



WATER-RIGHT DOCKET

Great Smoky Mountains National Park

Docket No: 25

UNNAMED SPRINGS. NEWFOUND GAP SYSTEM

Preliminary Docket Information

00-00-0000: see grsm docket no. 1 for map and preliminary map showing locations of water sources within the park

SEE GREAT SMOKY MOUNTAIN DOCKET NO. 1 FOR MAP
AND PRELIMINARY MAP SHOWING LOCATIONS OF
WATER SOURCES WITHIN THE PARK.

WATER RIGHTS DOCKET
Newfound Gap
Great Smoky Mountains National Park

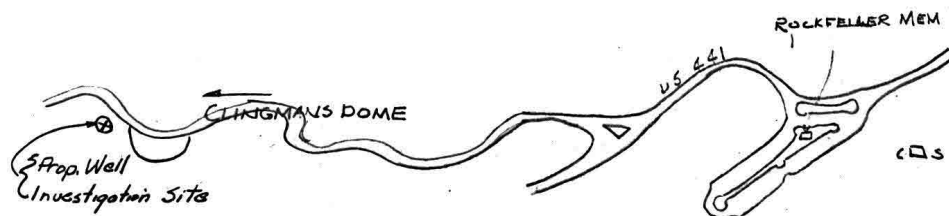
Supporting Hydro Data

NEWFOUND GAP

Situation: At the present time, the park has a spring development supplying water to the Newfound Gap area. The present spring has a capacity of approximately 5 g.p.m. or 7,200 gallons per day. Many times during the summer months, it is questionable whether we can continue operation of the comfort station facility as the available storage drops to dangerous levels. The park has taken the facility out of operation until the summer of 1967 as we are in the process of increasing the size of the parking area from 100 cars to a new capacity of 200 cars. The only controlling factor on the loadings to the parking area comfort station in the past has been the lack of space for parking but with the scheduled enlargement, the water demand will probably double to 12,000 to 15,000 gallons per day. There is a spring located approximately 1,600 l.f. up the road from the present spring development.

Proposed: We do not know what capacity there is in the new spring area but hope to do some development work this summer to determine if it has the quantity needed for supplementing the existing supply. Also, in order to explore all possibilities, we plan on drilling an 8" well in the vicinity of the present intake area with the hopes that it can be developed in case the spring developments fail to prove adequate.

Progress to date: We have requested wage rates for this drilling investigation and hope to have the well under contract by mid-May 1966. There is a project in the tentative 1968 F.Y. program for the extension of this system. A well of 10 to 20 g.p.m. is desired, if possible.



NEWFOUND GAP

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Gerald A. Rowe, Chief of Maintenance
Great Smoky Mountains National Park

DATE: June 23, 1969

FROM : W. M. McMaster, Hydrologist, USGS, WRD
Knoxville, Tennessee

SUBJECT: Chemical analyses, water from Sugarlands and Newfound Gap Wells

Attached are results of analyses of water from wells at Sugarlands and Newfound Gap. The iron in Newfound Gap well water is substantially higher than that of other ground water in the Park. I think the pH values listed are higher than they probably were when the samples were collected.

Bill

William M. McMaster



5010-108

(Newfound Gap - Addendum No. 1)

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

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
WATER ANALYSIS

W.R. Lab. No. NC 51108

Location <u>near Cherokee - Haywood County</u>			
Source <u>Newfound Gap Well</u>			
Depth <u>225'</u> ; Drilled: <u>12/68</u> ; Pt. of coll: <u>Pump discharge</u> ; Owner: <u>Nat'l. Park Ser., Gatlinburg Tenn.</u> ; Use: <u>Public Supply</u> ; WBF: <u>ANAKEESTA Formation</u> ; WL: <u>80.0'</u> below Land Surface; Yield: <u>4.5 GM meas.</u> ; Appear.w.c.: <u>clear</u> ; Sampled after pumping <u>4 hrs.</u>			
Date of collection <u>2/14/69</u> by <u>W. M. McMaster</u>			
Gage height(ft.) <u>-</u>		Discharge(sec.ft.) <u>-</u> Temp.(°F) <u>11</u>	
(Parts per million) (in milligrams per liter)			
Silica (SiO ₂).....	12	Carbonate (CO ₃).....	0
Aluminum (Al).....	.1	Bicarbonate (HCO ₃).....	60
Iron (Fe).....	.52	Sulfate (SO ₄).....	13
Manganese (Mn).....	.18	Chloride (Cl).....	1.6
Calcium (Ca).....	16	Fluoride (F).....	.1
Magnesium (Mg).....	4.3	Nitrate (NO ₃).....	.4
Sodium (Na).....	2.2	Phosphate (PO ₄).....	.01
Potassium (K).....	1.2		
Lithium (Li).....	.		
(Parts per million) (in milligrams per liter)			
Dissolved solids:		ABS.....	
Sum.....	81	Color.....	5
Residue upon evaporation @ 180°C.....	75		
Hardness as CaCO ₃	57		
Noncarbonate.....	8		
pH.....		Specific conductance (micromhos @ 25°C)	119

Preliminary Report, Newfound Gap Well

A ground-water supply of 10-20 gpm is desired at Newfound Gap to supplement or replace the existing spring supply. Increased parking capacity at this location will mean an increase in water usage at the comfort station.

Geology

As described previously by Sumsion in a reconnaissance report of this area, the Newfound Gap area is underlain by the Thunderhead Sandstone and the Anakeesta Formation. As shown in figure 1, these formations are separated by the Oconoluftee Fault, the trace of which is followed by the valley of Beech Flats Prong. Bedrock is arkose, subgraywacke, phyllite, and sandstone. The phyllite contains moderate to abundant iron sulfide.

Drilling

A 6-1/4 inch test well was drilled Nov. 21-26 by Jack Terry Well Drilling Co., Sevierville, Tenn. using an air rotary rig. The well is located at the northeastern edge of a fill area west of U. S. Hwy 411 and 0.6 mi southwest of Newfound Gap, at an altitude of about 4900 ft, or about 140 ft lower than the comfort station at Newfound Gap parking lot.

The well is cased to a depth of 24 ft, and penetrates fresh to weathered sandstone and phyllite, as shown in figure 2. Several weathered fracture openings were penetrated, the deepest being 1.5 ft thick at a depth of 167 ft. At the finish of drilling at 225 ft, the rig was blowing 6 gpm from the well.

Pumping

A four-hour pumping test was run on this well on February 14, 1969, using a submersible pump set at 107 ft. Static water level was 36.90 ft below the top of casing, which is about 1.5 ft above ground surface.

Results of the test were disappointing, as it was expected that the yield would be at least 6 and perhaps 8 gpm at a specific capacity of between 0.2 and 0.5. Instead, drawdown was 45 ft at 4.5 gpm or a specific capacity of only 0.1. Pumping water level at the end of the test, when drawdown was approaching stability, was 82 ft, as shown in figure 1.

This well will provide 4.5 gpm on a continuous basis, or 2700 gallons in 10 hours. This would perhaps be sufficient for operation of a comfort station.

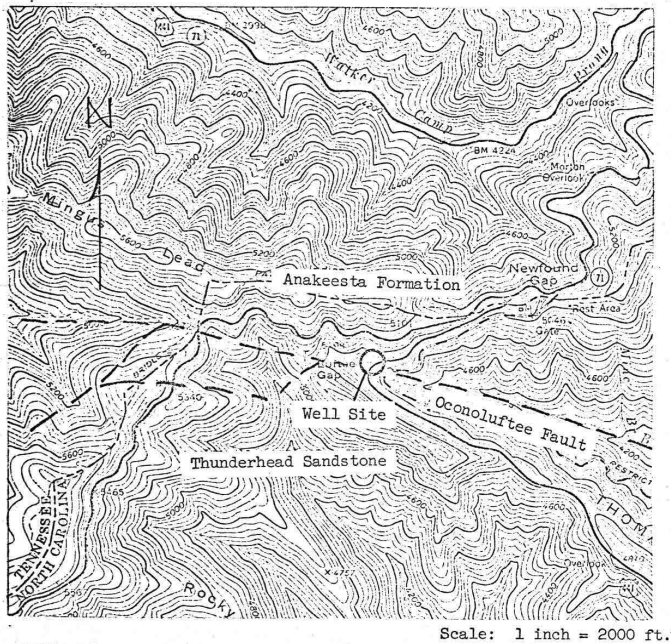
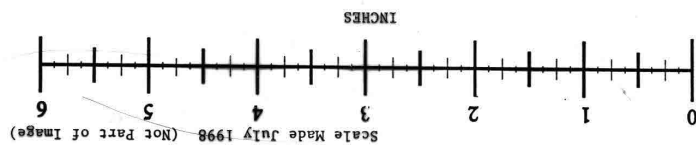
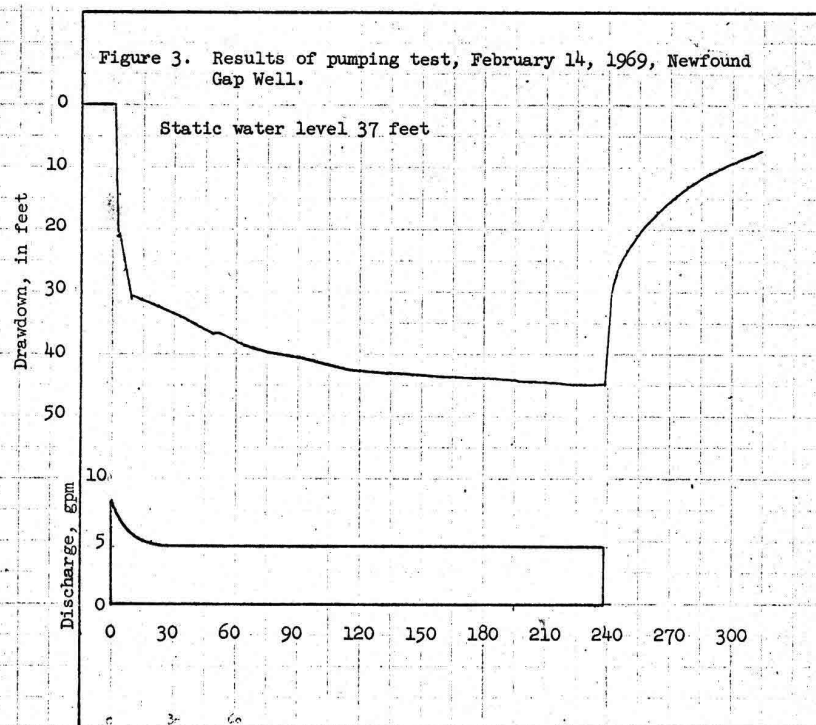
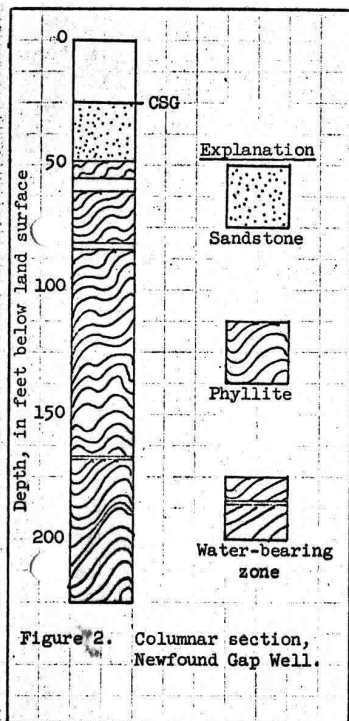


Figure 1. Location of well and general geology at Newfound Gap.





NAME OF SYSTEM: Newfound GapLOCATION: U.S. 441LOCATION: STATE: North Carolina COUNTY: Swain

- | <u>A. Source of Supply</u> | <u>Location - Reference to Permanent Landmark</u> | <u>Coordinates</u> |
|--|--|---------------------------------------|
| 1. Small un-named spring | Approximately one mile west of Newfound Gap on Clingmans Dome Road at elevation 5,110. | Lat. N 35°36'31"
Long. W 83°26'10" |
| <p>Before roadway was constructed, the spring was closed in with a concrete box with a 3" galvanized supply line extended to the storage site located at base of road fill. This is a gravity system that utilizes a water operated chlorinator which treats water before it goes into the storage tanks.</p> <p>The storage tanks consist of a 1,000 gallon concrete reservoir and two 3,000 gallon steel horizontal tanks that lie on top of the ground. Minimum available flow capacity of the spring in August 1965 was measured at five gallons per minute (7,200 gallons per day) and maximum flows have been measured at 60 gallons per minute.</p> | | |
| 2. Small un-named spring
(Development proposed) | Approximately 1,600 feet above the present utilized supply and on left side of the road. | Lat. N 35°36'32"
Long. W 83°26'15" |
| <p>Plans have been made to develop this spring which has a quantity that fluctuates at about the same capacity as present utilized spring. This project, covered by PCP U-241-1, calls for connecting this supply (which will flow downhill to present storage area) to existing system and to also increase the storage to 20,000 gallons.</p> | | |

(Newfound Gap - Addendum No. 1)

In a report made by a U.S.G.S. geologist in April 1966, he recommended against the drilling of a well for this area. It was explained that this area contained abundant pyrite (FeS_2) which would result in heavy acid waters characterized with a very unpleasant taste. Stream flow records for the above listed spring have been accumulated and the capacity varies from a low of five gallons per minute to a high of 45 gallons per minute. The U.S.G.S. in January 1968, however, suggested the need for reinstatement of an investigative well in this area to provide desired geologic data needed in the overall report.

B. Consumption:

The present parking area has been reconstructed, increasing its capacity to 156 cars (from old capacity of 92 cars), 6 bus and 8 car-trailer units. Water consumption in the past had been kept low because the size of available parking restricted usage. With the completion of the enlargement of the parking area and with the future development of the second spring, we expect the following consumption:

Maximum daily - 12,500 - 15,000 gallons	Maximum Monthly - 375,000 gallons
Maximum annual - 2,250,000 gallons	

(Newfound Gap - Addendum No. 1)

C. Distribution Mains and Laterals (February 1967)

<u>Size</u>	<u>Type</u>	<u>Length</u>
4"	Plastic	5,300 Lineal Feet
4"	Cast Iron	175 Lineal Feet
4"	Galvanized	175 Lineal Feet
2"	Galvanized	210 Lineal Feet
1½"	Galvanized	400 Lineal Feet
1"	Galvanized	100 Lineal Feet
¾"	Galvanized	<u>100</u> Lineal Feet
TOTAL		6,460 Lineal Feet

D. Problems Involving Present System:

As explained in Section B, the water consumption has increased, beginning in the summer of 1968 with the completion of the parking area expansion. Most of the plastic lines in the Newfound Gap Parking Area itself were replaced with galvanized pipe as part of the parking area construction. There has been some conjecture that this system be expanded to provide water for a comfort station to be located at a proposed 60-car parking area called the Oconaluftee Valley Overlook, which is located approximately one mile south of Newfound Gap on U.S. 441. If this is the ultimate plan, it may be desirable to increase the storage capacity beyond that now considered under present system expansion.

E. Additional Information:

A water resources investigative deep well was drilled at the Oconaluftee Valley Overlook Parking Area (proposed) site in November 1968. A very limited supply (approximately 4.5 gallons per minute) was obtained which can be developed at some future date as a supplement to the Newfound Gap system.

(Newfound Gap - Addendum No. 1)



SPRING ENCLOSURE AND BURIED 1,000 GALLON CONCRETE RESERVOIR



NEWFOUND GAP RESERVOIR CONSISTING OF TWO 3,000
GALLON STEEL TANKS

Other Supporting Information

PROPOSED SITES FOR WATER RESOURCES INVESTIGATION

1. Park Headquarters
2. Green Mountain (Foothills Parkway)
3. Newfound Gap
4. Cades Cove
5. Deep Creek
6. Smokemont
7. Abrams Creek
8. Twin Creeks
9. Collins Creek
10. Metcalf Bottoms
11. Cataloochee
12. Elkmont
13. Cosby
14. Chimneys
15. Rocky Mountain (Foothills Parkway)
16. Webb Mountain (Foothills Parkway)
17. Little Greenbrier
18. Greenbrier
19. Sinks
20. Towstring
21. Indian Camp Creek
22. Tremont Ranger Station
23. Round Bottom Campground
24. Balsam Mountain Campground
25. Main Oconaluftee Residential Area
26. Old Oconaluftee Residence Area (Ravensford)
27. Big Creek Ranger Station
28. Cataloochee Ranger Station
29. Cataloochee Maintenance Area
30. Twentymile Ranger Station
31. Cherokee Orchard
32. Sugarlands

(09/28/67)

May 1962 Edition
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Gerald Rowe, Chief of Maintenance
Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

DATE: September 7, 1967

FROM : W. M. McMaster, USGS, WRD
Knoxville, Tennessee

SUBJECT: Summary of work plans for study of water resources of Great Smoky Mountains
National Park, North Carolina and Tennessee Districts

As I promised you on August 11, I am sending you our plans for the study of water resources of Great Smoky Mountains National Park that have been modified as a result of a meeting between North Carolina and Tennessee U. S. Geological Survey personnel July 6-7, 1967.

W. M. McMaster

W. M. McMaster
Hydrologist

cc: Edward J. Kennedy, Chief, Tenn. District
Ralph C. Heath, Chief, N. C. District



5010-108

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

Summary of work plans for study of water resources of Great Smoky Mountains
National Park, North Carolina and Tennessee Districts

Sept. 7, 1967

At a meeting in Knoxville during July 6-7, 1967, North Carolina and Tennessee personnel discussed modification of plans in the study of water resources of the Great Smoky Mountains National Park. Those who attended the meeting were: Ralph C. Heath, North Carolina District Chief; Edward J. Kennedy, Tennessee District Chief; D. R. Rima, Assistant District Chief for Tennessee; Nat Thomas, G. C. Goddard, and E. F. Hubbard of North Carolina; and W. M. McMaster of Tennessee.

At the meeting it was agreed that the effort in both districts should be combined under leadership of one individual; McMaster was delegated project leadership. McMaster will be responsible for ground water interpretive aspects of the study and Hubbard will be responsible for surface water interpretive aspects.

The final product will be a hydrologic atlas of the Smokies area, published by the Geological Survey, that will consist of the 1:125,000 base map upon which will be delineated ground water and surface water information. Ground water occurrence and availability will be shown as a series of patterns, each defining a range between a minimum, a maximum, and an average of expected well yields within the area covered by the pattern. These areas are expected to be established by topographic criteria, geologic location, estimated soil thickness, and background information provided by test wells drilled during the course of the study. If a test well appears capable of yielding the desired quantity of water for water supply at the drilling site, a pumping test will be run.

Surface water information will be indicated by isopleths of minimum flow in cubic feet per second per square mile at the 2-year 7-day recurrence interval, based on a series of low-flow measurements made during the course of the study, at a total of about 100 sites throughout the Park distributed so as to define variations in flow with location and altitude. It is hoped that these sites can be measured a total of 6-8 times following periods of about 7 days of no rainfall.

Ground water and surface water chemical quality will be described, based on results of analysis of water from test wells and samples collected from streams. A series of coliform analyses of stream water is planned to define possible areas of contamination.

An explanatory text and supplementary illustrations will be included. The atlas is expected to provide the NPS engineer a basis for planning future developments of any kind in the Park for which knowledge of water resources is required.

Consideration will be given to popular-type brochure for distribution to Park visitors, describing and illustrating the occurrence of water in the area and its role in shaping the mountains.

Test drilling and reporting will continue to be handled by the District in which the site is located.

Plans are to complete the text of the final report by May 1969 for transmission through final review prior to publication. However, if insufficient opportunities to collect flow-measurements occurs during the remaining time through November 1968, it is hoped that supplementary funds will be available from NPS to make additional measurements during the following year.

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SEP 14 1965

Handwritten:
R...
EWC
WRY 9/17

Memorandum

To: Superintendent, Great Smoky Mountains

From: Acting Assistant Regional Director, Operations,
Southeast Region

Subject: Water Resources Investigations, Great Smoky Mountains
National Park

We will be glad to assist you in developing a detailed water resources study at Great Smoky Mountains National Park during the 1966 fiscal year as requested in your memorandum of August 23. The results produced from such a study should provide us with the basis for a full and most effective development of all water resources located within the Park boundaries. It is evident that new sources of water are needed to meet the demands of future and existing Park facilities.

We believe the investigative work should include the following:
(1) The first and most pressing problem involves the need to expand several water supply systems in order to provide more water to take care of a greater number of Park visitors and increased Park uses. This requires an evaluation of the probable capacity of the present sources of supply and the locating of possible new sources of water supply of acceptable quality for increased demands of the future and (2) The second phase of the project (extending over a period of several years) would be to conduct surface and ground water studies throughout the Park in order to obtain a general knowledge of all water resources. With such information at hand, the Park staff will be able to plan efficiently for new or expanded developments.

An over-ceiling item was included in the 1966 F.Y. Regional Water Resources Program in the amount of \$26,000 to initiate a study of domestic water supply needs and test well drilling work at the Park. Mr. E. W. Reed, Chief, Water Resources, has recently advised that at present the Washington Office reserve contains sufficient funds to finance this study.

We agree a meeting and field reconnaissance should be held at the Park between representatives of the U. S. Geological Survey, the Regional Office and the Park staff to properly formulate a logical approach to this water resources project. In early October, we will take the necessary action to firm up a satisfactory date for the meeting with all those concerned.

(SIGNED)

W. Mikell

cc:

~~Director~~, w/c of inc.

Chief, RQDC (2), w/c of inc.



UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

August 23, 1965

Y REFER TO:
L54

EAST REGION	
AUG 26 1965	
Regional Director	
Asst. Reg. Dir. (A)	26
Asst. Reg. Dir. (CA)	
Asst. to Reg. Dir. (PA)	
Asst. to Reg. Dir. (D)	
Resource Studies Act.	

X *Land & Water*
Main

Memorandum

To: Regional Director, Southeast Region
From: Superintendent, Great Smoky Mountains *lost Side*
Subject: Water Resources Investigations, Great Smoky Mountains National Park

Over the past couple of years, continued increases in demands on the numerous surface water supplies have gradually developed into a problem that needs immediate attention. While it is recognized that in the past we have shown little or no interest in water resources investigations, it now appears that well supplies may not only be a desirability but a necessity. During periods of prolonged drouth such as we are now experiencing in the Park, the surface supplies diminish to the point of nearly drying up, and supplemental supplies of low quality water are heavily treated and pumped into the supply lines.

During USPHS Engineer Henderson's recent trip to the Park, we had occasion to closely observe several of our major supplies. For example, we found that the Ash Hopper Branch gravity supply that ordinarily supplies headquarters was providing 19 gallons per minute (actual meter readings) over a period of a week. The consumption at this time was metered at 35,000 to 37,000 gallons per day and so, needless to say, we had to pump a supplemental supply out of a branch of Fighting Creek which runs through the residential area. We actually were only able to obtain a maximum of 15 gallons per minute from this supply. Incidentally, this creek pumping station is only a couple of hundred feet from the first domestic user and less than 1,000 feet from our major development area which definitely does not allow the desired chlorine retention time for safe water treatment. Also, when you realize that our actual usage exceeded an average of 25 gallons per minute and all available water in the system amounted to 34 gallons per minute, it is easy to see there is little margin for any emergency whether it be a leak in the line, any type of fire drawdown or allowance for any consideration of lawn sprinkling. If either of these supplies decrease further, we do have several alternatives in order to retain a minimum supply on hand.

By metering, we have determined that we are wasting 13,000 gallons per day through our Visitor Center dehumidifier system. This is quite a luxury and one that needs some study as to the possibility of re-circulation of this water. If our present supply should decrease any further, we would of course have to shut down the dehumidifier system which would have rather detrimental effects on artifacts storage as well as causing the Visitor Center to be rather uncomfortable.

Further checks on other major supplies in the Park showed similar conditions but none as critical as that that exists in the Headquarters area. If at all possible, and if it can be worked into your Water Resources Investigation program as an emergency measure, we would like to suggest the programming of an exploratory well for this fall. While we have little information on the characteristics of wells in this area, Mr. Henderson felt that a well programmed for 100-foot depth with rotary drill method (possible heavy river boulder sub-surface) should provide a plentiful supply for the area. On this basis, it appears that funds in the construction amount of \$2,500 would be needed to drill, case and test the well.

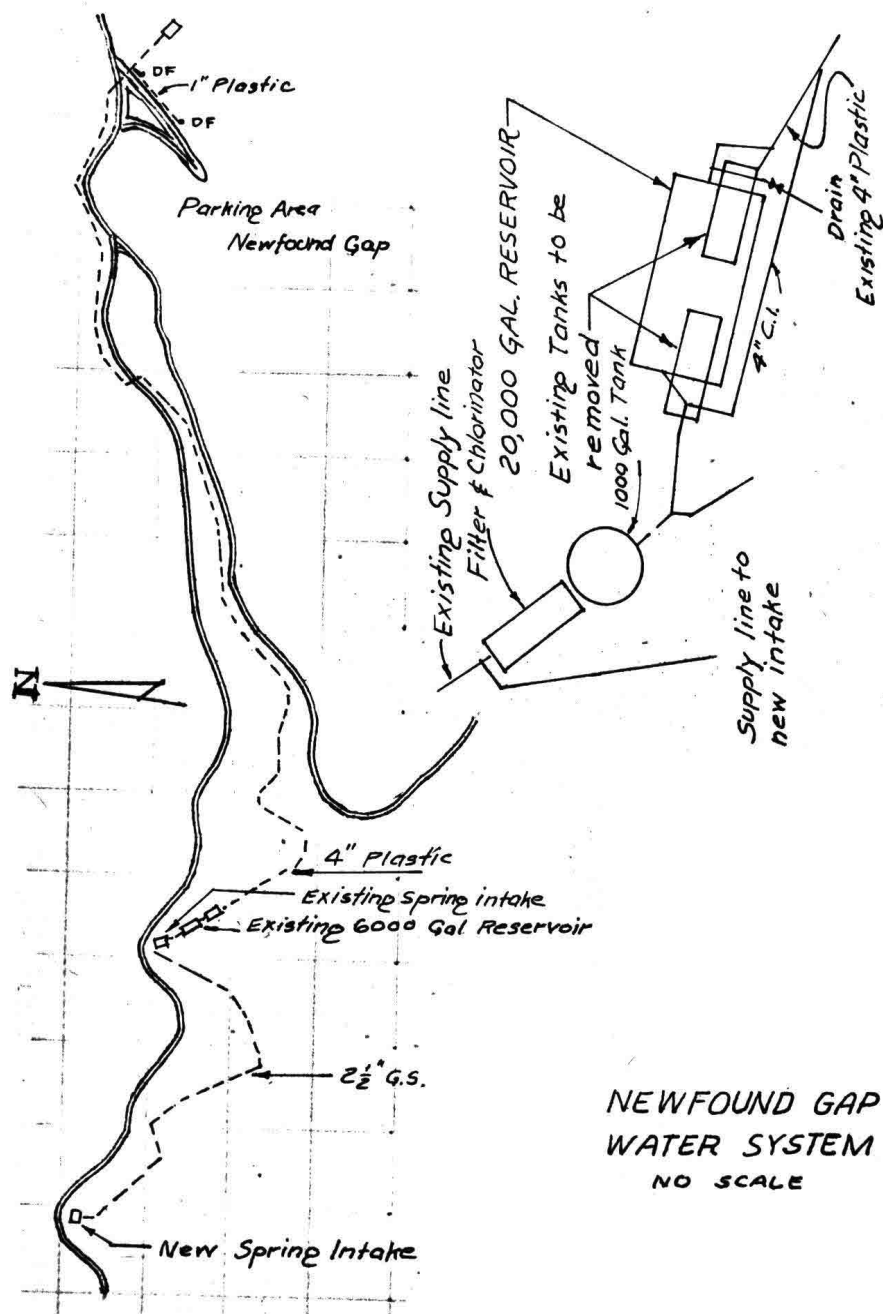
In an August 19 telephone conversation between Hydraulic Engineer Vick of your office and Chief of Maintenance Rowe, Mr. Vick had mentioned that he had put an over-ceiling item in his 1966 F.Y. Water Resources budget in the amount of \$24,000 to initiate a study of Park domestic water supply needs. We support this program whole-heartedly and hope that a necessary field inspection involving personnel from the USGS, the Regional Office, and the Park can be set up for the month of November.

As suggested to Mr. Vick in the abovementioned telephone call, the following listing is a tentative priority list of well investigations which we would like to see programmed:

1. Headquarters -- As soon as possible.
2. Green Mountain Picnic Area, Foothills Parkway -- 1967 F.Y.
3. Cades Cove -- 1967 F.Y.
4. Cataloochee -- 1967 F.Y.
5. Rocky Mountain -- 1967 F.Y.
6. Chilhowee, Foothills Parkway -- 1968 F.Y.

7. Cades Cove -- 1968 F.Y.
8. Deep Creek -- 1968 F.Y.
9. Smokemont -- 1968 F.Y.
10. Chimneys -- 1969 F.Y.
11. Elkmont -- 1969 F.Y.
12. Cosby -- 1969 F.Y.
13. Webb Mountain, Foothills Parkway -- 1969 F.Y.


George W. Fry



Docket Information

Number of Documents in Docket 24

Documents Dated from 8/23/1965 to 6/23/1969

Docket Compiled: 3/30/2011