



WATER-RIGHT DOCKET

Glacier Bay National Park & Preserve

Docket No: 1

BARTLETT COVE WATER SYSTEM

Preliminary Docket Information

00-00-0000: explanation/summary for docket 1

W A T E R D O C K E T I N F O R M A T I O N

A R E A GLACIER BAY N M

DOCKET NO. 1

APPLICATION NO. _____

PERMIT NO. _____

CERTIFICATE NO. _____

TITLE OF DOCKET *Bartlett Cove Water System*
ALDER CREEK DIVERSION

PRIORITY _____

REMARKS: _____

Supporting Hydro Data

Form 10-174
(Rev. 1-56)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

REPORT 7 SPL

COMPLETION REPORT OF CONSTRUCTION PROJECT

REGION Four	AREA Glacier Bay National Monument	COUNTY	STATE Alaska
PROJECT OR JOB TITLE Water and Sewer System		PCP NO. U-9-2 & U-10-2	
LOCATION IN AREA Bartlett Cove		MASTER PLAN NO. NM-GB-3016	BUILDING NO.
WORKING DRAWING NO. AND TITLE NM-GB-3003 Water & Sewer-Bartlett Cove NM-GB-3015-Bartlett Cove Water and Sewer System Extension			
APPROPRIATION TITLE AND SYMBOL 14X1035 Buildings and Utilities		ACCOUNT NO. 332.1	
CONTRACT NO. Day Labor		DATE WORK STARTED August, 1956	DATE WORK COMPLETED 11-9-1959
NAME OF CONTRACTOR AS-BUILT DRAWING BY		ADDRESS	

COST ANALYSIS

CONSTRUCTION ITEMS	QTY.	UNIT COST IN PLACE	TOTAL COST IN PLACE
6" wood stave pipe w/fittings, valves & valve boxes for water main	4475 lin.ft.	7.50	33,562.50 *
4" wood stave water pipe w/fittings, valves and valve boxes	900 "	7.00	6,300.00
2 1/2" galv. water line on main pier w/fittings, valves, drains & 1" service to float	300 "	8.00	2,400.00
2" Galv. pipe for drains on water main, w/fittings valves and valve boxes	200 "	6.00	1,200.00
1 1/2" Galv. pipe w/fittings, valves and valve boxes for water service to Bldgs. No. 2,3,5,6,11 & 12	300 "	5.00	1,500.00
3/4" Galv. pipe w/fittings & valves for water service to Bldg. No. 10	200 "	4.00	800.00
(continued--see attached sheet)			
		TOTAL	\$67,091.68 ✓

SUMMARY OF EXPENDITURES

PERSONAL SERVICES \$28,085.38	EQUIPMENT \$271.70	MATERIALS AND SUPPLIES \$30,844.05
OTHER Other: \$3,318.85 Facilitating Serv.: \$1,734 Equip.Operation: \$1,257.86 Equip.Depr. \$1,579.84		

CHANGE ORDERS

ORIGINAL CONTRACT AMOUNT \$17,000.00	FIRST \$1,000	SECOND \$51,000	THIRD (-\$10,000)
FINAL CONTRACT AMOUNT \$67,091.68	FOURTH (-\$2,250)	FIFTH \$12,250	SIXTH (-\$1,908.32)

THIS PROJECT OR JOB HAS BEEN COMPLETED IN ACCORDANCE WITH
APPROVED DRAWINGS, SPECIFICATIONS, AUTHORIZED CHANGES

SUBMITTED BY (Name and title) J. Jerrol Coates, Supervisory Engineer WDC	DATE 11-9-59
APPROVED BY (Name and title) L. J. Mitchell, Superintendent	DATE 2-12-60

(ATTACH NARRATIVE STATEMENT, PHOTOGRAPHS, AND "AS BUILT" DRAWINGS TO THIS FORM)

<u>COST ANALYSIS</u>			
Construction Items	Qty.	Unit Cost in Place	Total Cost in Place
4" Fire hydrants w/4" valves & valve boxes	7 ea.	500.00	3,500.00
Pump house structure	1 ea.	479.18	479.18
7500 gallon redwood water storage tank	1 "	2,000.00	2,000.00
Water intake sump	1 "	1,000.00	1,000.00
Water intake structure	1 "	1,200.00	1,200.00
Gasoline driven engine pump (standby)	1 "	800.00	800.00
Electric motor driven pump	1 "	1,000.00	1,000.00
6" orangeburg pipe for sewer main	600 lin.ft.	6.00	3,600.00
4" perforated orangeburg pipe for septic tank effluent disposal	500 lin.ft.	5.00	2,500.00
Sewer manholes	2 ea.	300.00	600.00
Reinforced concrete septic tanks	2 "	1,500.00	3,000.00
Reinforced concrete distribution boxes	2 "	200.00	400.00
4" orangeburg pipe for sewer connections to Bldgs. No. 2,3,5,6, and 12 (includes 50' of cast iron/under road to Bldg. No. 5) pipe	250 lin.ft.	5.00	1,250.00

*Includes cost of pipe remaining on hand which was not installed
into the concessioner's area pending firming up of plans as to
a concessioner's requirements.

Cost Verification

Personal Services	28,085.38
Supplies and Materials	30,844.05
Other Direct Expenses	3,318.85
Facilitating Services	1,734.00
Equipment Operation	1,257.86
Depreciation of Equipment	1,579.84
Equipment	<u>271.70</u>

Total Cost

67,091.69 ✓

PS&S Costs JV 34-8 3/10/60

(15.28%)

10,250.18

FISCAL CLEARANCE (Sgd) K. S. Beck

K. S. BECK
REGIONAL ACCOUNTANT
DATE MAY 10 1960

TOTAL

77,341.86

<u>Sub total</u>	<u>Direct</u>	<u>Indirect</u>	<u>Total</u>
Water System	55,741.68	8,515.90	64,257.58
Sewer "	11,350.00	1,734.28	13,084.28

BARTLETT COVE
WATER AND SEWER SYSTEM

Work on this project was initiated by day labor in August 1956, when clearing and excavation for the pumping line near Alder Creek and the sewer and septic tank in the residential area were completed during that month.

Materials ordered in July arrived in September when the 375 foot, 6" orangeburg sewer main, the 1200 gallon reinforced concrete septic tank, distribution box, and 300 feet of 4" perforated orangeburg pipe for septic tank effluent disposal were installed in the proposed residential area.

In October approximately 400 feet of 4" wood stave pipe was installed from the proposed water storage tank site to the road where 1100 feet of the permanent 6" wood stave water main was installed between this point and the residential area. At this time, construction ceased for the season.

Work was resumed as soon as the snow was off in early May, 1957, when the 60" corrugated metal pipe sump and the concrete floored, wood frame pumping plant structure were completed. In addition, 400 feet of 4" wood stave water supply line was installed above ground on log cribbing over the boggy area from the site of the intake to the sump.

In June the 7500 gallon redwood storage tank was installed, which, with the installation of the gasoline engine driven pump, and intake structure, essentially completed this stage of the construction.

The extension of the water and sewer system was undertaken with the purchasing of materials which were delivered to the site in August 1957. Construction was undertaken by day labor in September and by the end of October, 1068 feet of 6" wood stave water main had been completed from the tee at the end of the previously installed 4" line near the pumping plant to the point of distribution in the utility area. This section of the line was tested prior to backfill with hydrostatic pressure from the redwood storage tank.

In November the reinforced concrete septic tank, distribution box, and 200 feet of 4" perforated orangeburg pipe for the disposal of the septic tank effluent was installed for the buildings in the utility area. Work on the 2000 foot extension of the 6" wood stave water main from the residential area to the valves in the main pier area which began in November was completed and hydrostatically tested prior to backfilling by mid-December, when construction was discontinued for the season.

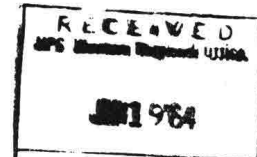
Work was resumed in April 1958, when the 170 feet of 6" orangeburg sewer main was installed in the utility area, together with connections to Buildings No. 6 and 12. 100 feet of 4" sewer lateral was constructed in the residential area to complete the connection to residence No. 3. The 4" lateral is of orangeburg pipe except that cast iron was used under the residential road where the water main is located.

Lack of equipment held up completion of this project; however, the system was placed in operation in May 1958. With the completion of two manholes in the utility area sewer main, the installation of 300 feet of 2½" galvanized water line to the end of the main pier, and the installation of a 60 gpm electric motor driven pump, (leaving the existing gasoline engine driven pump as a standby unit) the project was essentially completed by August 1958. Work since that date includes the construction of a ¾" galvanized water line from the 6" wood stave main to the power house (Bldg. No. 10), and the detection and repair of several leaks occurring in the line. It is possible that these leaks resulted from the earthquake of July 9, 1958. A complete test of the water system in May 1959 with a leak detector disclosed no leaks. The entire project was complete as of November 9, 1959.

Equipment employed in this construction included, at various times, a Byers Back-Hoe loaned by the Civil Aviation Agency, a rental bulldozer, a Service owned dump truck and hand equipment, and in the final phases a Service owned dozer.

As indicated on the drawings, the supply, pumping, and storage components of this water system were planned to be temporary installations to be replaced when funds are available for a suitable permanent installation.

Water Supply / SBC



D-36

June 16, 1964

AIRMAIL

Edward E. Johnson, Inc.
315 North Pierce
St Paul 4, Minnesota

Re: Glacier Bay St, Alaska

Gentlemen:

We are enclosing samples numbered 1 and 2 GBS Project 45A-648 for your inspection and recommendation for a screen in the development of a well.

These samples were taken from an open excavation at a proposed well site in Glacier Bay National Monument, Alaska. The samples were taken at a depth of approximately 16 ft. below the ground surface and approximately at the static water table. The over-lying material is glacial moraine composed of coarse sand, gravel and rock with a gradation coarser than these samples, but as a general rule of not more than 1/4 inch size materials with some small gravel and occasional rock 1" to 2" in diameter. The samples were taken about 24' above high tide line and back from the beach approximately 300 ft.

We desire to develop a water supply from a well or wells producing approximately 25 gallon per minute. The diameter of the well and screen length is subject to your recommendation. A single well producing the required sustained flow of course is preferable.

The coarse sand, Sample No. 1, overlays the sand in Sample No. 2. The excavation indicated the water bearing strata to be at least 6' deep and in the Sample No. 2 material. From a previous test hole, from which a sample was taken, it is believed that this same material extends down another 15 to 20 feet.

We would appreciate your recommendation as to the size and type of screen which should be installed in this proposed well. Should there be a charge for this service we would appreciate being advised as to the charges so that the necessary funds may be budgeted.

Very truly yours

Robert G. Cooper
Coordinating Project Supervisor
Western Office, Design and Construction

Enclosures

cc: Supt., Sitka & Glacier Bay

*Glacier
Water Rights*

*at 10:00
10:00 Ranger*

Glacier Bay National Monument
Gustavus, Alaska

June 10, 1964

Memorandum

To : Superintendent, Sitka and Glacier Bay
From : Chief Ranger
Subject : 24-Hour Test of Water Supply

To fill in the additional data requested a 24 hour test pumping was made on the culvert test hole.

Pipe detail is as follows: perforated pipe, 24, 5/16th inch holes per linear foot.

Measurements taken as control are as follows:

Top of 36" pipe to water line 26"
Top of 36" pipe to sand inside 57"
Top of 12" pipe to water level 47"
Top of 12" pipe to sand inside it 7' 6"

When pumping was started the water level drew down two inches and then held level, rising only about one half inch in the whole twenty-four hour test period.

The volume pumped per minute, based upon a check every three hours was only 22 inches per minute.

David B. Ertter
Chief Ranger

Ketcham

Siler

April 7, 1964

L-54

Memorandum

To: Superintendent, Glacier Bay

From: Regional Chief, Division of Land and Water Rights,
Western Region

Subject: Horizontal well, Bartlett Cove, Glacier Bay

On March 27, 1964, Chief Branch of Water Resources Reed transmitted copies of the Third Revision of Work Order 4-WR-64B to all areas conducting work under this authority. The copy for Glacier Bay should have been received by you by this time. The project "Construct horizontal well and make tests for quantity of water" at Bartlett Cove has been increased to a total of \$5,500. Also, funds are available to pay charges of the United States Geological Survey from carryover funds from the 1963 fiscal year program.

The letter report of March 27, by Mr. Melvin V. Marcher of the Geological Survey has been discussed with the Staff of the Western Office of Design and Construction and we have reached the joint conclusions as follows: We recommend that you use the \$3,000 to continue to develop the horizontal well (infiltration gallery) as planned, using the material you have on hand and hiring the type of equipment necessary to excavate and backfill a trench into water bearing sand. With the 12" pipe you have on hand we will have to use Mr. Marcher's alternate method of flushing the line if fine silt creates a problem. To do this at the high end of the trench an additional length of pipe should be installed to the surface of the ground. This should be at about a 45° angle if possible. It will allow flushing the entire line with a portable pump and hose when required. The Public Health Service will require an overlapping cover on this for protection of the water source.

We regret that travel restrictions will not permit an engineer from the Western Office of Design and Construction or this office to assist you at the site but we hope completion of the construction will not be too difficult. If a dragline is used the trench sides should be flat enough to relieve much of the pressure and sloughing you are now experiencing. If you plan to use hand tools to grade the ditch and place the pipe between vertical wells, a cribbing or retaining wall will be required. Pressures in this type of material when the walls are restrained vertically are as great or greater than liquid

water standing to the height of the undisturbed ground on the uphill side of the trench. Extreme caution should be taken for the sake of safety. We hope that cribbing or a retaining wall will not be necessary but we know conditions vary with each construction site. Perhaps Mr. Marcher is experienced in this type of work. However, if not, an experienced construction foreman or engineer in the area could be hired to supervise the project if shoring and sheeting is required. In any case the work should be done quickly with enough men on the job to assure safety and efficiency.

A sample of the sand and silt from the water bearing beds that are encountered in the trench construction should be taken at this time and marked so that information for an alternate well will be available if needed. Also as quickly as results are available as to quantity and quality of water please send the data to both the Western Office of Design and Construction and this office so that final construction drawings can be prepared.

(SGD) JAMES M. SILER

James M. Siler

cc:
Director w/c USGS report and
incoming letter
Chief, WDC (2) w/c of incoming
letter

RWKetcham:lsr 4/7/64



Water Rights/Glac

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Ground Water Branch
P. O. Box 303
Anchorage, Alaska

RECEIVED	NOV 30 1964	RECEIVED	NOV 30 1964
U.S. GEOLOGICAL SURVEY	U.S. GEOLOGICAL SURVEY	U.S. GEOLOGICAL SURVEY	U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA	ANCHORAGE, ALASKA	ANCHORAGE, ALASKA	ANCHORAGE, ALASKA

March 27, 1964

Ketchikan

Mr. L. J. Mitchell, Superintendent
Sitka and Glacier Bay National Monuments
U. S. National Park Service
Mendenhall Building
Juneau, Alaska

Dear Mr. Mitchell:

In response to your request, I visited the Bartlett Cove headquarters on March 11, 1964, to evaluate the geologic and ground-water conditions at the site of the proposed infiltration gallery. Ranger Butts provided me with information on construction that has been done so far.

The attached cross section presents my interpretation of geologic conditions at the site. Sand exposed in the trench is fine to coarse and contains a significant proportion of silt especially in the lower part. The thickness of the sand below the bottom of the trench is unknown. According to Ranger Butts, a test pit dug within the trench showed that the sand is water bearing and that the water table was only about a foot below the trench floor. That the sand is water bearing is also shown by a small spring discharging from the trench and by several springs downhill from the trench. The total discharge of these springs was estimated by me to be about 10 gpm (gallons per minute).

According to the information you gave me, the amount of water that will be needed eventually should be sufficient to supply 20 permanent and semipermanent residents, a 150-person lodge, and a restaurant. Although it is difficult to estimate the amount of water that will be used by the restaurant, a source of supply yielding 20 gpm should be adequate.

If the outwash deposit shown on the cross section is as much as 30 feet thick and is as coarse as that exposed in the trench, a well drilled in the trench probably would supply sufficient water. In order to determine the thickness of the sand a test boring would be required. If a well is drilled, considerable care should be exercised in selecting the proper length of screen and screen slot size. Manufacturers of well screens, such as the Edward Johnson Company, St. Paul, Minnesota, will provide advice on screens if samples of sand from the water-bearing beds are sent to them. They will also provide advice on well development.

If permeable sand extends down to and below sea level, it is probable that fresh water also extends below sea level. Theoretically, the depth to which fresh water extends can be determined by the formula $h=37t$, where h = the depth of fresh water below sea level and t = the height of fresh water above sea level. The application of this formula is modified by local geologic conditions and because the subsurface geologic conditions at the Bartlett Cove site are unknown, the formula must be used with caution. Furthermore, any well that extends below sea level and is heavily pumped is susceptible to contamination by salt water.

An infiltration gallery such as you have planned also probably would supply sufficient water. According to Ranger Butts the sand has a strong tendency to flow when saturated thus excavation below the water table undoubtedly will be difficult and retaining walls will be required. Engineers from your department can provide you with advice on construction methods.

If a gallery is installed, the intake pipe should be placed deep enough so that the water table will not fall below the top of the pipe. Measurements made by Mr. Waller in drive points across the creek from the gallery site indicate that the total water-level fluctuation is on the order of one foot. However, to be on the safe side, the top of the intake pipe probably should be at least two feet below the mean water table.

Because the sand contains a significant amount of silt which eventually might be washed through the gravel packing and into the intake pipe, the pipe ought to be large enough so it can be entered and cleaned periodically. An alternate method might be to provide a means of inserting a hose into the end of the intake pipe away from the sump and flushing the silt out.

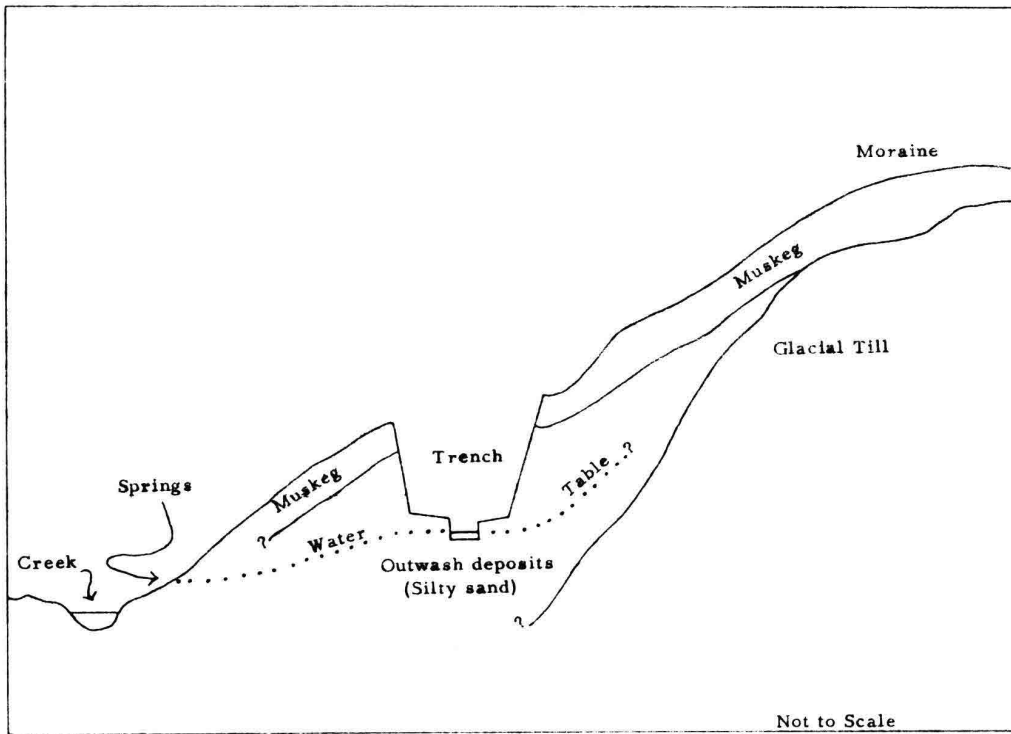
In summary, a sufficient water supply probably could be obtained from a drilled well in the vicinity of the trench if the sand extends downward for at least 30 feet. To insure maximum yield the proper screen should be selected. To eliminate the possibility of salt water contamination the well should not extend below sea level. An infiltration gallery probably would supply sufficient water but because of the tendency of the sand to flow, excavation may be difficult. Some provision should be made for periodic cleaning of the intake pipe.

Sincerely yours,

Melvin V. Marcher
Geologist-in-Charge

Attachment

cc - Regional Director, National Park Service ✓
Branch Area Chief, G&B, Menlo Park
Chief, Ground Water Branch



Diagrammatic cross section showing geologic conditions at site of proposed infiltration gallery, Bartlett Cove, Glacier Bay National Park

D5039

Mr. Richard Ketchum, WRO

Feb. 26, 1964

Superintendent, Sitka & Glacier Bay

Status of test well, Bartlett Cove

Following the conference telephone with you and Mr. Cooper recently, we cut a trench from the lateral to Alder Creek to dispose of excess water from the trench. As soon as this was opened, and flow allowed to begin, the water did not drain from the sand as we may have anticipated, but rather the suspended fine sand flowed out. As the trench was evacuated, the same material began flowing from the lower strata of the trench sides undermining the banks and allowing collapse of the trench sides. It soon became obvious that the fine sand would remain suspended in the water, making a mass that could well be described as quick sand.

We are not optimistic over the prospect of obtaining water from this source. The strata, down to 21 feet consisted of about 6 inches of muskey soil on the surface, on top of a very fine sand that could well be described as silt. This silt formation continued to the bottom of the trench without variation in character. There was no rock or gravel in it, and it was most unstable even before reaching the water saturated level.

It is our opinion that no filter system could be devised to accumulate water in this material. It is so fine that it moves with the least current, and remains suspended once disturbed.

As the trench remains at this moment, it continues to erode up the hillside, and we shall be compelled to backfill within a few days to arrest erosion that is continuing.

We will not backfill for about a week yet thinking that perhaps you will have further instructions.

Personally, I have about reached the conclusion that we must depend on Alder Creek for our water supply with a good filter and chlorinating system.

I will be pleased to have any suggestions from you.

S. L. MITCHELL

L. J. Mitchell
Superintendent

cc:
Chief Ranger, Glacier Bay

WKO

Sitka & Glacier Bay National Monuments
Juneau, Alaska

L54

July 1, 1963

Memorandum

To: Chief, Western Office Design & Construction
From: Superintendent, Sitka & Glacier Bay
Subject: Exploratory Water Well, Bartlett Cove

The following is quoted from a memorandum dated June 26, written to the Superintendent by Chief Ranger Fisher. It gives current status of the "horizontal" well project.

"The current, and most satisfactory -to-date, site of water exploration work is located on the slope south of Alder Creek at a point approximately on a line between the existing pumphouse and 8,000 gallon storage tank. The elevation is approximately 54 feet.

Mr. Roger Waller agreed with the choice of this site and appeared optimistic about the possibility of obtaining a satisfactory supply from a gallery well at this point. The enclosed rough sketch illustrates our proposal.

The proposal to pipe water from the collection pipe, by gravity to the pump stemmed from consideration of the difficulty that is encountered in excavation below the level of the water table. At that point, an unmanageable slurry of water and sand is encountered. It followed that in order to install a pipe in the excavation, the water would have to be drained off by gravity. Experience has proven that keeping the excavation dry by means of a diaphragm pump is practically impossible.

Mr. Waller suggested that a sandpoint be driven at the point chosen for the well and that tests be made from it. This was attempted but failed because salvaged pipe broke, our wooden maul broke, and no other materials were available. Driving ceased at a point 12 to 30 inches from target depth.

Then a trench was excavated by means of a D-4 Cat along the line of the proposed transmission pipe. (The backhoe on the front end loader would not perform along this line because of the slope.) This trench followed the level of the aquifer into the slope to a point where the water emerged 14 feet below the surface.

Next, testing was attempted by cutting both ends from a 55-gallon oil drum and employing it as a casing to sink into the water bearing sand. Sand was then excavated from inside the drum and the space baled out to observe the rate of recovery of the water level. Initial observations show the rate of recovery by this method to be approximately one gallon per minute. I believe this proves little because the water level in the immediate area was obviously lowered by the excavation. A sizeable, but undetermined, quantity of water drains out the lower end of this excavation. If, for instance, this casing extended from the original ground surface, through the undisturbed material, to the same level, recovery would be many times as rapid.

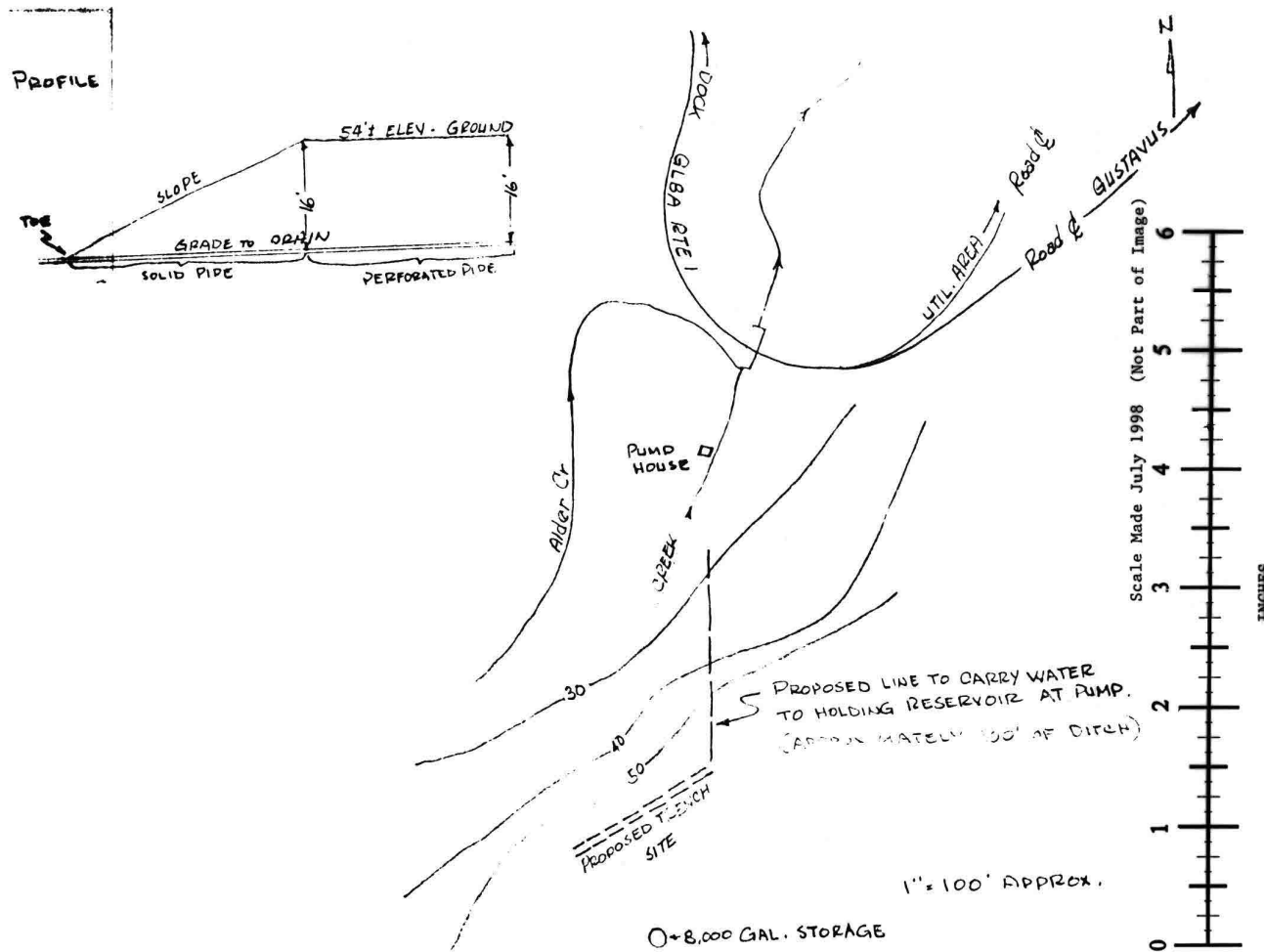
It is my opinion that a sizeable quantity of water could be obtained from a gallery well constructed as proposed to a length of approximately sixty feet. Mr. Waller's report will agree, I am sure.

I hesitate to venture an estimate of the amount of work that would be required to make such an installation with the equipment at hand. The backhoe mounted on our front end loader reaches only 12 feet under ideal conditions, and excavation to that depth is very slow. The bucket width is 20 inches. The trench could be excavated by bulldozer, but this method does not appear practical to me. It would involve excavation of approximately 500 cubic yards of material and then rehandling for the back-fill. Excavation with our backhoe would involve removal of approximately 50 cubic yards by hand including hand-lifting to the surface.

U.S. GEOLOGICAL SURVEY

L. J. Mitchell
Superintendent

cc
Regional Director, Western Region
Chief Ranger, Glacier Bay
Roger Waller, USGS, Anchorage



10/2

*L54
water rights/sec* Sitka and Glacier Bay National Monuments
Juneau, Alaska
May 24, 1963

Memorandum

To: Chief, Western Office Design & Construction
From: Superintendent, Sitka & Glacier Bay
Subject: Exploratory Water Well, Bartlett Cove

The following is quoted from a memorandum dated May 23, written to the Superintendent by Chief Ranger Fisher. It gives current status of the "horizontal" well project.

"The excavation thus far is approximately 30' x 12' x 2' and accumulates approximately 4,500 gallons of water for the 24 hr. period. We are in solid clay, with a small amount of shale so far (more of a small outcrop than a strata). It can be pumped out with the electrical centrifugal pump or the Edwards gear pump we have on hand to some extent as long as the water is clear. When it becomes muddied up as when trying to keep the hole dry enough for hand excavation or probing, the pump in use fails. From either debris getting into the pump or stopping up the strainer. If we dig much further with the backhoe there will be no way of removing material from the trench when hand excavation of the last 6' begins. A diaphragm pump which will remove muck, etc., and not lose its prime when it picks up mud, appears essential for the completion of this project. From previous experience, we know that when we do strike a water bearing sand, it will have to be pumped out to deepen the hole to required dimensions since it forms a slurry when freed from confinement.

We are still trying by various means to sink a test hole through the remainder of this clay strata in anticipation of striking a water-bearing layer in the next few feet - elevation of 15' or so above sea level.

All water entering the excavation so far is surface water seeping in from the top 3 feet or so of the sides and running in from immediately under the overburden."

A diaphragm pump was rented in Juneau and has been transported to Bartlett Cove for completion of this excavation.

/S/ L. J. MITCHELL

**L. J. Mitchell
Superintendent**

✓
**cc: Regional Director, Western Region
Chief Ranger, Glacier Bay
Roger Waller, USGS, Anchorage**

COPY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
Ground Water Branch
Room 29, Federal Building
Anchorage, Alaska

COPY

April 19, 1963

Mr. L. J. Mitchell
Superintendent
Glacier Bay National Monument
U. S. National Park Service
P.O. Box 1781
Juneau, Alaska

Dear Mr. Mitchell:

This letter is in response to your telephone request of March 29 to revisit the Bartlett Cove headquarters to evaluate the findings of your recent test-hole project. Please make reference to our letters of September 14 and 25, 1962 to your San Francisco office in regard to our initial reconnaissance of the site. A sketch map is attached for clarification of this discussion to show the general locations of the 20-foot test holes.

Geologic conditions. --The driving of well points did not permit a very accurate description of material encountered. However, with information on the excavations dug prior to driving the well points, the description of the ease of driving the points and the indications of water, and my previous geologic observations, it is apparent that a surface layer of sandy material is present throughout the site. The sand samples, as noted in the spoil piles from the excavations at each hole, ranged from medium to very coarse in size. Individual samples appear well sorted--containing grains of predominately one size. A clay layer was definitely encountered in holes, 2, 3, 4, and 5. Holes 2 and 3 apparently encountered the clay layer at about a 10-foot altitude (using a NPS site map and elevations reported by your field personal). Holes 4 and 5 had clay sediment within the pipe screen, as determined by the writer. Holes 1, 6, and 7, possibly did not encounter the clay.

Water-bearing conditions. --Attempts by your crew to pump each test hole were relatively unsuccessful with the means (gas-barrel pump) they had at hand. Their conclusions were that only test 2 had a water-yielding potential because this hole naturally flowed. Attempts to test it thoroughly were prevented by a broken joint in the hole. However, fresh water was present in each pipe at the time of the writers visit. Measurements of the water level were made by the writer at least four times in each test hole during the period April 4-5. The water level varied appreciably in test holes 1, 6, and 7, but less so in 4 and 5. These five wells (about 100 feet from high tide level) showed that the water level responded to the 10- to 15- foot tides during this period. Holes 1, 6, and 7, fluctuated about 0.5 foot and 4 and 5 fluctuated about 0.1 foot. The lag behind high and low tide

appeared to be about one-half hour. These fluctuations indicate that the well points are tapping an aquifer that transmits water. The aquifer may be freely discharging water into the ocean under water-table conditions, or it may be confined under clay and discharging under artesian conditions. Fluctuations in wells 4 and 5 may have been dampened because of partially plugged screens as evidenced by clay in the pipes. Rough determinations of elevations indicate that the water level in well 6 and 7 was about 3 feet above low tide level. Wells 1 and 5, within the lagoon area, had a water level about 5 feet above low tide level.

Well 3 is about 300 feet from high tide level and in Alder Creek valley. Its water levels indicated a small decline which probably represents a seasonal trend.

Summary of test-hole construction.--Water-bearing material was found in each hole. Determination of yield is believed to be primarily unsuccessful due to the probable plugging of the small-diameter screens in each well point. The reported well points used, "type 94 - finest mesh available," probably means that the screen openings are less than .006 inches wide. Inspection of the excavated sand indicated that screen openings .020 to .040 inch probably would have permitted better water movement into the well points. Also, it would have permitted cleaning out the fine material from the aquifer and the clay which becomes plastered on the surface of the screen when driving through clay layers.

Conclusions and recommendations.--The test-hole project was successful in that it proved that a potential aquifer exists at the site. Water samples from the test holes were not taken, but a sample of a ground-water seep near test 1 was collected. A chemical analysis of this water should be indicative of that expected from a shallow well. A field check of the water indicated that this water contained 0.3 ppm iron and a low chloride content. The complete analysis and, one on water from the present Alder Creek supply, will be forthcoming.

The evidence still points to the feasibility of a shallow supply constructed away from surface sources of contamination, or a drilled well or wells. Drilling a well near the storage tank, or higher up the hill to the west, may possibly encounter a thicker sequence of the water-bearing sand. Such a well would eliminate pumping water up to a storage tank for a gravity system. However, the possibility of encountering unfavorable rock and water-bearing material increases with sites located farther up the moraine. Aquifers beneath or within the clay are also possible. Well 2 encountered a confined water-bearing zone as evidenced by the water flow out the pipe.

Sincerely,

/s/ Roger M. Waller
Geologist in Charge
Alaska District

Attachment

CEIVED
MAR 11 1963

Sitka and Glacier Bay National Monument
Juneau, Alaska

134

March 9, 1963

Memorandum

To: Chief, Western Office Design & Construction
From: Superintendent, Sitka and Glacier Bay
Subject: Ground Water Investigation, Bartlett Cove

Enclosed is a copy of a report made by Mr. Fisher which will bring you up-to-date on results of subject tests.

After receiving Cooper's telegram of March 8, I contacted Bartlett Cove and have been assured that this project can be accelerated.

I have requested an individual report on each site as they are tested, so that I can keep your office apprised of progress.

You can be assured that we will proceed as quickly as possible.

/S/ L. J. MITCHELL
L. J. Mitchell
Superintendent

Enclosure
on

✓ Regional Director, w/copy incoming
Chief Ranger, Glacier Bay,

Superintendent, Adak and Glacier Bay

3/8/63

Chief Ranger, Glacier Bay

Test Wells, Bartlett Cove.

Of the seven proposed test wells, three have been driven approximately to the required depth of twenty feet.

Results are as follows:

Well No. 2: Driven to 18 feet; pipe broke off under ground. At 11 feet a layer of approximately 18 to 24 inches of what seemed to be clay was encountered. Then a layer of gravel was entered. At 14 feet a slight artesian flow was found. It did not yield at all to pumping, however. At 15 feet the flow increased to 1 gallon per minute. The point was backwashed in order to remove any clay that might be adhering to it, but this did not improve the flow. The hole still would not yield to pumping at a rate greater than the artesian flow. The well was driven an additional 3 feet with no improvement in flow. The pipe then broke at a coupling underground.

Well No. 1: In order to expedite the driving of this point, the machine was employed to dig a pit approximately five feet deep. At 4 feet below the surface, a layer of fine waterbearing gravel and sand was encountered. The rate of flow was estimated at about 3 to 4 gallons per minute but the walls of the pit sloughed off so rapidly that pumping was impossible. The material rapidly turned into a slurry. Also, it was impossible to measure the depth of this strata because the machine could not keep up with the caving in of the pit sides. The point was driven to a depth of twenty feet with no flow or yield to pumping efforts at any depth. No layers of clay were detected.

Well No. 3: Driven to a depth of 17 feet. Failure of the pipe threader then halted the project; also additional drive caps needed. The well was pumped at intervals but no water encountered before a depth of 15 feet. There only a very small rate was obtained- less than 1/2 gallon per minute. Driving will be resumed on this point.

Note that the wells are numbered above according to the plans. They are listed in the order that work was performed on them.

The project was halted because of lack of materials on February 18. A new pipe threader and additional couplings were received on March 7, but the required drive caps are still needed. The failure of the old threader to cut the threads properly resulted in the drive caps originally obtained being ruined in driving. Work performed since the 7th was limited to cutting and threading pipe in the shop in preparation for driving another well.


John
Chief Ranger

180 New Montgomery
San Francisco 5, California

Ketcham

134

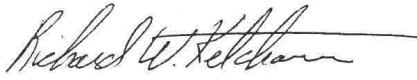
October 5, 1962

Memorandum

To: Chief, Western Office of Design and Construction
From: Acting Regional Chief of Lands - Western Region
Subject: Geological Investigation of Ground Water, Glacier Bay
National Monument

Enclosed is a supplementary report to the water supply reconnaissance submitted to you last week. It stresses the fact that there may be salt water intrusion in any area close to the ocean.

Water development should be inland or we must hope for a clay deposit to protect the water and perhaps create an artesian effect.


Acting Regional Chief of Lands

Enclosure

Copy to: Superintendent, Glacier Bay w/c of complete report
Director w/copy of complete report

RWKetcham:lsr



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
345 MIDDLEFIELD ROAD
MENLO PARK, CALIFORNIA
DAVENPORT 5-6761

IN REPLY REFER TO:

10-01-1962

October 1, 1962

L-54
200

Mr. Keith Neilson
Assistant Regional Director
U. S. National Park Service
180 New Montgomery
San Francisco 5, California

Dear Mr. Neilson:

I am forwarding with this letter the original of a supplementary report on the Sandy Cove and Bartlett Cove sites in Glacier Bay National Monument.

Mr. R. M. Waller, Geologist-in-Charge, Anchorage, Alaska, has supplied supplementary information including reference to the possibility of sea-water intrusion that I believe should be kept clearly in mind if any development of ground water sources is made which were at the sites named.

Sincerely,

Enclosure

J. H. Feth
Acting Branch Area Chief, GW
Pacific Coast Area

cc: R. M. Waller, GW, Anchorage, Alaska
Chief, GWB, Wash., D. C. Code: 4053-0001, w/encl.



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
Ground Water Branch
Room 501, Cordova Building
Anchorage, Alaska

September 25, 1962

Mr. Keith Neilson
Assistant Regional Director
U. S. National Park Service
180 New Montgomery
San Francisco 5, California

Dear Mr. Neilson:

This letter is a supplement to the previous letter on the ground-water potentials of the Bartlett Cove and Sandy Cove sites of the Glacier Bay National Monument; a couple of points need clarification.

Sandy Cove ground-water potential

The conclusions discussed in the previous letter were intended, except where noted, to apply to Sandy Cove as well as to Bartlett Cove. In general, it is believed that small quantities of ground water can be obtained in the sandy deposits at the head of the cove and in local areas along the sides of the cove. Where the sandy material extends below sea level, the probability of encountering salt water is high, especially near the shore. Development should therefore be inland. The water probably occurs at very shallow depth and could be developed by simple methods, such as by driven points or hand dug wells.

Greywacke or hard limestone bedrock occurs locally and probably at relatively shallow depth elsewhere. The rock probably would not yield water of quantities greater than that needed for individual domestic purposes. Bedrock wells would have to be drilled by standard well-drilling equipment.

In summary, the Sandy Cove area has a ground-water potential. No specific site was investigated as the general location of proposed building was not known. In general, the sandy deposits at the head of the bay appear to be the best source to be explored for large quantities of water, either in single shallow wells or in a complex of small, shallow wells.

Bartlett Cove salt-water hazard potential

The potential of encountering salt water upon drilling wells at Bartlett Cove is present. Drilling at the present buildings along the shore would involve well depths below sea level. The presence of a clay deposit, however, may provide an artesian aquifer that has a source of recharge inland and a static head that may provide a fresh-water aquifer. Other similar coastal areas in Alaska have such an occurrence. Pumping of such aquifers, however, requires constant surveillance to watch for salt-water intrusion.

Wells drilled upslope from the shore, on the morainal ridge, may encounter aquifers above sea level and thus be free from salt-water intrusion hazards.

Sincerely,

Roger M. Waller
Geologist in Charge
Alaska District

RECEIVED
NATIONAL PARK SERVICE
WASHINGTON OFFICE

Nov 28 9 13 AM '62

180 New Montgomery
San Francisco 5, California

L54

November 26, 1962

DE Lee
Sanchez
Wm 12/6
Miller

Memorandum

To: Superintendent, Sitka and Glacier Bay
From: Acting Regional Chief of Lands - Western Region
Subject: Water Test Wells at Bartlett Cove, Glacier Bay

This memorandum authorizes you to proceed with ground water investigations at Bartlet Cove in Glacier Bay. This work should be in accordance with the cost estimate given in your memorandum of November 16, 1962. If additional work is required or actual costs exceed the estimate you should advise this office by teletype.

(Sgd.) Richard W. Ketcham

Richard W. Ketcham

cc:
Director w/c of Supt's Nov. 16 memorandum
Chief, WQDC (2)

SITK



IN REPLY REFER TO:

L54

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Sitka and Glacier Bay National Monuments
Juneau, Alaska

November 16 1962

Memorandum

To: Regional Director, Western Region
From: Superintendent, Sitka & Glacier Bay
Subject: Water Test Wells at Bartlett Cove, Glacier Bay

In response to the conference telephone with Mr. Ketcham of your office and Mr. Cooper of WODC on this date, we have prepared cost estimates for making driven test wells to a depth of 20 feet at 7 locations, and for excavated (trench) wells at 3 locations to be specified by WODC. Work is to include pump yield tests at each location where water is located, and collection of samples for mineral analysis and bacteriological tests. Excavated wells are to be back-filled after permanent water source is located. Estimate follows:

Equipment, labor and materials to sink 7 driven test wells to 20' and 3 excavated wells to 12-14', Bartlett Cove.

Labor: Assemble and drive wells, operate equipment for excavation of dug test wells. Pump test, sample & backfill \$614.00

Equipment rental and fuel \$222.00

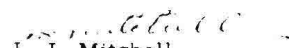
Materials:

Pipe, black iron 1-1/4" - 147 lin. ft. @ .58	86.00	
Couplings, blk iron 1-1/4" - 21 @ .64	13.44	
Well points 1-1/4" x 30" - 7 @ 13.50	94.50	
Drive caps 1-1/4" - 2 @ 2.60	5.20	
Miscellaneous costs	25.00	\$ 224.14

Total \$ 1,060.14

For cost estimate, Say \$ 1,060.00

We shall like to proceed as early as possible to avoid deep frost penetration. Approximately 3 weeks will be required to obtain materials required, after your authorization.


L. J. Mitchell
Superintendent

cc:
Chief, WODC (2)
Chief Ranger, Glacier Bay

Chf., Water Resources Section,
WASO

RECEIVED
NATIONAL PARK SERVICE
WASHINGTON OFFICE

Nov 19 7 55 AM '62 November 16, 1962

LS4

Memorandum (AIR MAIL)

To: Superintendent, Glacier Bay

From: Coordinating Project Supervisor, WODC

Subject: Water Investigations, Bartlett Cove, Glacier Bay

Reference is made to the telephone conversation between Regional Engineer Ketcham, you, and myself on November 16, 1962 and to the Geological Survey Report transmitted to you by Mr. Ketcham's memorandum of October 5, 1962, subject: Geological Investigations of Ground Water, Glacier Bay National Monument.

As discussed in our telephone conversation, it is necessary that certain investigations be made for a source of water for the proposed development scheduled for Bartlett Cove, Fiscal Year 1964. Three marked up prints of Drawing Number NM-GR-5303-A are transmitted showing the proposed locations for the well points and the alternate trench locations in case the driving of the well points is not possible.

The well points should be 1½ inches in diameter and driven to a depth of approximately 20 feet. As they are being driven, a check should be made for water within the pipe at the various stages of driving. If water is present in any quantity at any stage of the driving, the particular well point should be test pumped for approximately one hour and a water sample taken at the end of the pumping period. The water sample should be submitted to a laboratory and a complete chemical and bacteriological analysis made. The pumping rate should be accurately measured in gallons per minute. Seven suggested well point sites are indicated on the drawing. Sites 1, 2, 5 and 6 are indicated near Contour Elevation 20. Sites 3, 4 and 7 are indicated near Contour Elevation 30.

Should the driving of the well points be impossible because of sub-surface conditions, the trenches as shown should be excavated. These proposed trenches are located at Elevations 25, 30 and 40. The trenches should be 12 to 15 feet deep, or deeper if no water is encountered, approximately 25 feet long and whatever width is practical. A log of the material encountered at each test trench should be taken for future reference. If water enters the trenches

at various elevations, this should be noted. The trenches should be test pumped for several hours and the draw-down indicated (if measureable) to determine their approximate yield in gallons per minute. The area of the trench below its normal and draw-down level should be noted. A complete chemical and bacteriological analysis should be made of the trench water.

It is anticipated that a minimum of 30 gallons per minute should be developed to satisfy the requirements of the development. To assure adequate and proper design for the water supply, accurate and complete information should be furnished for the well points or the trenches.

It is understood that you will furnish an estimate of cost for each of the two proposed methods of investigations and that work will start at the earliest possible date so that design of the projects can be started. As indicated by Mr. Ketcham, expenditures incurred in making these investigations should be charged to Regional M&P Account 0140 (143.2).

It is requested that after the well points and/or trenches have been constructed and tested, their exact locations be marked on two copies of the enclosed prints and one copy submitted to this office and the other to the Western Region.

*Should be const. per work order 4-6763B
WPP*

SIGNED

Robert G. Cooper
Coordinating Project Supervisor, WODC

In duplicate

Attachments (3)

Copy to: Asst. Dir., D&C
Chief, Water Resources Section, WASO ✓
Reg. Dir., Western Region w/1 attachment
Engineer Ketcham, Western Region
Mr. Waller, Geological Survey, Water Resources Div., Alaska

January 26, 1961

L 54

Memorandum (AIR MAIL)

To: Superintendent, Glacier Bay
From: Regional Chief of Operations, Region Four
Subject: Bartlett Cove Water System, Water Right Docket No. 1,
Glacier Bay National Monument

Attached is a water right docket folder we prepared and are distributing for recording data on the Bartlett Cove water system.

The folder contains a copy of the completion report of the Water and Sewer System (completed November, 1959) and a copy of a map of the Bartlett Cove area (NMGB-2101) based on a portion of the Juneau B-6 quadrangle. These and additional data will be needed if Alaska adopts a water right code requiring filing for appropriative water rights.

(SGD) JOHN E. WOSKY

Regional Chief of Operations

Attachment

Copy to: Director (w/cy of docket)
Chief, WODC (2)(w/cy of docket)

ISSpaulding:lq

Spaulding L
Whitworth
Membey
Wosky
(quiet)

FILE COPY

Anderson myl 207

Send copy to: The Superintendent
Sitka & Glacier Bay
National Monuments
P. O. Box 1781
Juneau, Alaska 99805

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey Water Analysis
State Alaska Area Loc. Bartlett Cove Well Site City Juneau
Latitude _____ Longitude _____ Local Well No. #1
Owner _____ Use _____ Collector _____
Date 8/24/65 Sampling Depth _____ Appearance w.c. _____
Remarks test (pumping) @ 303 ft
(improved domestic water sample for mineralogical analysis).

Lab No. <u>8580</u>	Chemical Analysis (ppm)	Project _____
Specific Conductance (micromhos at 25°) . . . <u>519</u>	Aluminum (Al)	
pH <u>7.5</u>	Iron (Fe) <u>(dissolved)</u> <u>5.7</u> ✓	
Temperature °F	Manganese (Mn)	
Silica (SiO ₂) <u>12</u>	Copper (Cu)	
Calcium (Ca) <u>68</u>	Zinc (Zn)	
Magnesium (Mg) <u>28</u>	Dissolved Solids:	
Sodium (Na) <u>7.7</u>	Residue @ 180°C	
Potassium (K) <u>7.3</u>	Calculated from	
Bicarbonate (HCO ₃) <u>312</u>	determined	
Carbonate (CO ₃) <u>0</u>	constituents <u>331</u>	
Sulfate (SO ₄) <u>12</u>	Hardness as CaCO ₃ :	
Chloride (Cl) <u>6.4</u> ✓	Ca, Mg <u>284</u>	
Fluoride (F) <u>0.1</u>	Noncarbonate <u>38</u>	
Nitrate (NO ₃) <u>0.1</u>	Color <u>10</u>	
Phosphate (PO ₄)		
Boron (B)		

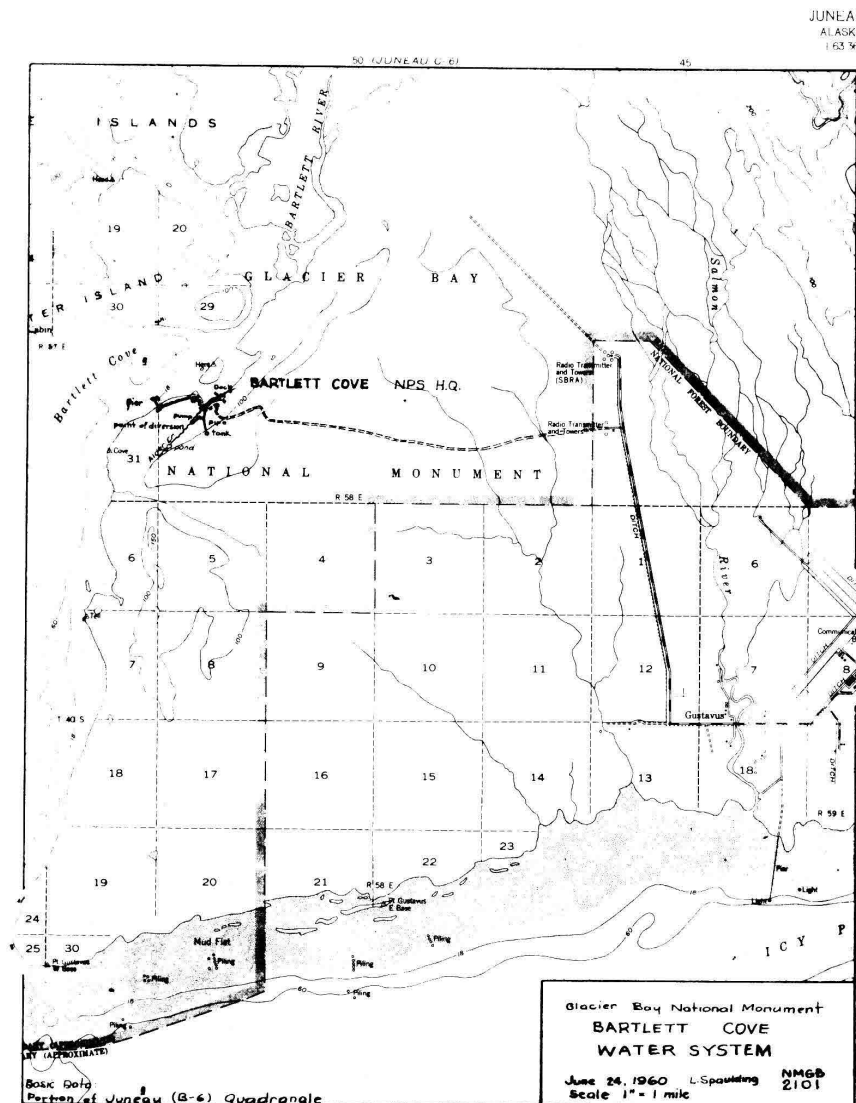
Equivalents parts per million (ppm)

Ca <u>3.39</u>	CO ₃ <u>0.00</u>	
Mg <u>2.29</u>	HCO ₃ <u>5.11</u>	
Na <u>0.33</u>	SO ₄ <u>0.87</u>	
Cl <u>0.19</u> <u>6.20</u>	Cl <u>0.18</u>	
	F <u>0.01</u>	<u>6.18</u>
	NO ₃ <u>0.01</u>	<u>6.08</u>

±0.4 % error

Analyses Completed 9-14-65 Chemist NH
Checked By _____ Transmitted 9-20-65

SWR 8/28/67
From Jerry Ray WRS
Use is 10,000 GPD +
They want a water softener. A 23,000 gpd unit is \$1600 ~~ea~~
Bill said To get a new sample and have it analysed
They said They would do it.



Docket Information

Number of Documents in Docket 36

Documents Dated from 1/24/1960 to 8/28/1967

Docket Compiled: 3/22/2011