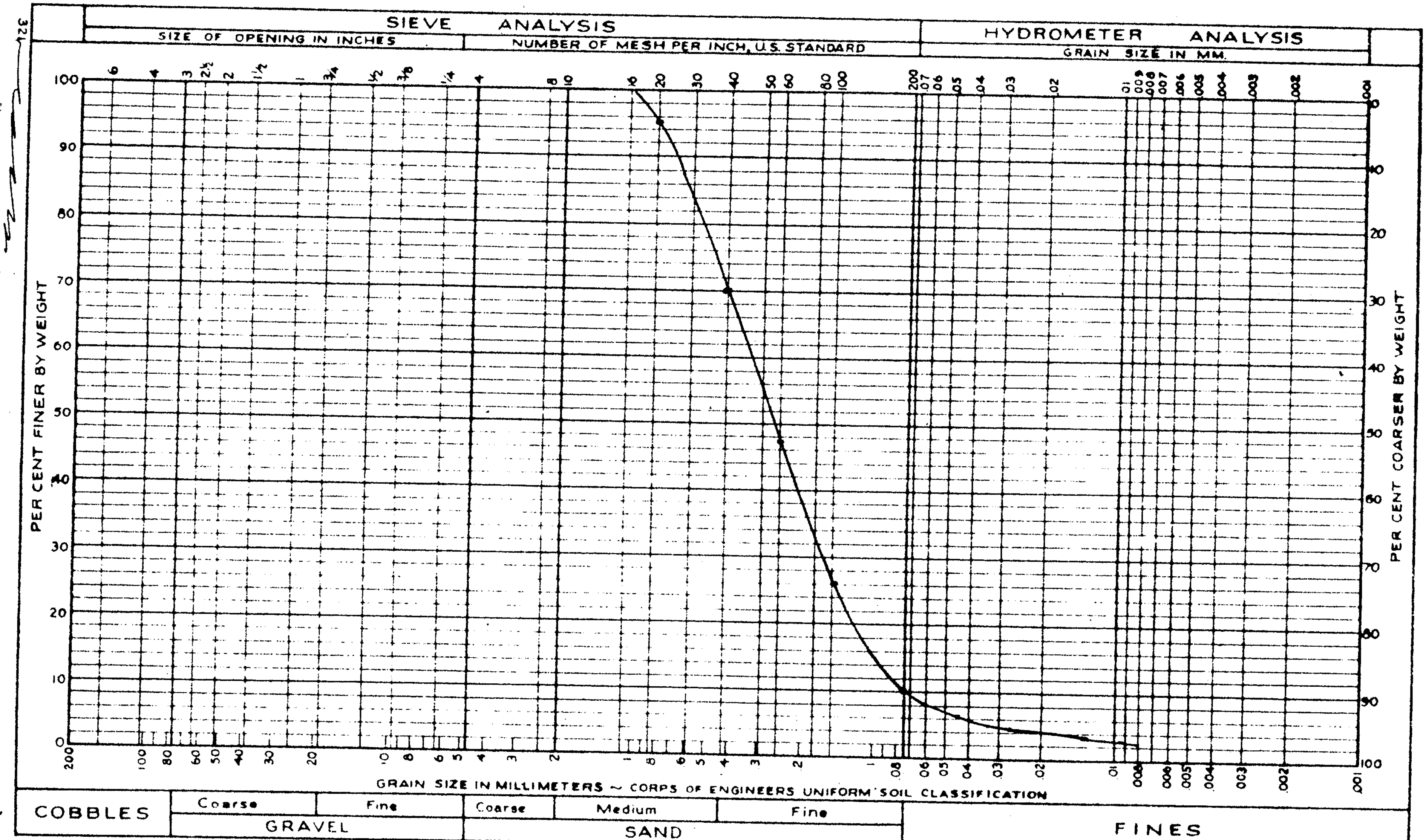
DEPTH FEET	% WATER CONTENT	SAMPLE NO.	SOIL LEGEND	CLASSIFICATION	MAX. SIZE PARTICLE	FORMATION DESCRIPTION & REMARKS
2			SM	Silty Sand		Med. Gray
4			ML	Sandy Silt		Light Gray
6						
8						
10						
12			SM	Silty Sand		Med. Gray - Sand generally quite fine
14						
16						
18						
20						
22			ML	Sandy Silt		Dark Gray - Occasional shell fragments
24						
26				Refusal on Rock at 24.6 ft. *Subsurface water fluctuates with tide.		

PND 3347

NPA FORM DEC. 1959 19 (REV.)

PROJECT Douglas Small Boat Basin PERMANENT HOLE NO. DH-40

1892-60



SAMPLE NO.	DEPTH - FT.	CLASSIFICATION	NAT W.C.	LL	PI	
1	13'-16'	Silty SAND (SP-SM)				

Note: 10% wood by volume of sample.

PROJECT Douglas SBH
Sample data DH-1
Submitted by GEOLOGY
Expl. or gp. sample No
W/O No. DELABNo. 1454-60
1/4/61 (Date of report)
[signature] Chief, Soil Mechanics ~~Branch~~

NPD FORM 321 JAN 1951

GRADATION CURVES

CORPS OF ENGINEERS, ~~NORTH PACIFIC DIVISION~~ TESTING LABORATORY, ~~PORTLAND, OREGON~~

Plotted:
Checked:

PND 3348

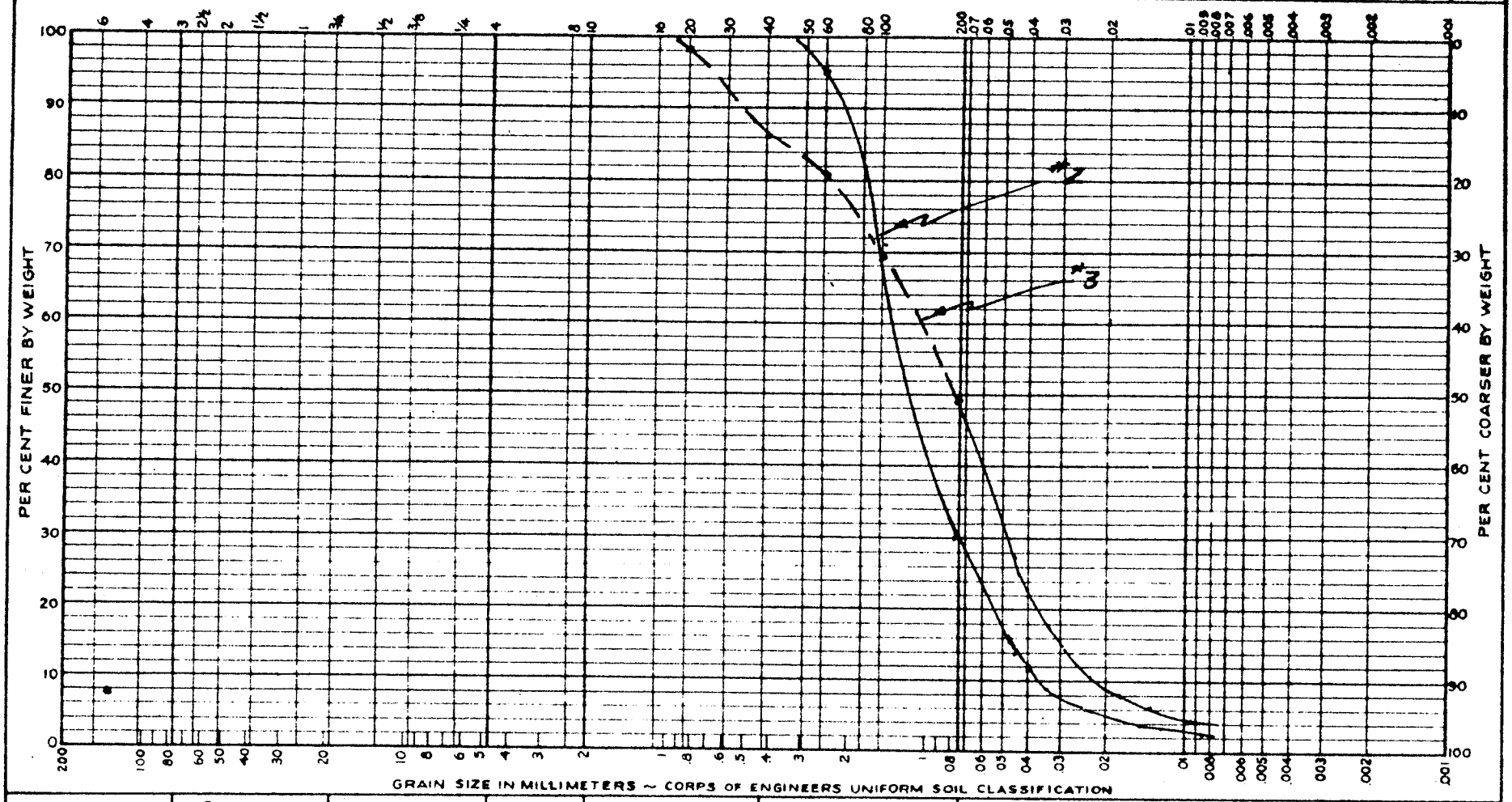
321

SIEVE ANALYSIS

SIZE OF OPENING IN INCHES | NUMBER OF MESH PER INCH, U.S. STANDARD

HYDROMETER ANALYSIS

GRAIN SIZE IN MM.



COBBLES	GRAVEL: Coarse, Fine	SAND: Coarse, Medium, Fine	FINES

SAMPLE NO.	DEPTH - FT.	CLASSIFICATION	NAT W.C.	L.L.	P.I.
2	2'-7'	Silty SAND (SM)			
3	18'-24'	Silty SAND (SM)			

PROJECT Douglas SBH.

Sample data DH - 3

Submitted by GEOLOGY

Expl. or gp. sample No.

W/O No. DEL 60 No. 1454-60

11/4/61 (Date of report)

L. B. Roman, Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

GRADATION CURVES

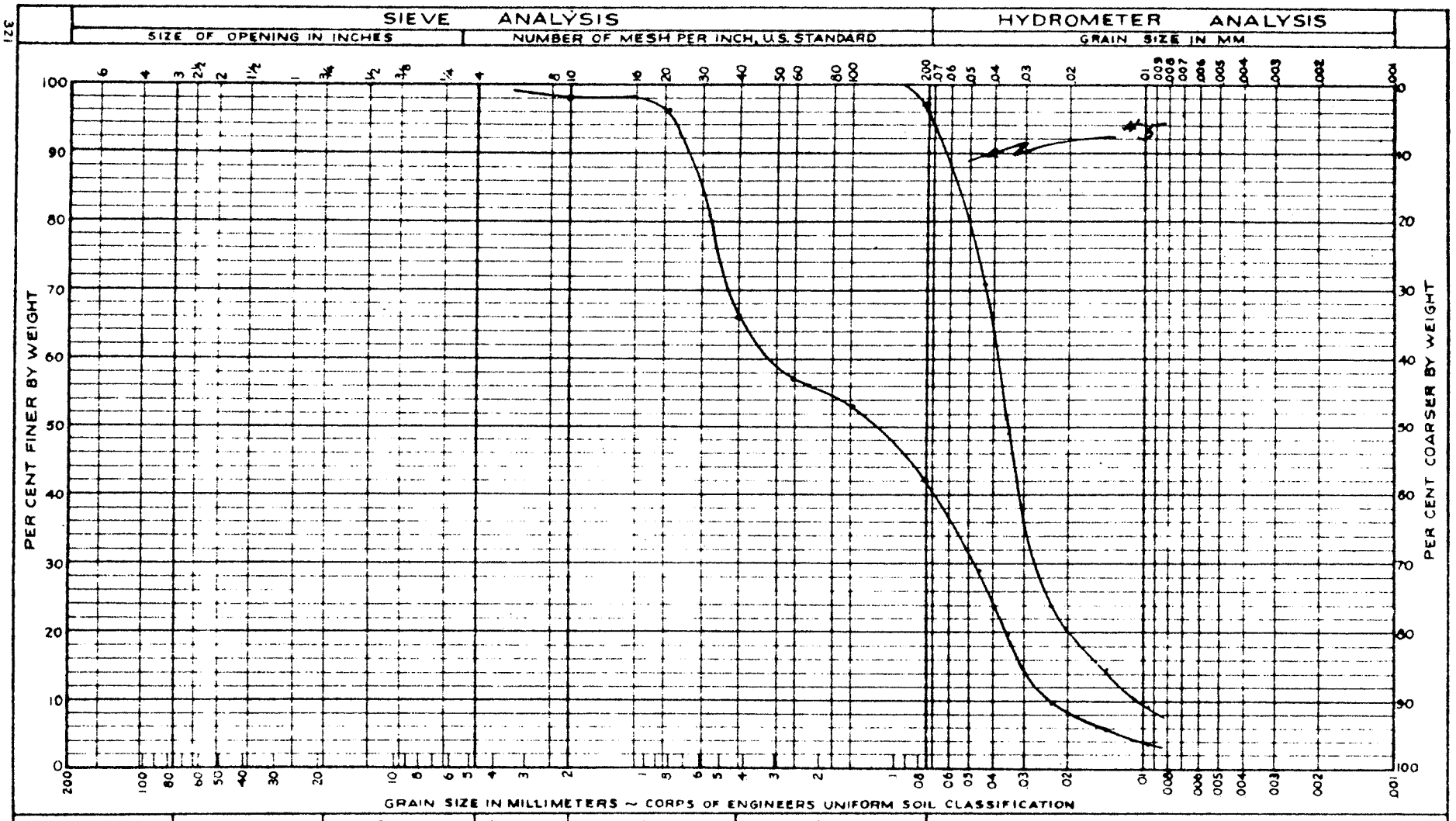
CORPS OF ENGINEERS, ~~NORTH PACIFIC DIVISION~~ TESTING LABORATORY, ~~PORTLAND, OREGON~~

Plotted:

Checked:

2

PND 3349



SAMPLE NO.	DEPTH - FT.	CLASSIFICATION	NAT W.C.	LL	PI
4	18'-20'	Silty SAND (SM)			
5	20'-21'	SILT (ML) Note: 15% wood by volume of sample			

NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS, NORTH PACIFIC DIVISION TESTING LABORATORY, PORTLAND, OREGON

Plotted:

Checked:

PROJECT Douglas SBH

Sample data DH-4

Submitted by GEOLOGY

Expl or gp. sample No

W/O No. DELaNo-1454-60

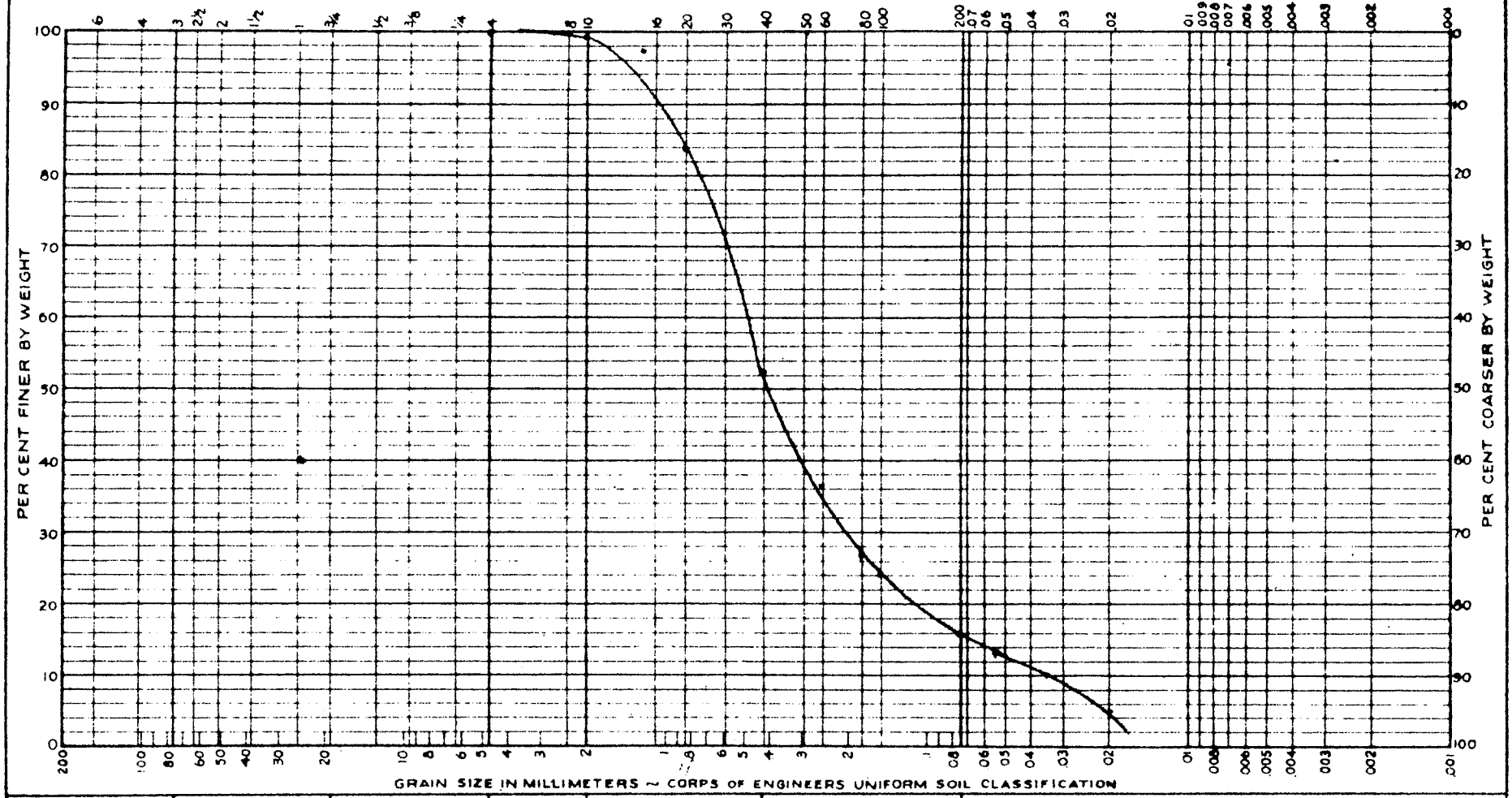
1/4/60 (Date of report)

Chief, Soil Mechanics Branch

PND 3350

321

SIEVE ANALYSIS		HYDROMETER ANALYSIS
SIZE OF OPENING IN INCHES	NUMBER OF MESH PER INCH, U.S. STANDARD	GRAIN SIZE IN MM



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE NO.	DEPTH - FT.	CLASSIFICATION	NAT W.C.	L.L.	P.I.
6	1'-2'	Silty Sand SM	-	-	-
		Slope in hydraulic placement-			
		1 vert. on 3 Hor.		∠ of Repose (dry) = 36°	

PROJECT

Sample data Douglas S. B. H.

Sample No 6

Submitted by Geology Recd. 26 Dec 60

Expl. or gp. sample No

W/O No. 1454-60

28 Dec 60 (Date of report)

Wm Knoepfler
Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

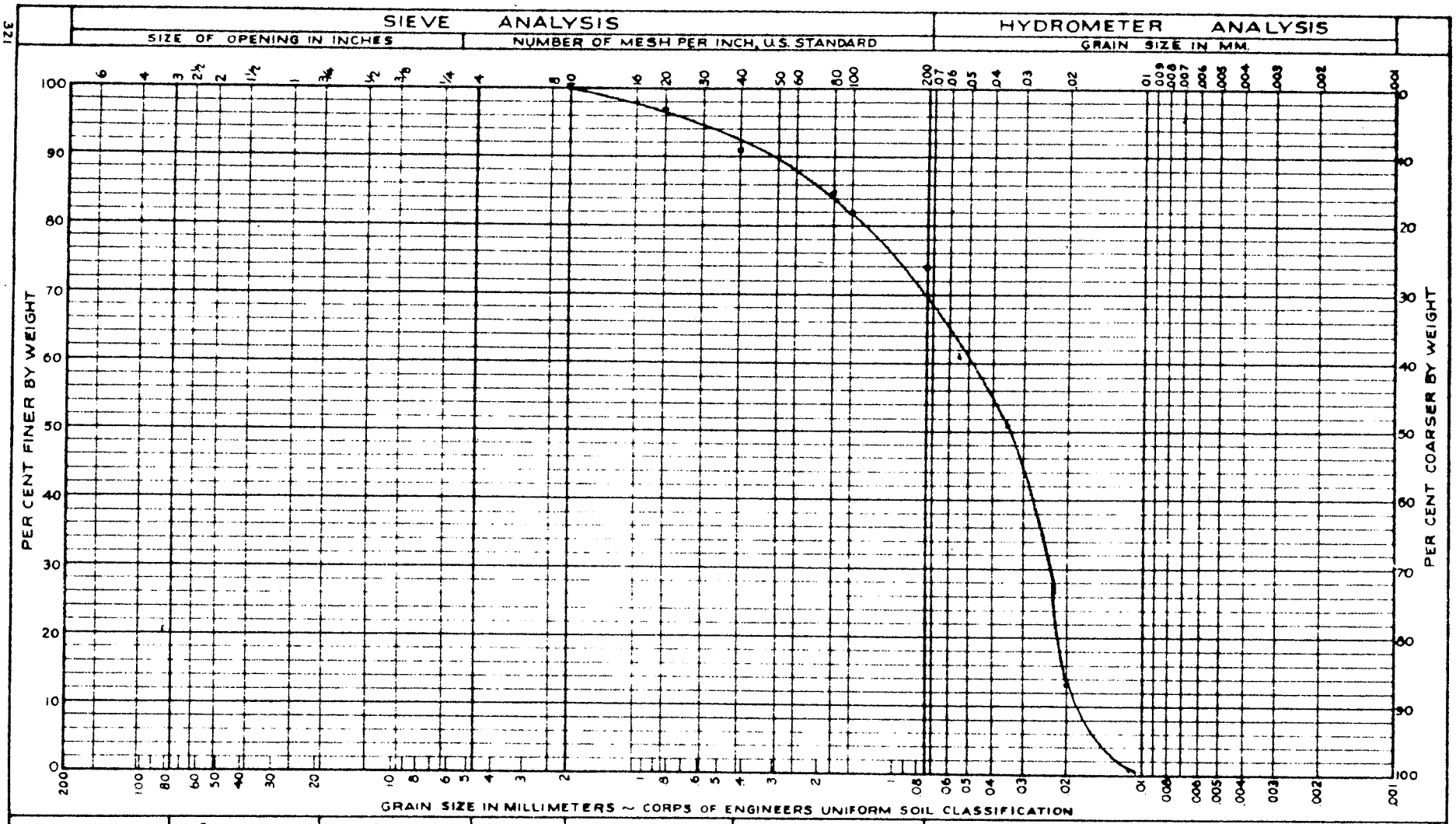
GRADATION CURVES

CORPS OF ENGINEERS, NORTH PACIFIC DIVISION TESTING LABORATORY, PORTLAND, OREGON

Plotted:
Checked:

7

PND 3351



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	LL	PI
7	0.5'-1	Silt- ML	—	-	30

NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS, NORTH PACIFIC DIVISION TESTING LABORATORY, PORTLAND, OREGON

Plotted:

Checked:

PROJECT Douglas S.B.H.

Sample data Sample #7

Depth 0.5'-1'

Submitted by Geology Recd 26 Dec 60

Expl or gp. sample No 7

W/O No. 1454-60

28 Dec 60 (Date of report)

Wm Krapfe
Chief Soil Mechanics Branch

PND 3352

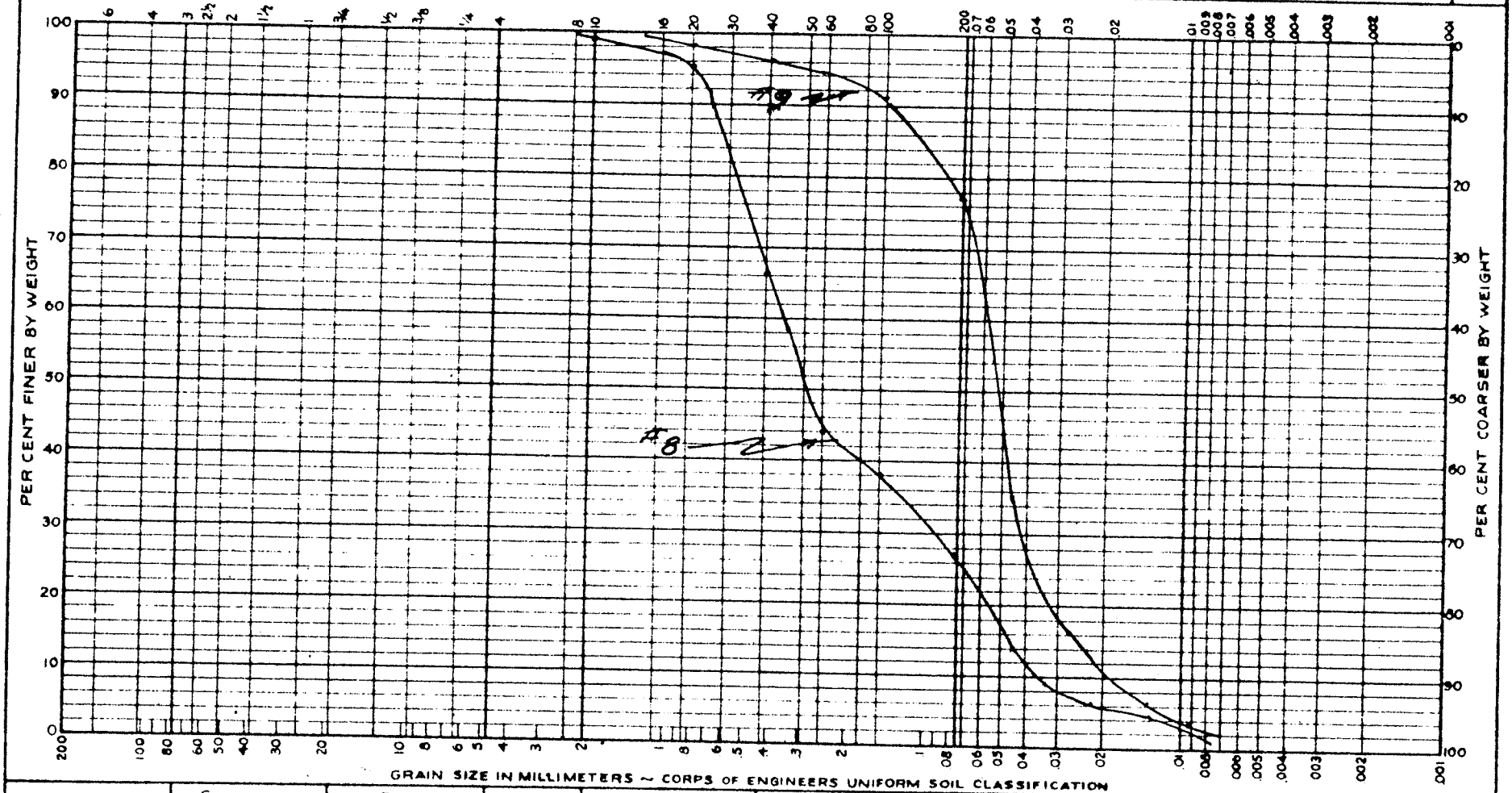
321

SIEVE ANALYSIS

SIZE OF OPENING IN INCHES | NUMBER OF MESH PER INCH, U.S. STANDARD

HYDROMETER ANALYSIS

GRAIN SIZE IN MM



COBBLES	GRAVEL: Coarse / Fine	SAND: Coarse / Medium / Fine	FINES

SAMPLE NO.	DEPTH - FT.	CLASSIFICATION	NAT W.C.	LL	PI
8	4'-5'	Silty SAND (SM)			
9	23'-25'	Sandy SILT (ML)			

PROJECT Douglas SBH

Sample data DH-5

Submitted by GEOLOGY

Expl. or gp. sample No

W/O No DELHBNo. 1454-60

1/4/61 (Date of report)

Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

GRADATION CURVES

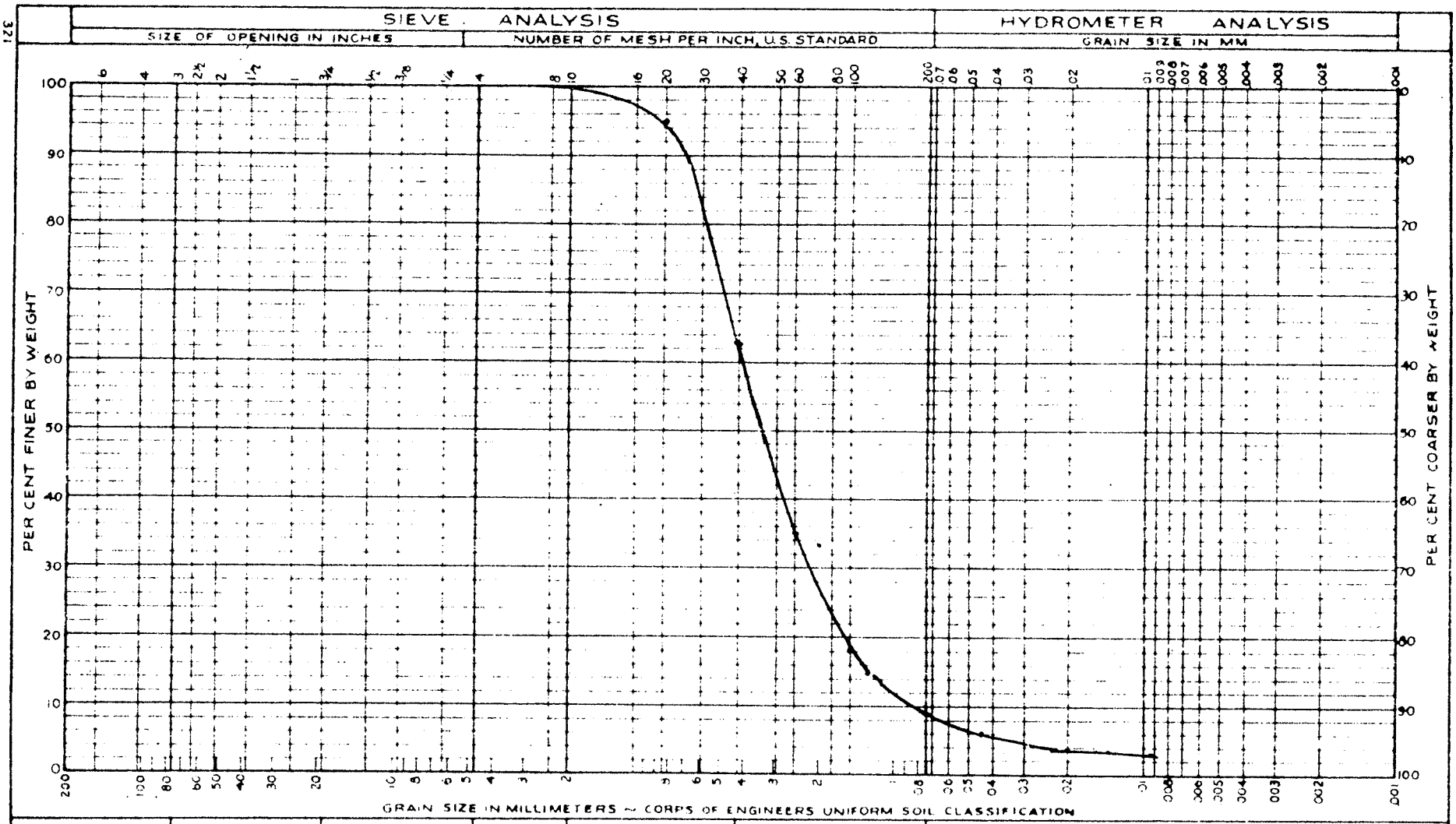
CORPS OF ENGINEERS, ~~NORTH PACIFIC DIVISION~~ TESTING LABORATORY, PORTLAND, OREGON

Plotted

Checked

4

PND 3353



SAMPLE NO	DEPTH - FT	CLASSIFICATION	NAT W C	L L	P I	
10	0 - 2'	Silty SAND (SP-SM)				-200 - 9 %

PROJECT Douglas SBH
Sample data DH-6
Submitted by GEOLOGY
Expl or qp. sample No
W/O No DE LRR No. 1468-61
2/1/61 (Date of report)
Chief, Soil Mechanics Branch

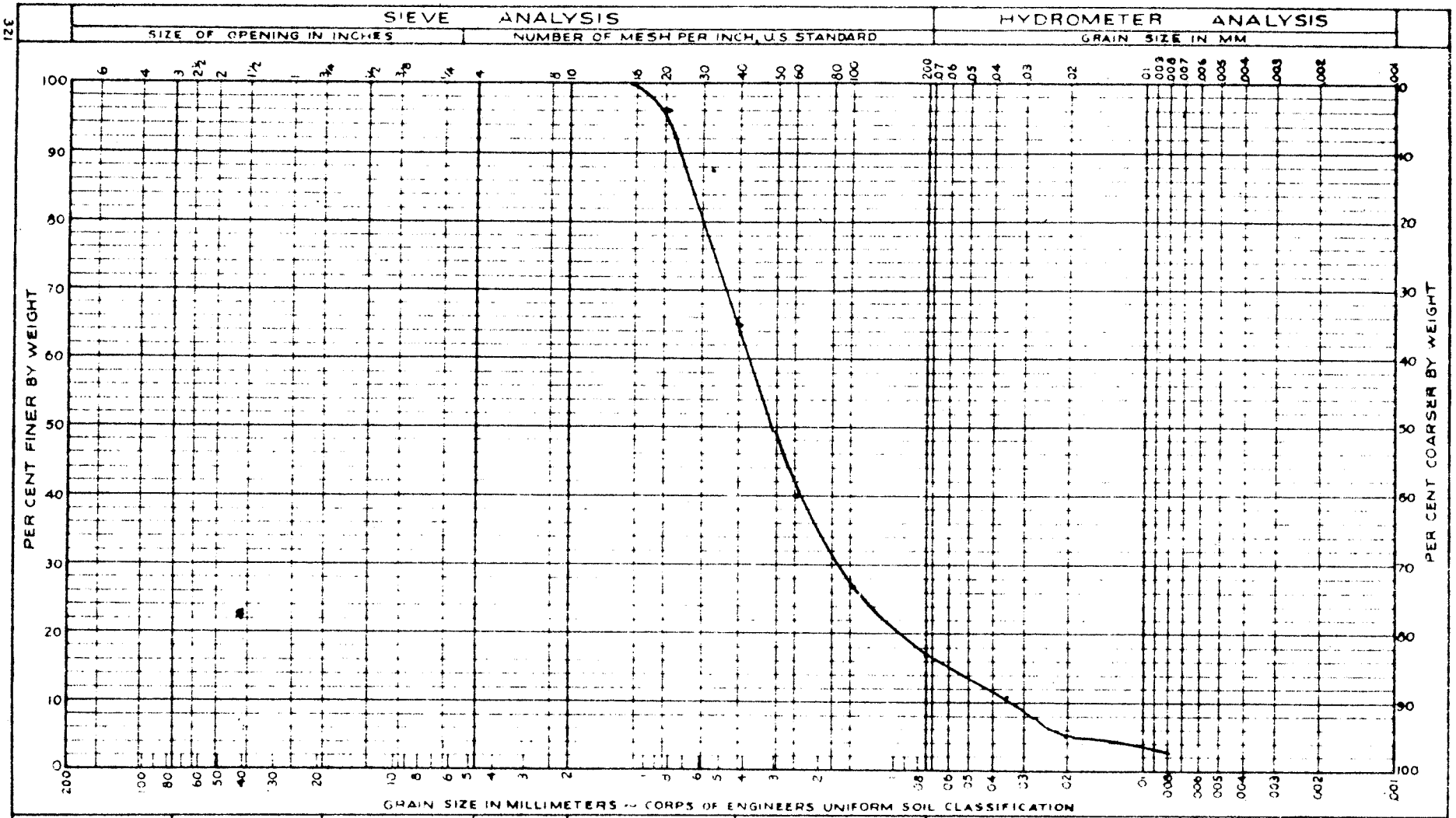
NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS, [redacted] TESTING LABORATORY, [redacted]

Plotted
Checked

PND 3354



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
11	6'-10'	SiHy SAND (SM)				-200 : 17 %

PROJECT DOUGLAS SBH
Sample data DH-6
Submitted by GEOLOGY
Expl or gp sample No
W/O No DELAB No. 1468-61
2/1/61 (Date of report)
Chief, Soil Mechanics Branch

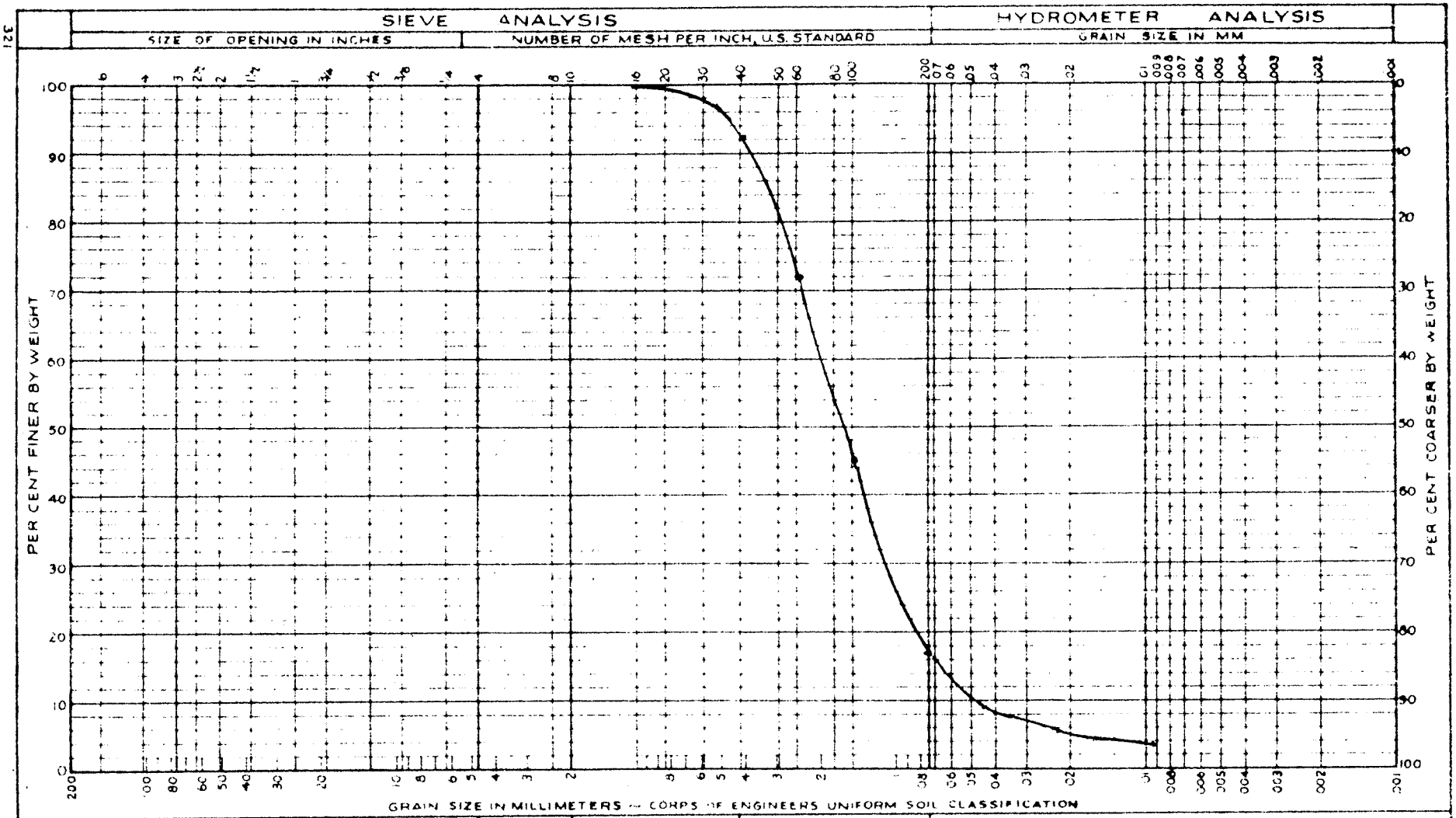
NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS NORTH PACIFIC DIVISION TESTING LABORATORY, PORTLAND, OREGON

Plotted
Checked

PND 3355



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
12	14'-18'	Silty SAND (SM)				-200 = 17 %

PROJECT Douglas S.B.H

Sample data DH-6

Submitted by GEOLOGY

Expl or gp sample No

W/O No DE Lab No. 1468-61

2/1/61 (Date of report)

Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

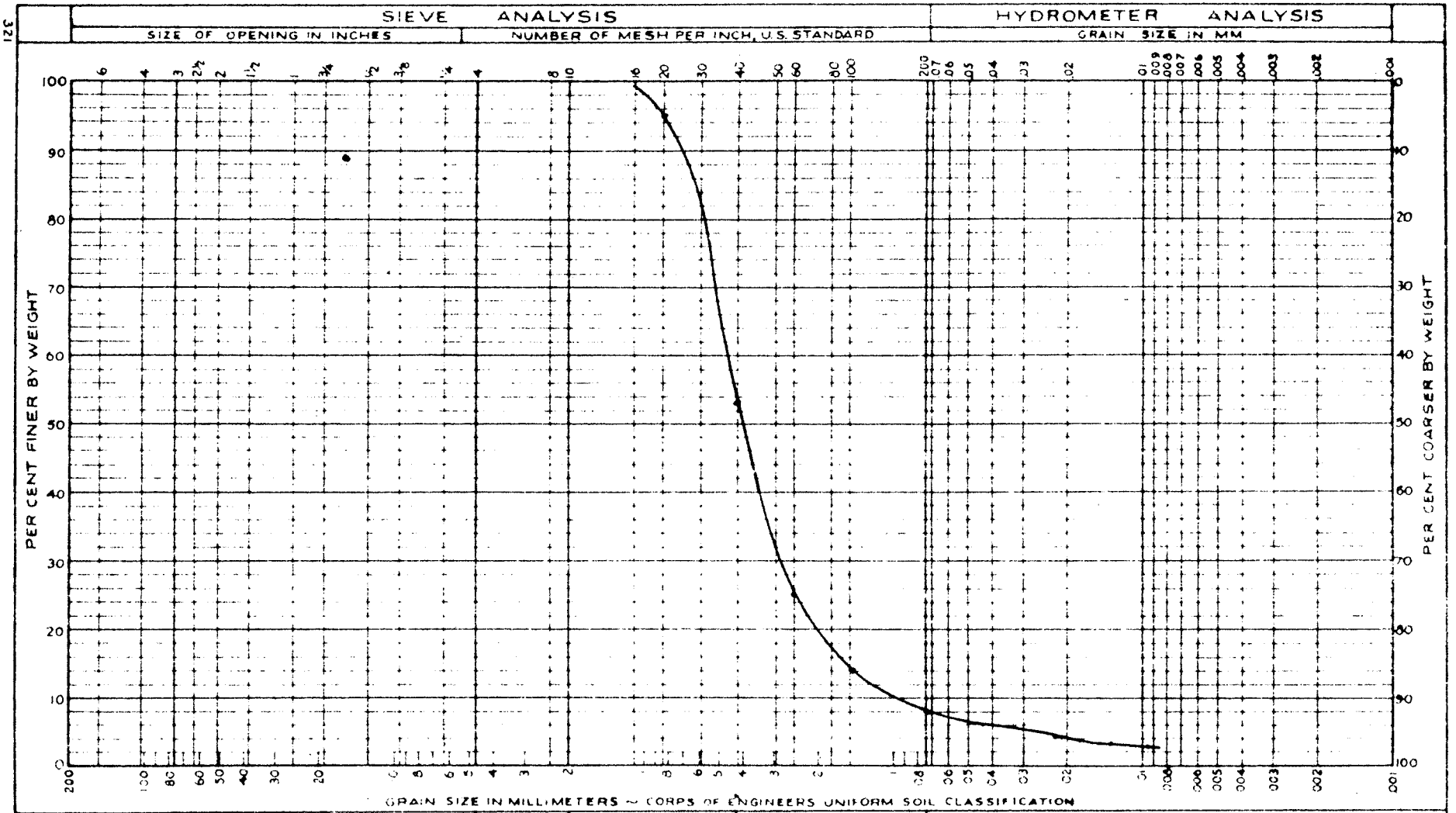
GRADATION CURVES

CORPS OF ENGINEERS ~~NORTH PACIFIC DIVISION~~ TESTING LABORATORY, ~~PORTLAND, OREGON~~

Plotted

Checked

PND 3356



SAMPLE NO	DEPTH - FT	CLASSIFICATION	NAT W C	L L	P I	
13	3'-6'	Silty SAND (SP-SM)				-200 = 8 %

PROJECT DOUGLAS SBH
Sample data DH-7
Submitted by GEOLOGY
Expl or gp. sample No
W/O No DELRB No. 1468-61
2/1/61 (Date of report)
J J Parsons Chief, Soil Mechanics Branch

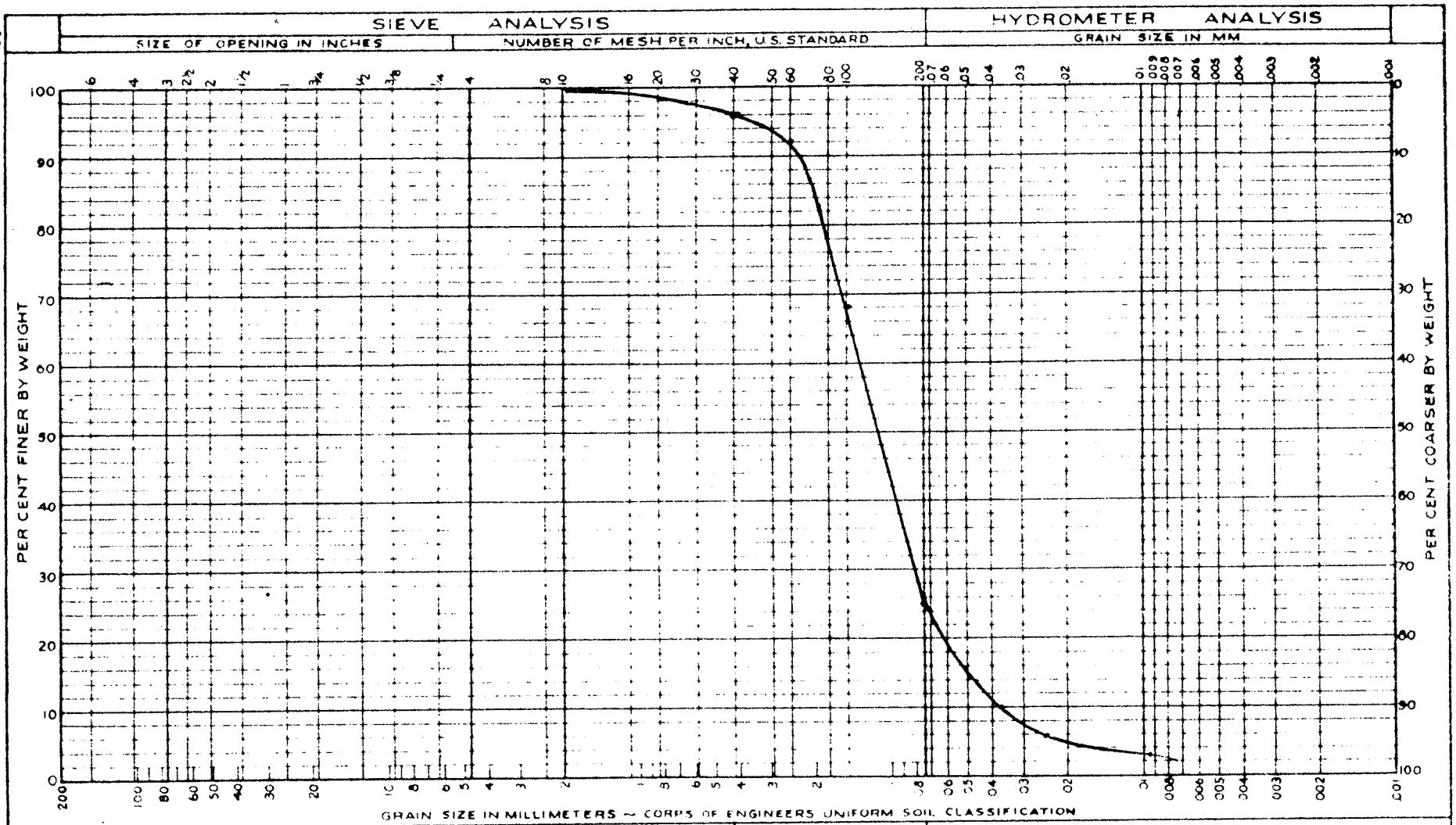
NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS [redacted] TESTING LABORATORY, [redacted]

Plotted
Checked

PND 3357



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W C	L L	P I	
14	9'-13'	Silty SAND (SM)				-200 - 25%

PROJECT Douglas SBH
Sample data DH-7
Submitted by GEOLOGY
Expl or gp. sample No
W/O No DELAB No - 1468-61
2/16/ (Date of report)
Chief, Soil Mechanics [redacted]

NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS [redacted] TESTING LABORATORY, [redacted], OREGON

Plotted
Checked

PND 3358

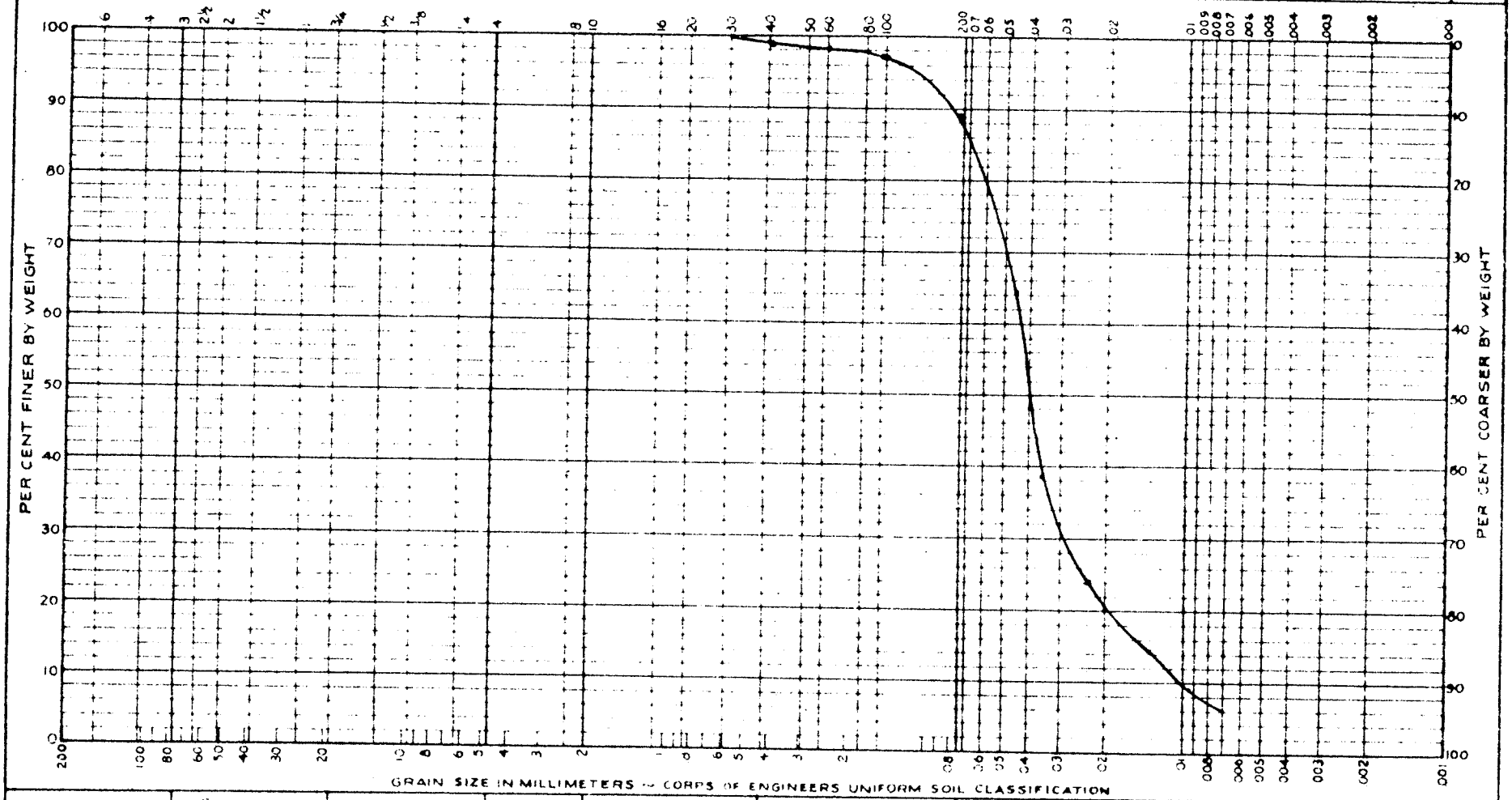
321

SIEVE ANALYSIS

SIZE OF OPENING IN INCHES — NUMBER OF MESH PER INCH, U.S STANDARD

HYDROMETER ANALYSIS

GRAIN SIZE IN MM



COBBLES	GRAVEL: Coarse, Fine	SAND: Coarse, Medium, Fine	FINES

SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
15	16.5 - 18.5	Sandy SILT (ML)				-200 = 88 %

PROJECT Douglas SBH

Sample data DH - 7

Submitted by GEOLOGIST

Expl or gp. sample No

W/O No DE Lab No. 1468-61

2/1/61 (Date of report)

J O Mann, Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

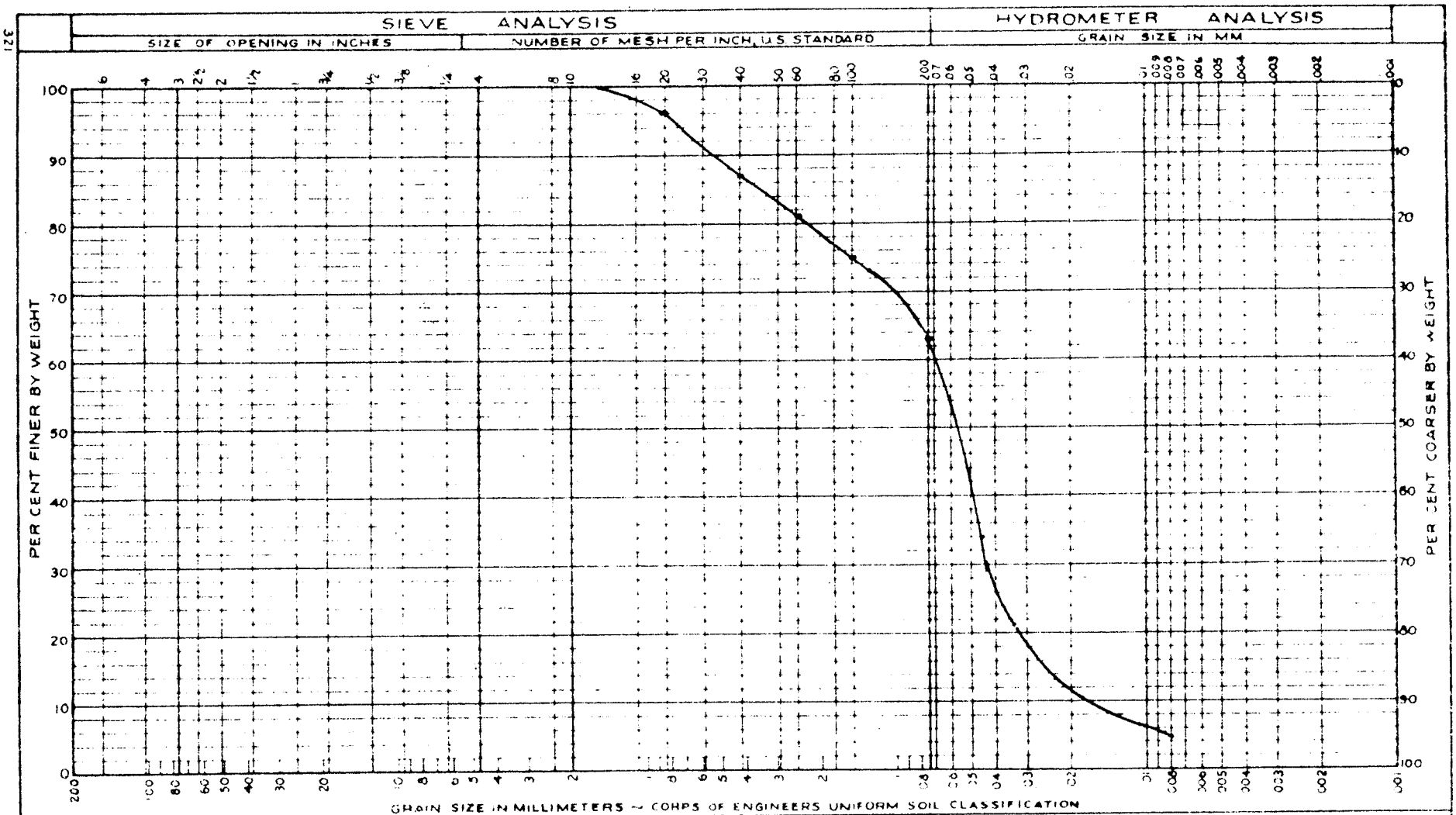
GRADATION CURVES

CORPS OF ENGINEERS, [redacted] DIVISION TESTING LABORATORY, [redacted], OREGON

Plotted

Checked

PND 3359



SAMPLE NO	DEPTH - FT	CLASSIFICATION	NAT W C	L L	P I	
16	0 - 2.5	Sandy SILT (ML)				-200 = 63 %

PROJECT Douglas SBH
Sample data DH-36
Submitted by GEOLOGY
Expl or gp. sample No
W/O No OE W&O No. 1468-61
2/1/61 (Date of report)
Chief, Soil Mechanics Branch

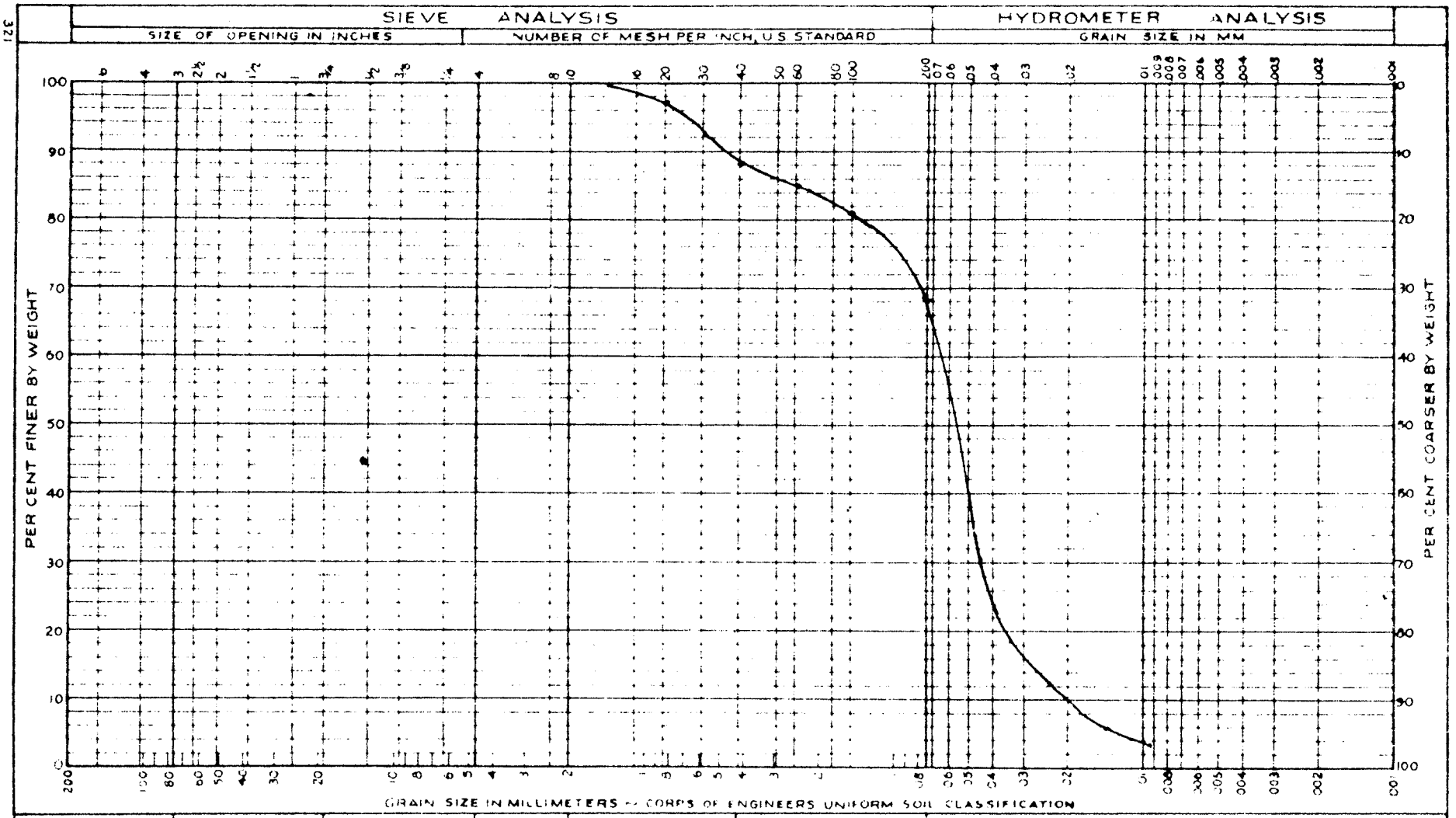
NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS, [redacted] DIVISION TESTING LABORATORY, [redacted], OREGON

Plotted
Checked

PND 3360



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
12	5' - 7.5'	Sandy SILT (ML)				-200 = 68 %

PROJECT Douglas SBH
Sample data DH-36
Submitted by GEOLOGY
Expl or qp sample No
W/O No DELABNo - 1468-61
3/1/61 (Date of report)
Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

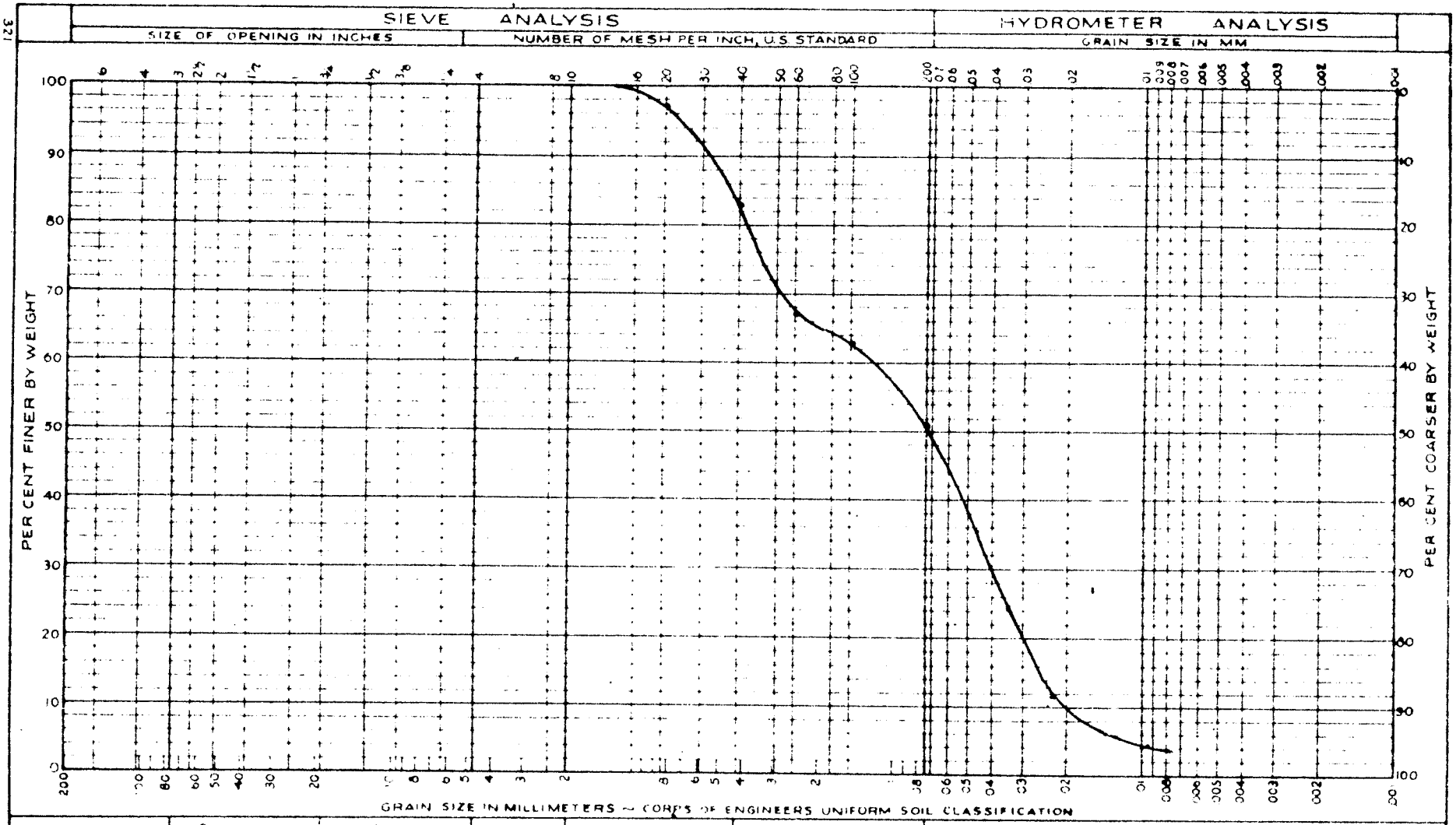
GRADATION CURVES

CORPS OF ENGINEERS [redacted] TESTING LABORATORY, [redacted] OREGON

Plotted
Checked

14

PND 3361



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
18	8'-11'	Sandy SILT (ML)				-200 = 51 %

PROJECT Douglas SBH
Sample data DH-36
Submitted by GEOLOGY
Expl or gp sample No
W/O No DELABNo-1468-61
2/1/61 (Date of report)

NPD FORM JAN 1951 321

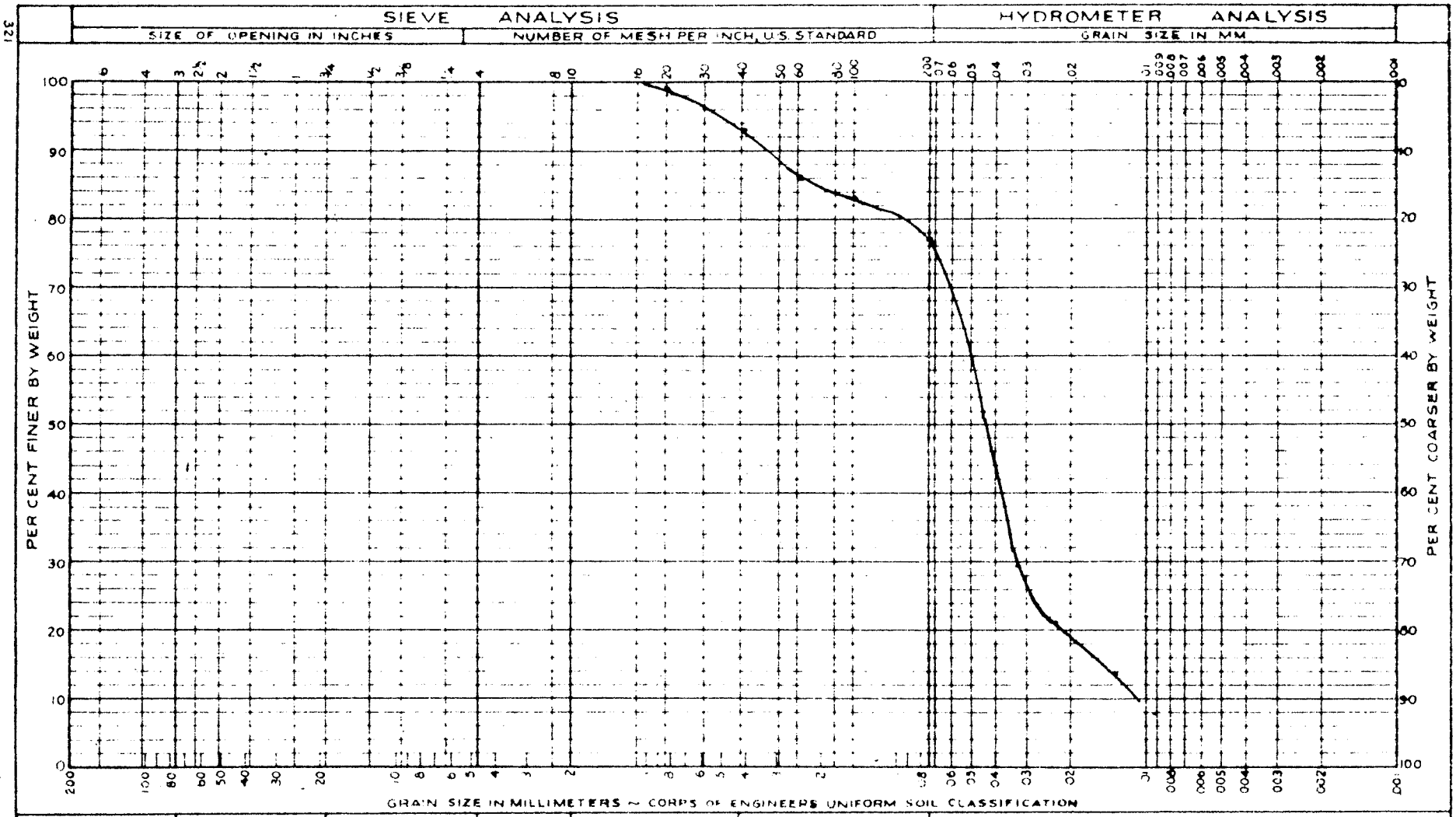
GRADATION CURVES

CORPS OF ENGINEERS, [redacted] TESTING LABORATORY, [redacted]

Plotted
Checked

Chief, Soil Mechanics Branch

PND 3362



SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT W.C.	L.L.	P.I.	
19	12'-15'	Sandy SILT (ML)				-200 = 77%

PROJECT Douglas SB/t
Sample data DH-36
Submitted by GEOLOGY
Expl or gp. sample No
W/O No DELAW No-1460-61
2/1/61 (Date of report)
Chief, Soil Mechanics Branch

NPD FORM JAN 1951 321

GRADATION CURVES

CORPS OF ENGINEERS [redacted] TESTING LABORATORY, [redacted]

Plotted
Checked

PND 3363

LOOKING ACROSS SITE AREA FROM JUNCTION OF DIKE AND CAUSEWAY

PND 3364

JANUARY 1961 DOUGLAS SMALL BOAT BASIN PHOTO 1

PND 3365

DIKE ALONG SOUTHWEST SIDE OF SITE AREA

JANUARY 1961

DOUGLAS SMALL BOAT BASIN

PHOTO 2

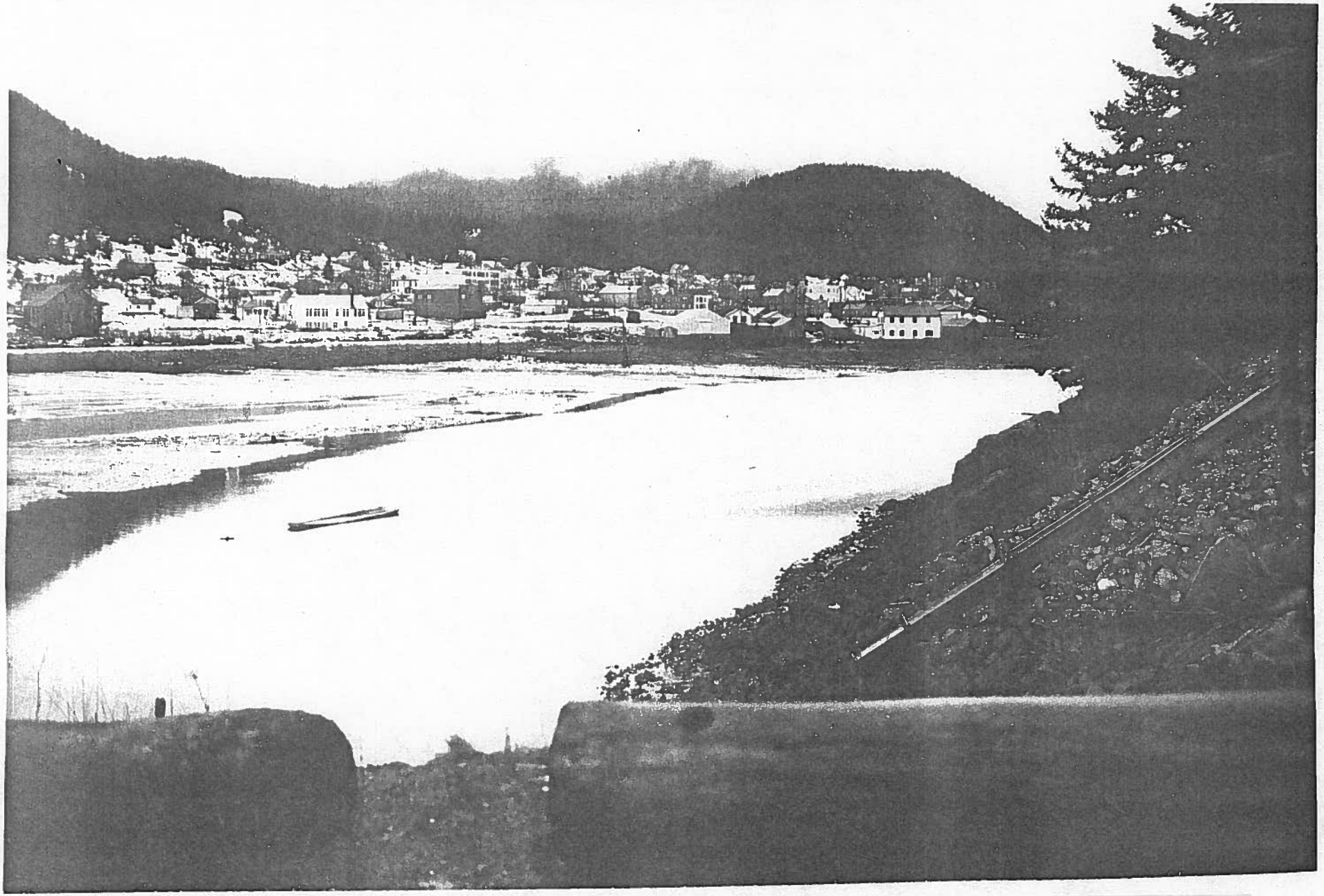
LOOKING NORTHWEST ALONG SOUTHWEST SIDE OF JUNEAU ISLAND

PND 3366

JANUARY 1961

DOUGLAS SMALL BOAT BASIN

PHOTO 3



LOOKING WEST FROM JUNCTION OF CAUSEWAY AND JUNEAU ISLAND
(NOTE BOXED WATERLINE TO USBM IN RIGHT FOREGROUND)

PND 3367

DECEMBER 1960 DOUGLAS SMALL BOAT BASIN PHOTO 4

LOOKING EASTERLY TOWARD JUNEAU ISLAND FROM WEST CORNER OF TIDAL BASIN

PND 3368

DECEMBER 1960 DOUGLAS SMALL BOAT BASIN PHOTO 5

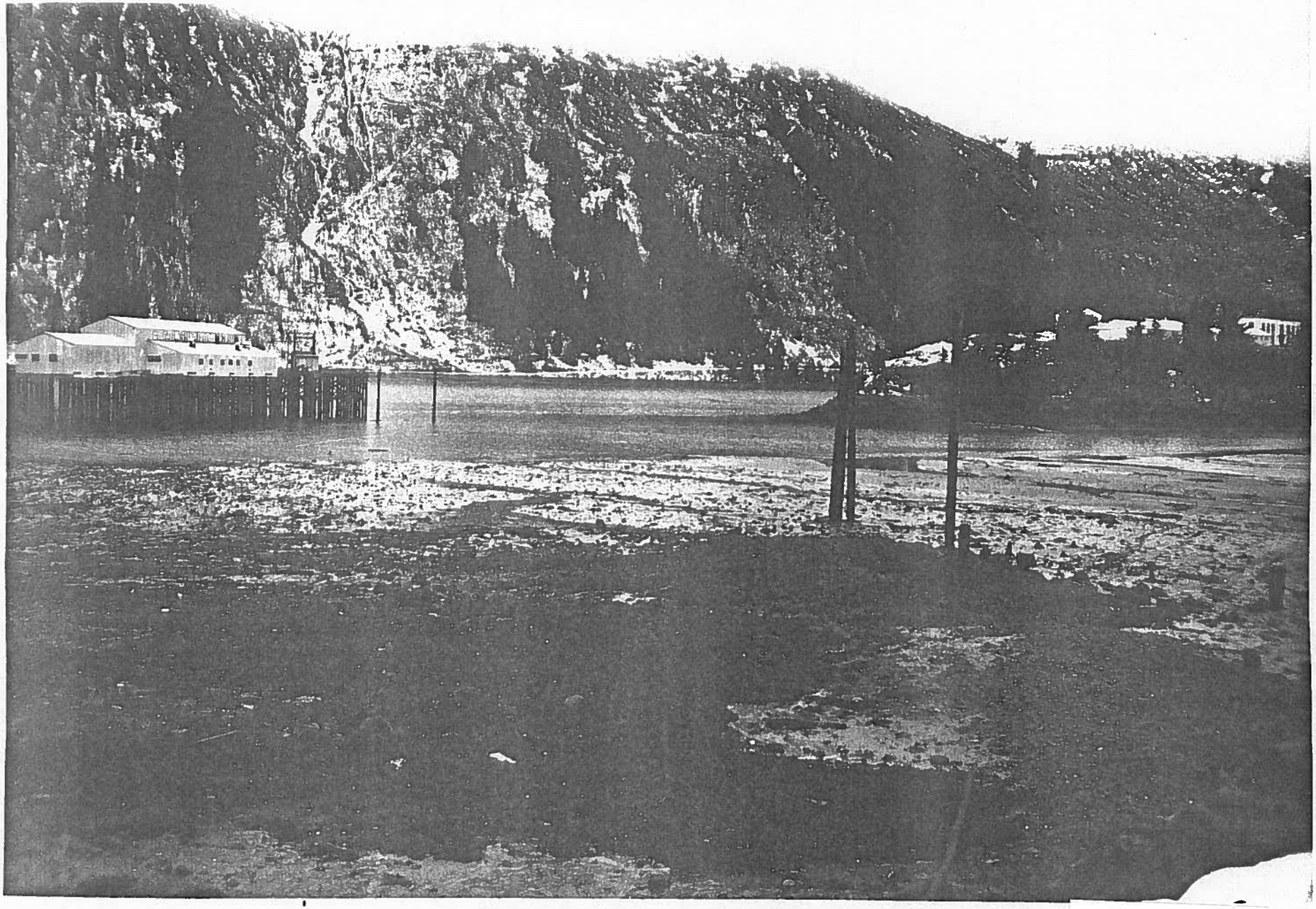
LOOKING SOUTHEASTERLY ACROSS SITE AREA

DECEMBER 1960

DOUGLAS SMALL BOAT BASIN

PHOTO 6

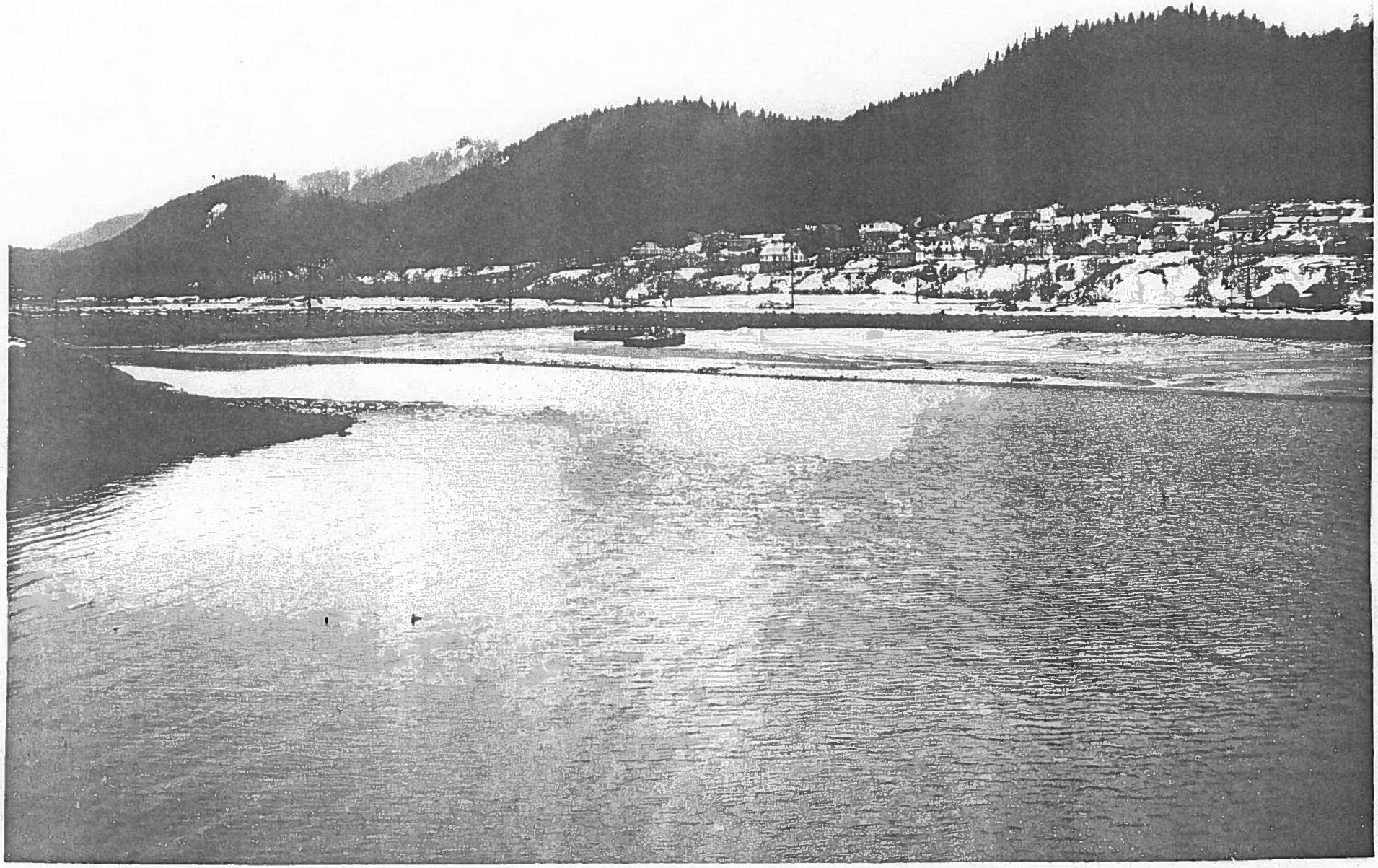
PND 3369



PND 3370

LOOKING NORTHEASTERLY TOWARD ENTRANCE TO TIDAL BASIN

DECEMBER 1960 DOUGLAS SMALL BOAT BASIN PHOTO 7



LOOKING INTO TIDAL BASIN FROM END OF DOUGLAS DOCK

PND 3371

DECEMBER 1960

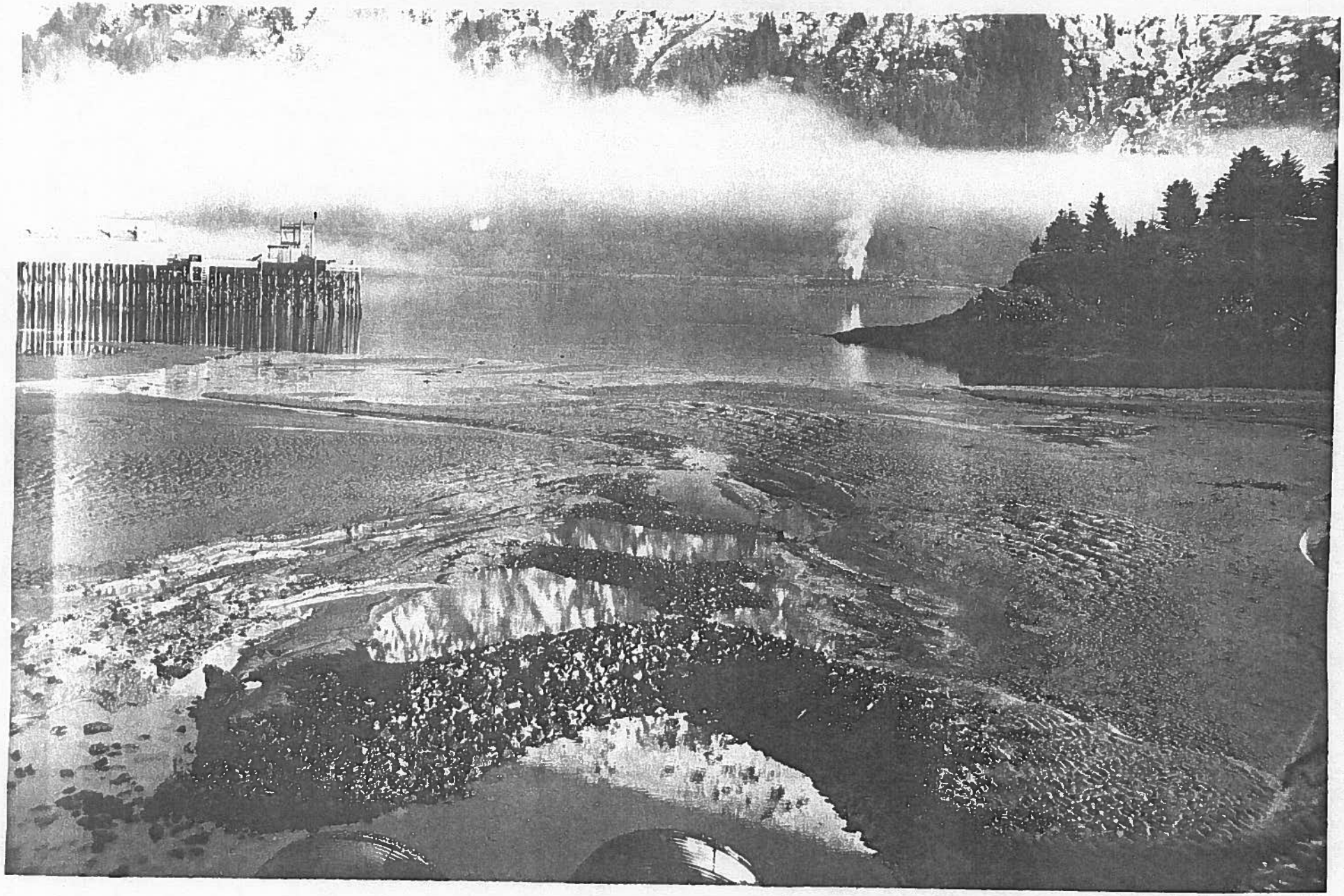
DOUGLAS SMALL BOAT BASIN

PHOTO 8

PND 3372

SHOAL AREA EXTENDING SOUTHWESTERLY FROM NORTHWEST END OF JUNEAU ISLAND

JANUARY 1961 DOUGLAS SMALL BOAT BASIN PHOTO 9



LOOKING NORTHEASTERLY TOWARD ENTRANCE TO TIDAL BASIN.
WASHING IN FOREGROUND FROM CULVERTS IN DIKE.
GRAVELS WASHED FROM DIKE DURING CONSTRUCTION.

PND 3373

JANUARY 1961

DOUGLAS SMALL BOAT BASIN

PHOTO 10

SKIFF BLOWN OUT OF BASIN DURING NORTHEASTERLY WIND

PND 3374

JANUARY 1961

DOUGLAS SMALL BOAT BASIN

PHOTO 11

CAUSEWAY TO JUNEAU ISLAND
(NOTE EROSION ALONG LEFT SIDE)

PND 3375

JANUARY 1961

DOUGLAS SMALL BOAT BASIN

PHOTO 12