



WATER-RIGHT DOCKET

Blue Ridge Parkway

Docket No: 32

TOMPKINS KNOB AREA.

Supporting Hydro Data

00-00-0000: summary of test drilling on the blue ridge parkway

SUMMARY OF TEST DRILLING ON THE BLUE RIDGE PARKWAY NORTH CAROLINA AND VIRGINIA

The following is a summary of the test drilling and production well construction program for Park sites along the Blue Ridge Parkway. This drilling program was conducted during the period July - October, 1963 by the National Park Service.

Tomkins Knob

One test well was drilled to a depth of 200 feet at this site in banded amphibolite gneiss. Fracture zones at this site proved to be small and the zone had low permeability. Because of the small yield of ground water (2 gpm) no pumping test was performed. The alternate test site at Tomkins Knob was not drilled, at the discretion of the Blue Ridge Parkway personnel.

Mabry Mill

One test well was drilled at this site to a depth of 200 feet, and completed August 28, 1963. The 6-inch well casing was set at 47 feet below land surface and the well was finished as an open-end well from 47 feet to 200 feet in mica gneiss. Ground water was obtained from permeable zones at 50 feet and at 185 feet. Static water level in the well was 3.6 feet below land surface at its completion. The well was test pumped for yield. Yield of the well was 25 gpm after 3 hours of pumping. The pumping level was 100 feet below land surface. A hydrograph of the test is included. The chemical quality of water from this well is acceptable for general use without treatment. A complete chemical analysis of the water is attached.

Jeffries Park (Tompons Knob)

After an investigation of the occurrence of ground water at Jeffries Park on the Blue Ridge Parkway, two well sites were located March 23, 1967. The well sites are within the east-trending draw containing Falls Creek. Well site no. 2 is more accessible and was, therefore, selected as the site to be drilled. The well was subsequently drilled and tested during June 23 - 28, 1967. A lithologic log of the well follows:

0-29 ft.	Unconsolidated micaceous sand, clay, and gravel. Water in alluvium about 10 ft. below land surface. Set 29.5 ft. of 6-inch casing.
29-33	Granite gneiss.
33-36	Mica schist, the well yielding about 25 gpm.
36-50	Mica schist and granite gneiss.
50-60	Granite gneiss.
60-70	Granite gneiss, well yielding about 30 gpm.
70-80	Hornblende gneiss.
80-88	Mica schist.
88-105	Mica gneiss.
105-160	Mica schist, well yielding 30 - 35 gpm.
160-170	Granite gneiss, well yielding 35 - 40 gpm.
170-185	Mica schist, well yielding about 40 gpm.
185-200	Granite gneiss.

Upon completion of drilling operations, a test pump was installed at a depth of 196 feet and was operated at full capacity for four hours, then at a lower rate for almost five hours. The test provides indirect evidence that the bedrock consists of relatively impermeable rock within which are a few permeable water-bearing openings.

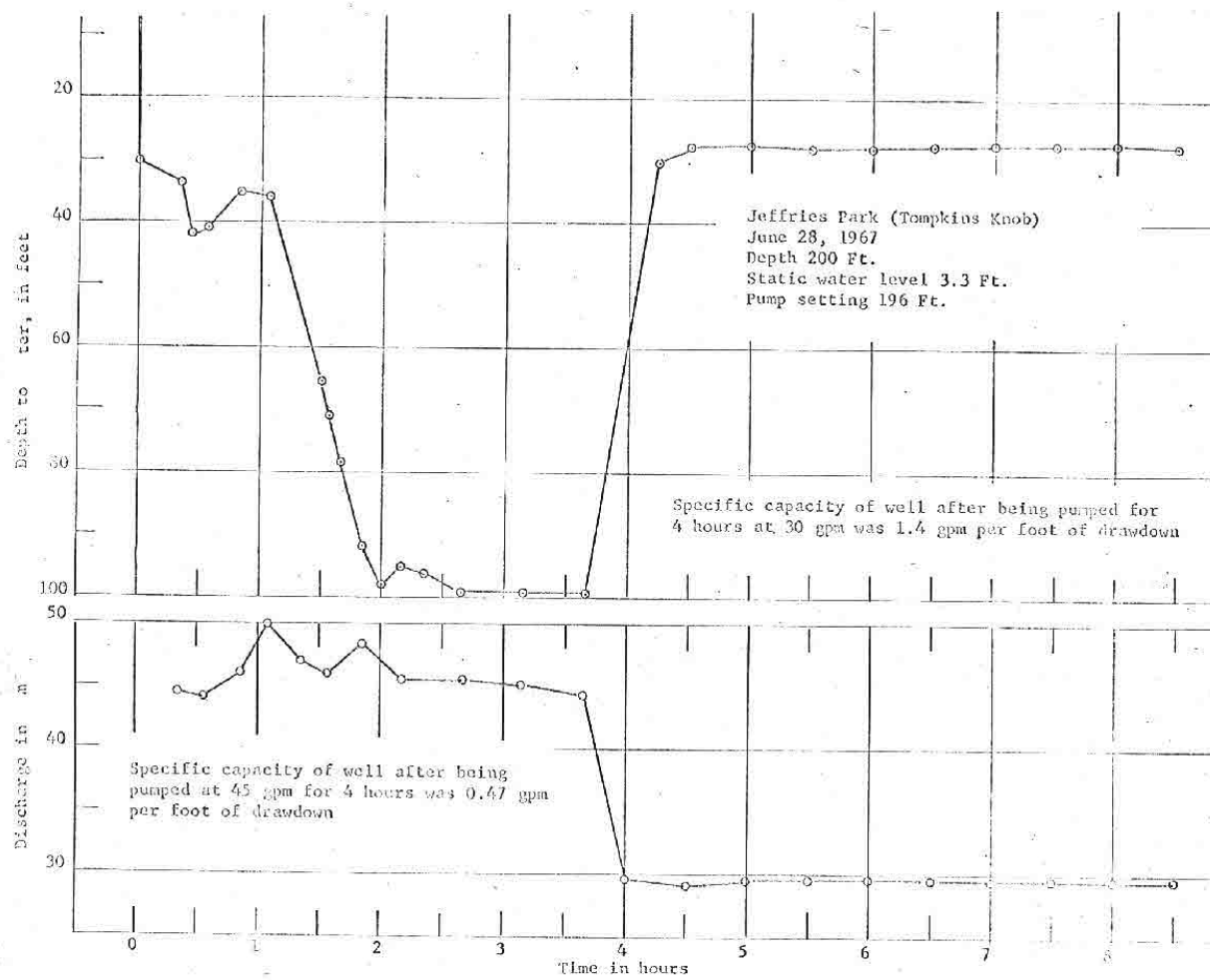
Figure 1 is a graphical plot of the pumping water-level and the rate of discharge. The well was pumped during the first four hours of the test at an average rate of 45 gpm, and then the pumping rate was reduced to about 30 gpm. The graph of the water level (fig. 1) indicates that the well penetrates at least two water-bearing zones. During the first hour of pumping the water level declined 30-35 feet to the level of the upper zone, remained stationary at this level one hour, and then abruptly declined 60 feet to a depth of 95 to 100 feet, where the water level fluctuated until the pumping rate was reduced. The initial decline of the water level represents dewatering of the casing and reduction of water level to the upper water-bearing zone. The one hour interval during which the water level declined only about five feet represents the time needed to partly dewater the upper water-bearing zone near the well. During the remainder of the test, a part of the water entering the well came from the lower zone plus a continuing substantial amount from the upper zone. The specific capacity of the well while being pumped at 45 gpm for four hours is 0.47 gpm per foot of drawdown.

JEFFRIES PARK

After the pumping rate was reduced to about 30 gpm, the water level rose to a depth of about 28 feet and remained steady throughout the remainder of the test (fig. 1). The specific capacity of the well while being pumped at 30 gpm is 1.4 gpm per foot of drawdown.

This well will readily yield up to 30 gpm and is adequate for the anticipated requirements of the camp site. At pumping rates in excess of 30 gpm the cost per gallon pumped would be increased, because the specific capacity is much lower at greater pumping rates.

A sample of the water from this well was analyzed by the U. S. Geological Survey laboratory in Raleigh, North Carolina. The results are shown in table 1. They indicate that the water is of excellent quality with the exception of being acidic; the pH value is 5.4. Unless treated to increase the pH value, this water will have a corrosive effect on the water system. Small flakes of mica were found in the water during drilling, but they disappeared after the first four hours of pumping. If the mica in the water becomes a problem, it can be easily removed with a filter.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
WATER ANALYSIS

W.R. Lab. No. _____

Location <u>Jeffries Park (Tompkins Knob), 12 miles east of Boone, N. C.</u>			
Source <u>Blue Ridge Parkway, N. C.</u> Drilled: <u>Cased 29 ft.</u> Diameter <u>6 in.</u> Depth: <u>200 ft.</u> Drilled: <u>6/28/67.</u> Collected well head. Owner: <u>NPS, Roanoke, Va.</u> Use: <u>Public Supply, WBF: Metamorphic complex. WL: Static 3.3' below land surface.</u>			
Yield: <u>30 gpm pump meas.</u> Prod. intervals <u>33-200 ft.</u> Sampled after pumping <u>8 Hrs</u>			
Date of collection <u>June 28, 1967</u>			
Cage height(ft.) _____		Discharge(sec.ft.) _____ Temp.(°F) <u>50</u>	
(Parts per million)			
Silica (SiO ₂).....	8.4	Carbonate (CO ₃).+.(HCO ₃)..	6
Aluminum (Al).....	.0	Bicarbonate (HCO ₃).....	
Iron (Fe).....	.02	Sulfate (SO ₄).....	.2
Manganese (Mn).....	.01	Chloride (Cl).....	.5
Calcium (Ca).....	1.0	Fluoride (F).....	.1
Magnesium (Mg).....	.5	Nitrate (NO ₃).....	.2
Sodium (Na).+(K)	.2	Phosphate (PO ₄).....	00
Potassium (K).....			
Lithium (Li).....			
(Parts per million)			
Dissolved solids:		ABS.....	
Sum.....	15	Color.....	3
Residue upon evapo- ration @ 180°C.....		TH.....	4
Hardness as CaCO ₃			
Noncarbonate.....			
pd.....	5.4	Specific conductance (microhos at 25°C).....	16

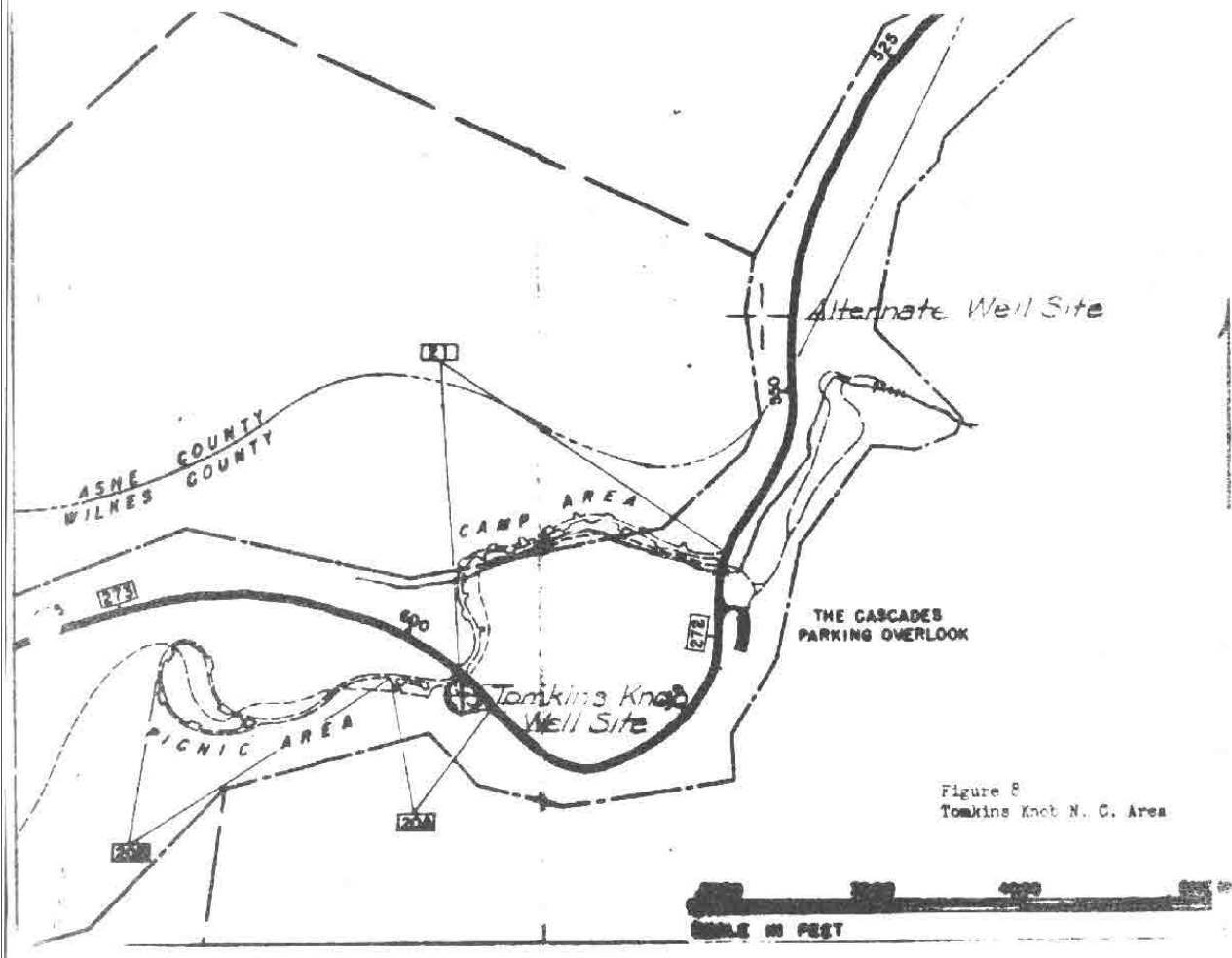
Table 1. Analysis of water from well at Jeffries Park.

Original data from sample to review

Tompkins Knob

Stream valleys of moderate to gentle topographic relief descend northwestward from the Tompkins Knob area. Southeast of Tompkins Knob the steep Blue Ridge front descends abruptly to the Inner Piedmont. The western part of this area is underlain by mica gneiss and granite gneiss. Banded amphibolite underlies the eastern part of the Tompkins Knob area. Foliation in these metamorphic rocks is variable, but generally strikes N 70°-80° E and dips 30°-50° SE. Fracture systems strike N 40°-50° W and N 60°-70° E.

A proposed test-well site was located on the south side of the Parkway adjacent to a small area of seeps and springs at the head of a southeast-trending draw (figure 8). The site is near an old cabin on the Parkway and is about 0.5 mile west of the Cascades parking area. The required yield of the well is 25 gpm, and the estimated drilling depth is less than 200 feet in banded amphibolite. An alternate site was located west of the Parkway in a northwest-trending draw about 0.3 mile north of the Cascades parking area. Drilling depth at the alternate site is estimated to be less than 200 feet in banded amphibolite and will require the construction of an access road.



Other Supporting Information

BLUE RIDGE PARKWAY

WATER SYSTEM DATA

AREA Blue Ridge Parkway DATE COLLECTED _____ COLLECTED BY _____)

1. Name of System: Jeffress Park
2. Location: State North Carolina County Wilkes General Area HP 271.9
Reference to permanent landmark _____
3. Source of Supply: Spring Capacity 7 gpm
(Well, spring, stream, impoundment, etc.)
4. Type of System: Gravity
(Pumped, gravity, etc.)
5. Treatment: None
(Filtration, Chlorination, Airation, etc.)
6. Distribution Mains: Size 1" Length 3768'; Size _____ Length _____
Size 2" Length 1946'; Size _____ Length _____
Size 3/4" Length 45'; Size _____ Length _____
7. Pump Unit: Make _____; Type _____; Model No. _____
Serial No. _____; Outlet _____ in.; Inlet _____ in.
(Size) (Size)
8. Power Source: _____ Motor: Make _____; HP _____;
(Elec., gas, generator)
Serial No. _____; Voltage _____; Amps _____;
RPM _____; Type _____; Phase _____;
Cycles _____; Others _____; Stages _____
9. Control: Automatic _____; Manual _____;
(Float, Electrobe, Pressure, Time)
Other _____
(Explain)

None

10. Pump Design: Capacity _____ (Actual) _____ gpm _____ (Design) _____ gpm
Head _____ (Actual) _____ ft. _____ (Design) _____ ft.

11. Pump Housing: Type Const. _____; _____; Size _____
(Walls) (Roof)

12. Storage: _____; Type Const. _____
(Pneumatic, elevated, underground, etc.) (concrete, wood, steel)
Size _____; Capacity 10,000 gal.; Inlet 3763.58 ft. 1 in.
(Elev.) (Size)
Outlet 3757.9 ft. 2 in.; Pressure Setting _____
(Elev.) (Size) (if pneumatic)

13. Distribution: Water Closets _____; Lavatory _____; Urinal _____
Drinking Fountain _____; Hose Bibs _____; Residences _____
Other _____; _____

14. Metered or nonmetered: _____; No. 1; Size 1-1/2"
No. _____; Size _____
No. _____; Size _____

15. Fire Protection: Fire Hydrants _____; Yard Hydrants _____

16. Water Analysis: _____

17. Condition of System: _____
(Repairs needed itemize)

Note: Future developments at this area will require the use of
a 30 gpm test well drilled here in August 1967.

Docket Information

Number of Documents in Docket	10		
Documents Dated from	6/15/1967	to	6/28/1967
Docket Compiled:	2/8/2011		