



WATER-RIGHT DOCKET

Cape Cod National Seashore

Docket No: 3

NAUSET LIGHT WELL

Supporting Hydro Data

02-29-1968: letter to mr. stanton on final report; february 29, 1968



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
2300 John Fitzgerald Kennedy Federal Building
Boston, Massachusetts 02203

February 29, 1968

Mr. Richard L. Stanton, Chief
Office of Land and Water Rights
National Park Service
Washington Planning and Service Center
1730 North Lynn Street
Arlington, Virginia 22209

Attention: Mr. Richard W. Ketchum

Dear Mr. Stanton:

Enclosed is the final report of supervisory work by John Cotton of the Boston office of the Water Resources Division for the National Park Service under Contract No. 14-10-5-609-204 for Test Well Drilling at Hemenway Landing, Nauset Light, Eastham Visitor Center, and Griffin Island. All work was completed by The Able Drillers and Pump Company on September 2, 1967, in accordance with the plans and specifications of the contract.

Enclosed also is Standard Form 1081 prepared in accordance with the instructions in your letter of February 26, 1968.

A summary for each area is tabulated below.

	Well Depth	Well Development	Test Pumping	Test Drilling Hole / Depth
Hemenway Landing	99.2 ft.	24 hrs.	8 hrs.	1 106 ft.
Nauset Light	137.8 ft.	25.5 hrs.	9 hrs.	1 112 ft. 2 150 ft.
Eastham Visitor Center	115.7 ft.	24 hrs.	8 hrs.	1 120 ft. 2 111 ft.
Griffin Island	95.9 ft.	24 hrs.	10 hrs.	1 105 ft.

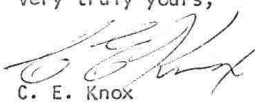
Mr. Richard Stanton

- 2 -

February 29, 1968

The design sustained yield for each well was 20 gallons per minute (gpm); all four wells may be pumped safely at 20 gpm. In fact, all four wells will yield much more than 20 gpm. However, pumping from shallow coastal aquifers involves the danger of inducing salt-water movement into the fresh ground-water reservoir. One good principle to follow in establishing pumping schedules is not to allow the water level to fall below mean sea level (msl). The "maximum" yield (following the above principle) for each of the four wells is given in the geohydrologic descriptions of the wells. Unfortunately, even with this precaution, salt-water encroachment may still occur with prolonged pumping. Therefore, the highest pumping rates should not exceed 50 percent of the "maximum" yield reported for each well.

Very truly yours,



C. E. Knox
District Chief

JEC:g

Encls. Report, 4 copies
SF1081, 6 "

TEST WELL DRILLING AT NAUSET LIGHT

Location of well. This well is about 240 feet east of Ocean View Drive and about 10 feet south of the dirt access road that leads to the temporary rest rooms which serve the beach (see figure 1).

Physical description of well. This 8-inch diameter well is 137.8 feet deep with a 10 foot #25 Johnson stainless steel screen from 127.8 to 137.8 feet. The well casing extends 1.8 feet above the land surface; the top of the first coupling is 4.0 feet below land surface. For details see figure 3.

Geohydrologic description of well. The well is screened in unconsolidated gravelly sands. See table 3 for the log of subsurface materials. The land surface is 46.7 feet above msl. On August 23, 1967, the static water level was 42.52 feet below land surface or about 4 feet above msl. Ocean tides affect the water level.

The well was pumped for 9 hours at 45 gpm. Tidal affects altered drawdown readings during the last 6 hours of the test. Drawdown at the end of 3 hours was about 2.4 feet. Based on this information the specific capacity of the well is about 19 gpm. With a drawdown of 4 feet this well will yield about 80 gpm. The design yield of 20 gpm is possible with no danger of salt-water encroachment.

Chemical quality of water. After 9 hours of pumping the chloride content (32 ppm) had not changed and was about normal for fresh ground water on Cape Cod. The iron content (0.27 ppm) is below the iron content of water from nearby wells. No treatment will be needed. The complete chemical analysis is in table 5.

Test drilling. Two test wells were drilled; the first, about 200 feet east of the final well (see figure 1) and at an altitude of 34.7 feet above msl, was drilled to a depth of 112 feet. The log of this well is in table 4. The second test well was drilled about 3 feet west of the final well to a depth of 150 feet. The combined log of this well and the final well is in table 3.

The second test site was favored for three reasons:

1. The site is farther from the ocean.
2. The site is farther from both older and proposed leaching fields.
3. The aquifer sands at this site are coarser.

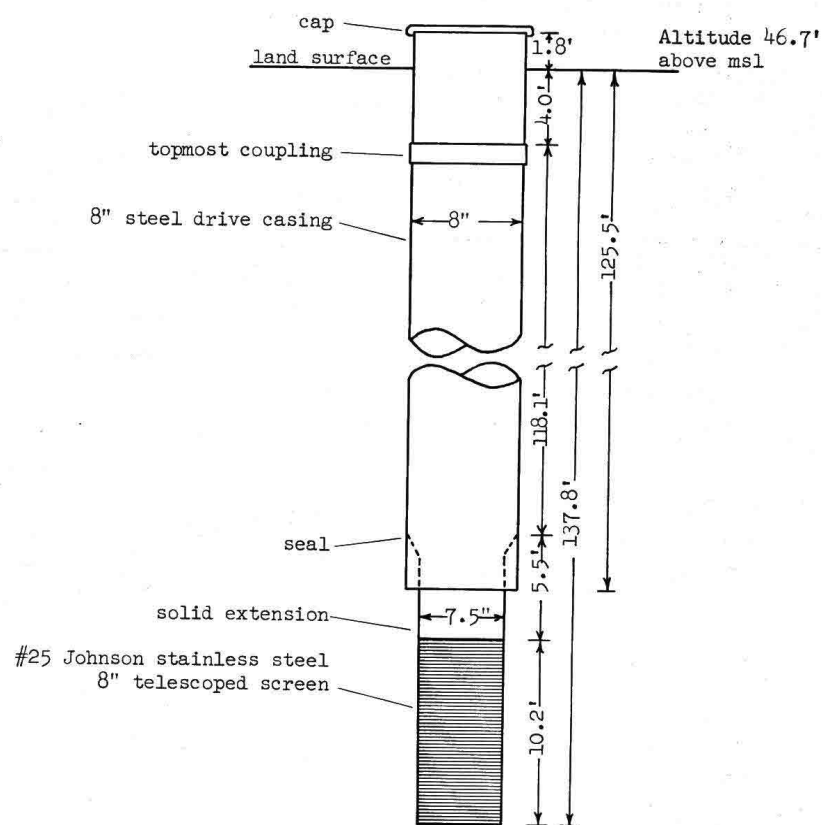


Figure 3.--Design of well at Nauset Light

Table 3.--Generalized combined log of second test well and final well at Nauset Light

Sample interval (ft. below surface)	Material description
0 - 10	Sand, medium and coarse, buff.
10 - 15	Sand, fine and medium, buff
15 - 20	Sand, fine and medium, buff
20 - 25	Sand, fine and medium, buff; minor angular shale chips
25 - 30	Sand, fine and medium, buff; minor angular shale chips
30 - 35	Sand, fine and medium, buff; minor angular shale chips
35 - 40	Sand, fine and medium, brown
40 - 45	Sand, fine and medium, reddish brown
45 - 50	Sand, very fine and fine; silt; dark reddish brown
50 - 55	Sandy silt, reddish brown
55 - 58	Silty sand, reddish brown
58 - 60	Sand, medium and coarse, reddish brown
60 - 65	Sand, very fine and fine, yellow brown
65 - 70	Sand, fine and medium, yellow brown
70 - 75	Sand, very fine to medium, light yellow brown
75 - 80	Silty sand, yellow buff to dark brown
80 - 85	Silty sand, yellow buff
85 - 90	Silty sand, yellow buff
90 - 95	Silty sand, yellow buff
95 -100	Silty sand; sand fraction coarser than above, fine and medium, buff
100 -105	Sand, fine and medium, buff
105 -110	Sand, fine to coarse, buff to light gray
110 -115	Sand, fine to coarse, light gray
115 -122	Sand, medium and coarse, light gray
122 -127	Sand and gravelly sand layers; sand, medium to very coarse, light brown; gravel, very fine and fine
127 -132	Gravelly sand; sand, medium to very coarse, buff to light brown; gravel, very fine
132 -137	Gravelly sand; sand, medium to very coarse, buff to reddish brown; gravel, very fine and fine
137 -141	Gravelly sand; sand, coarse and very coarse, buff; gravel, very fine
141 -143	Gravelly sand; sand, medium to very coarse, buff; gravel, very fine
143 -150	Clayey silt, gray

Table 4.--Generalized log of the first test well at Nauset Light

Sample interval (ft. below surface)	Material description
0 - 17	Sand, fine and medium, yellow buff
17 - 25	Sand, some fine gravel, buff
25 - 30	Sand, fine and medium; minor fine gravel; buff
30 - 35	Sand, medium to very coarse; minor fine gravel; reddish buff
35 - 40	Sand, fine; scattered pebbles; yellow buff
40 - 45	Sand, medium to very coarse, buff
45 - 50	Sand, medium to very coarse, buff
50 - 55	Sand, fine and medium, buff
55 - 59	Sand, fine and medium, buff
59 - 63	Silt, buff
63 - 66	Sandy gravel; sand, coarse, reddish buff; gravel, very fine and fine
66 - 75	Sand, very fine to medium, yellow buff
75 - 82	Sand, very fine to medium, yellow buff
82 - 92	Sand, very fine to medium, yellow buff
92 - 98	Sand, very fine to medium, yellow buff
98 - 100	Clayey silt, yellow buff
100 - 102	Sand, fine to coarse, buff
102 - 112	Sand, medium and coarse, light gray

Table 5.--Complete chemical analysis, in parts per
million, of water from well at Nauset Light

Date of collection-----	8/23/67	Chloride (Cl)-----	32
Temperature (°F)-----	50	Fluoride (F)-----	.1
Silica (SiO ₂)-----	11	Nitrate (NO ₃)-----	.0
Iron (Fe) total-----	.27	Dissolved solids	
Manganese (Mn) dissolved--	.06	Calculated-----	83
Calcium (Ca)-----	3.6	Residue on evaporation at 180°C--	89
Magnesium (Mg)-----	2.5	Hardness as CaCO ₃ -----	19
Sodium (Na)-----	19	Non-carbonate-----	8
Potassium (K)-----	.8	Specific conductance	
Bicarbonate (HCO ₃)-----	14	(micromhos at 25°C)-----	150
Carbonate (CO ₃)-----	0	pH-----	6.7
Sulfate (SO ₄)-----	7.5	Color-----	2



Figure 1.--Location of wells at Hemenway Landing, Nauset Landing, and Eastham Visitor Center

-2-

Docket Information

Number of Documents in Docket 7
Documents Dated from 2/29/1968 to 2/29/1968
Docket Compiled: 2/1/2011