### Department of Natural Resources Resource Assessment Service MARYLAND GEOLOGICAL SURVEY Richard A. Ortt, Jr., Director

## **ADMINISTRATIVE REPORT NO. 16-02-02**

# HYDROGRAPHS AND TABLES SHOWING GROUND-WATER LEVEL RECORDS FOR SELECTED OBSERVATION WELLS IN ANNE ARUNDEL COUNTY, MARYLAND

#### **AND**

# HYDROGRAPH SHOWING SURFACE-WATER FLOW IN SAWMILL CREEK

#### **2016 REPORT**

Compiled by

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Prepared in cooperation with the Anne Arundel County Department of Public Works

#### **SUMMARY**

Since monitoring began in 2000, water levels in the **Aquia aquifer** in Southern Anne Arundel County at the Deale Athletic Field (AA Fe 92) have declined from about 24 ft in 2004 to about 34 ft below sea level in 2016. While fluctuating by as much as 8 ft as a result of local pumpage, the overall water-level trend since about 2006 has been relatively flat. The flattening of the trend is largely a result of a reduction of withdrawals from the Aquia aquifer in St. Mary's County as pumpage was shifted to the deeper Upper Patapsco aquifer to avoid elevated arsenic concentrations in the Aquia.

The most recent water levels in the **Magothy aquifer** range from about three feet above sea level west of Annapolis (AA Dd 42) to about 36 ft below sea level at the Annapolis well field (AA De 1); although water levels in AA De 1 are affected significantly by nearby production in that well field. Most water levels show some stabilization since about 2008 with the exception of AA Fe 93 in Southern Anne Arundel County which continues to decline.

The most recent water levels in the **Upper Patapsco aquifer** range from about 73 ft above sea level in northern Anne Arundel County (AA Ad 108) to about 28 ft below sea level on the Broadneck Peninsula (AA Cf 134). Recent water-level trends in the Upper Patapsco aquifer are stable or recovering in the Glen Burnie area (AA Ad 108 and AA Bd 159), Broadneck Peninsula (AA Cf 134 and AA Cg 24), and south of Annapolis (AA De 128). In the Broad Creek and City of Annapolis well fields (AA De 95 and AA De 219, respectively), water levels, while fluctuating in response to short-term pumping cycles, are relatively stable.

The most recent water levels in the **Lower Patapsco aquifer** range from about 77 ft above sea level in northern Anne Arundel County (AA Bd 160) to about 85 ft below sea level at the Crofton Meadows well field (AA Cc 115). Water-level trends in the Lower Patapsco aquifer are stable or recovering in the Glen Burnie area. In the Crofton Meadows well field, water levels have declined between 10 ft (AA Cc 89) and 85 ft (AA Cc 115) since 2014. The water-level trend at the Arnold well field (AA Cf 137) was relatively stable between 1988 and about 2010, declined between 2010 and 2012, and has been stable or slightly recovered since 2012 (AA Cf 137 and AA Cf 167). Water levels at the Broad Creek well field (AA De 206), while fluctuating as a result of short-term pumping cycles, appear relatively stable.

The most recent water levels in the **Patuxent aquifer** range from about 28 ft above sea level south of Ft. Meade (AA Cb 1) to about 80 ft below sea level in the Crofton Meadows well field (AA Cc 135). Beginning in about 2006, the water-level trend has been relatively stable in the Dorsey Road well field (AA Ad 90). A temporary cessation of Patuxent pumpage from the Dorsey Road well field during the winter of 2015-16 caused water levels to recover more than 100 ft, higher than any levels recorded since 1977. In the Crofton Meadows well field (AA Cc 102 and 135), water levels have declined more than about 15 ft since about 2012. In the Arnold well field (AA Cf 166—remote test well) water levels have been stable. The increased Lower Patapsco withdrawals at Arnold resulted in a decline of more than 40 ft in a monitoring well located about 5 miles to the east (AA Cg 22); water levels appear to have stabilized over the last couple years.

The daily discharge in **Sawmill Creek** was above approximately 5 cubic feet per second over the past year.

# **GROUND-WATER MONITORING WELLS**

Well Number	Locatio n	Aquifer
AA Ad 90	Aviation Blvd., Glen Burnie	Patuxent
AA Ad 102	Aviation Blvd., Glen Burnie	Lower Patapsco
AA Ad 108	Aviation Blvd., Glen Burnie	Upper Patapsco
AA Ad 109	Dorsey Road, Glen Burnie	Lower Patapsco
AA Bc 215	Telegraph Road	Lower Patapsco
AA Bd 152	Woodside School, Glen Burnie	Lower Patapsco
AA Bd 155	State Highway Administration, Glen Burnie	Lower Patapsco
AA Bd 156	Baltimore-Annapolis Bike Trail, Glen Burnie	Lower Patapsco
AA Bd 157	Rippling Woods Elementary School, Glen Burnie	Lower Patapsco
AA Bd 158	Center for Applied Technology, Glen Burnie	Lower Patapsco
AA Bd 159	Rippling Woods ES, near Glen Burnie	Upper Patapsco
AA Bd 160	Queenstown Park, near Glen Burnie	Lower Patapsco
AA Cb 1	Patuxent Wildlife Refuge Center	Patuxent
AA Cc 82	King Heights Water-Treatment Plant	Lower Patapsco
AA Cc 89	Crofton Water-Treatment Plant	Lower Patapsco
AA Cc 102	Crofton Water-Treatment Plant	Patuxent
AA Cc 115	Crofton Meadows Water-Treatment Plant	Lower Patapsco
AA Cc 116	Crofton Meadows Water-Treatment Plant	Lower Patapsco
AA Cc 135	Crofton Meadows Water-Treatment Plant	Patuxent
AA Cc 137	Crofton Meadows Water-Treatment Plant	Lower Patapsco
AA Ce 117	Severndale Water-Treatment Plant	Patuxent
AA Cf 99	Traffic Engineering Building, Broad Neck	Magothy
AA Cf 134	Amberly Water-Treatment Plant	Upper Patapsco
AA Cf 137	Arnold Water-Treatment Plant	Lower Patapsco
AA Cf 166	Arnold Water-Treatment Plant (remote site)	Patuxent
AA Cf 167	Arnold Water-Treatment Plant (remote site)	Lower Patapsco
AA Cg 22	Sandy Point State Park	Patuxent
AA Cg 23	Sandy Point State Park	Lower Patapsco
AA Cg 24	Sandy Point State Park	Upper Patapsco
AA Dd 42	Route 50 and Howard Grove Road	Magothy
AA De 1	City of Annapolis Water Works Building	Magothy
AA De 95	Broad Creek Water-Treatment Plant	Upper Patapsco
AA De 124	Central Avenue well field	Magothy
AA De 128	Central Avenue well field	Upper Patapsco
AA De 206	Broad Creek Water-Treatment Plant	Lower Patapsco
AA De 219	City of Annapolis	Upper Patapsco
AA De 232	City of Annapolis	Lower Patapsco
AA Df 19	U.S. Navy Radio Station	Upper Patapsco
AA Df 20	U.S. Navy Radio Station	Magothy
AA Df 79	U.S. Naval Academy	Magothy
AA Fe 92	Deale Athletic Field	Aquia
AA Fe 93	Deale Athletic Field	Magothy

# SURFACE-WATER MONITORING GAGE

Gage Number 01589500

01589500 Sawmill Creek

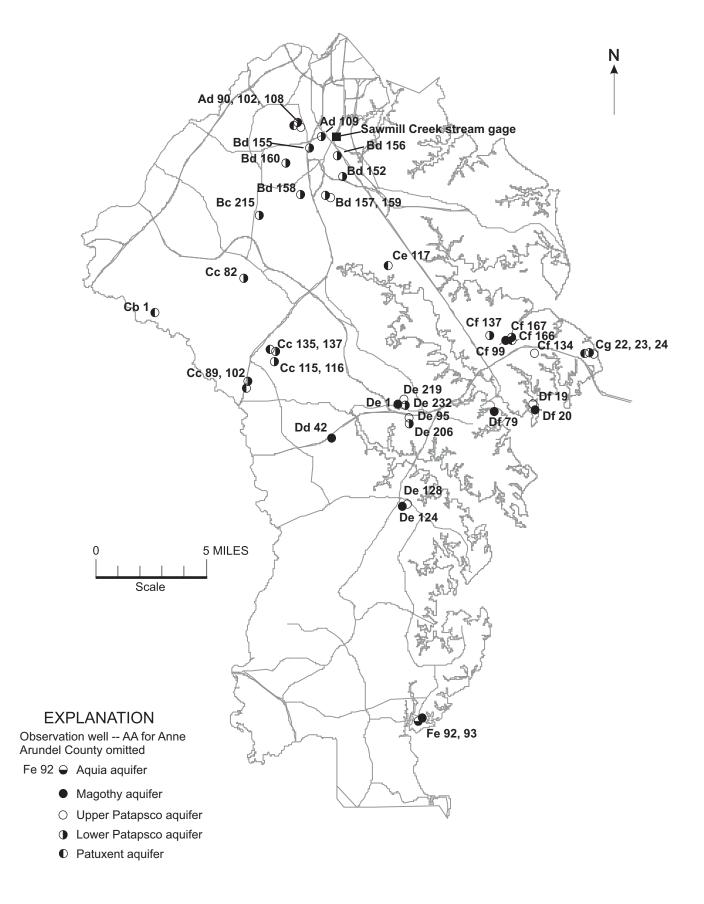


Figure 1. Location of observation wells and stream gage.

WELL NUMBER: AA Ad 90 PERMIT NUMBER: AA-04-0298 LOCATION: Aviation Blvd., Glen Burnie LAT. 39° 10' 32", LONG. 76° 38' 59"

AQUIFER: Patuxent Formation of Lower Cretaceous age

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 453 ft;

Casing diameter: 6 in. to 443 ft;

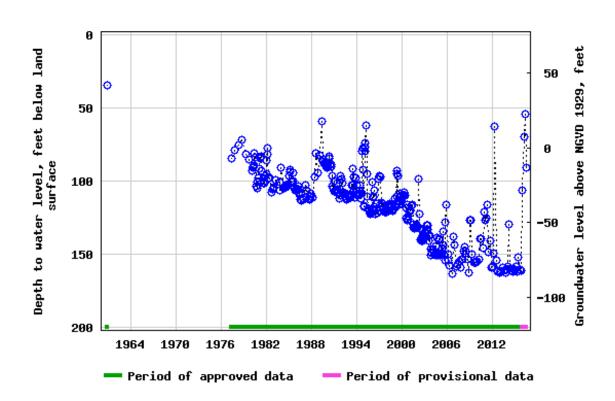
Screen diameter: 6 in. from 443 to 453 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 77.85 ft above NGVD of 1929. MEASURING POINT: Top of hole in flange 2.2 ft above land surface.

PERIOD OF RECORD: April 1977 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	160.17
10/8/2015	161.38
12/9/2015	160.44
2/12/2016	69.69
4/5/2016	54.08
6/7/2016	91.22



WELL NUMBER: AA Ad 102 PERMIT NUMBER: AA-81-2641 LOCATION: Aviation Blvd., Glen Burnie LAT. 39° 10' 32", LONG. 76° 38' 59"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 108 ft;

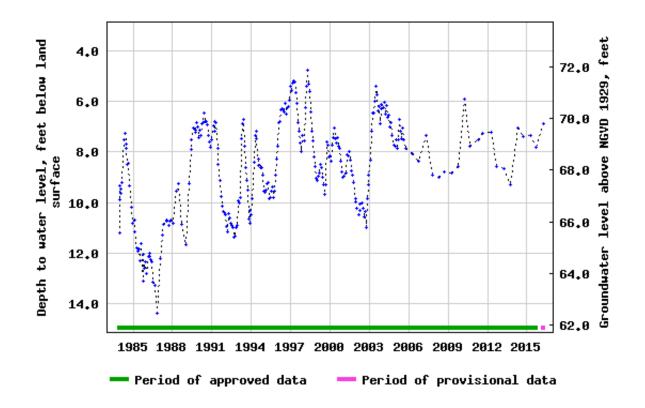
Casing diameter: 6 in. to 80 ft;

Screen diameter: 6 in. from 80 to 90 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 76.72 ft above NGVD of 1929. MEASURING POINT: Top of casing 5.27 ft above land surface.

PERIOD OF RECORD: December 1983 to current year.

	Water
Date	level
9/9/2015	7.80
4/5/2016	6.88



WELL NUMBER: AA Ad 108 PERMIT NUMBER: AA-81-3475 LOCATION: Aviation Blvd., Glen Burnie LAT. 39° 10' 32", LONG. 76° 38' 59"

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age. WELL CHARACTERISTICS: Drilled, observation, water-table well, depth 11.5 ft;

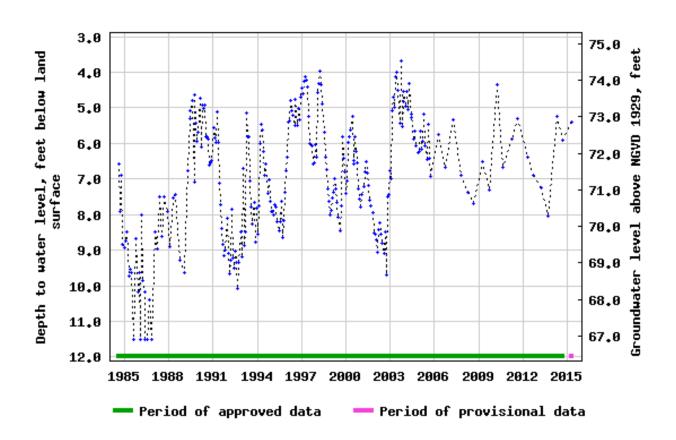
Casing diameter: 4 in. to 6 ft;

Screen diameter: 4 in. from 6 to 11 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 78.31 ft above NGVD of 1929. MEASURING POINT: Top of casing 5.5 ft above land surface.

PERIOD OF RECORD: August 1984 to current year.

	Water
Date	level
9/9/2015	6.40
4/5/2016	5.63



WELL NUMBER: AA Ad 109 PERMIT NUMBER: AA-81-4890 LOCATION: Dorsey Road, Glen Burnie LAT. 39° 10' 06", LONG. 76° 38' 01"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 46 ft;

Casing diameter: 4 in. to 36 ft;

Screen diameter: 4 in. from 36 to 46 ft. INSTRUMENTATION: Periodic measurements.

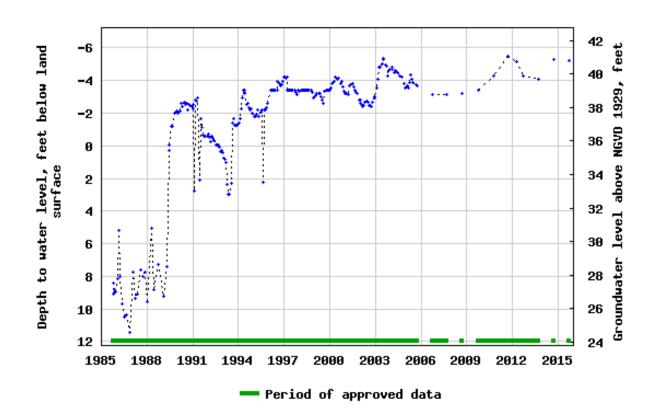
DATUM: Altitude of land surface is 35.78 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 4.29 ft above land surface.

PERIOD OF RECORD: October 1985 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM (READINGS ABOVE LAND-SURFACE INDICATED BY "-")

	Water
Date	level
9/5/2014	-5.30
9/9/2015	5.20



WELL NUMBER: AA Bc 215 PERMIT NUMBER: AA-81-1035 LAT. 39° 07' 00", LONG. 76° 41' 26" LOCATION: Telegraph Road

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, production, artesian well, depth 325 ft;

Casing diameter: 16 in. to 236 ft

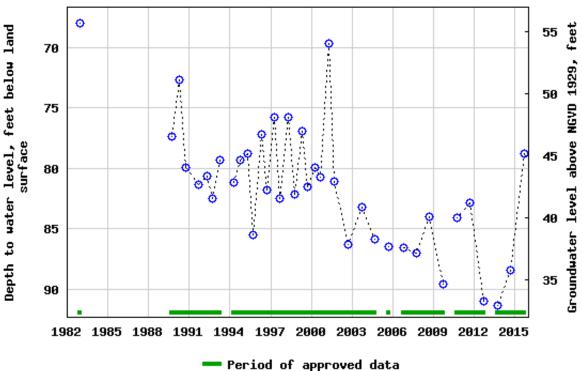
Screen diameter: 10 in. from 235 to 239 ft, 250 to 284 ft, and 288 to 316 ft.

INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 124 ft above NGVD of 1929. MEASURING POINT: Top of riser pipe 1 ft above land surface.

PERIOD OF RECORD: December 1989 to current year.

	Water
Date	level
9/9/2014	88.42
9/4/2015	78.81



WELL NUMBER: AA Bd 152 PERMIT NUMBER: AA-81-3463 LOCATION: Woodside School, Glen Burnie LAT. 39° 08' 21", LONG. 76° 36' 54"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 103 ft;

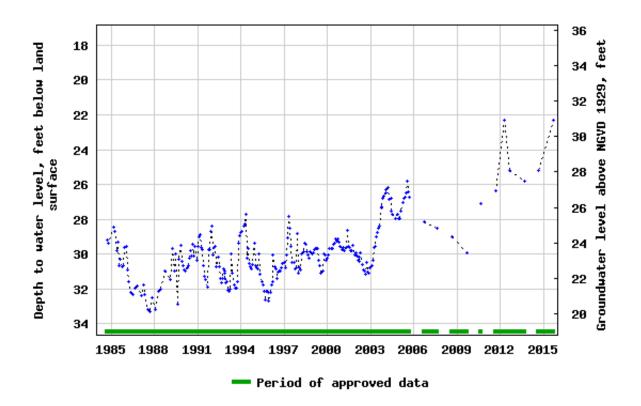
Casing diameter: 6 in. to 90 ft;

Screen diameter: 4 in. from 90 to 100 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 53.29 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 3.0 ft above land surface.

PERIOD OF RECORD: March 1985 to current year.

	Water
Date	level
9/5/2014	25.21
9/3/2015	22.31



WELL NUMBER: AA Bd 155

LOCATION: State Highway Administration, Glen Burnie

PERMIT NUMBER: AA-81-3460

LAT. 39° 09' 38", LONG. 76° 38' 37"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 159 ft;

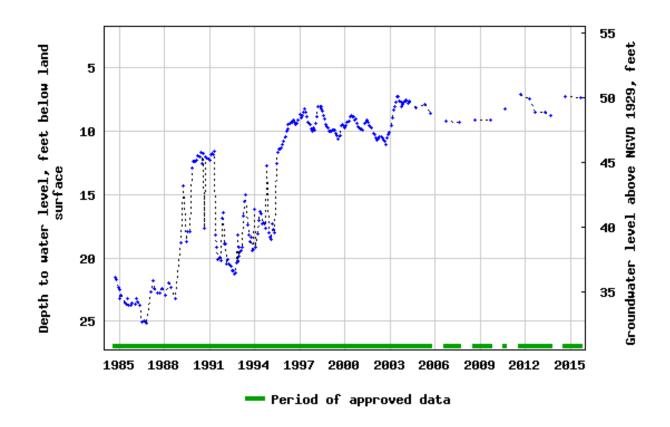
Casing diameter: 6 in. to 145 ft;

Screen diameter: 4 in. from 145 to 155 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 57.50 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 2.5 ft above land surface.

PERIOD OF RECORD: October 1984 to current year.

	Water
Date	level
9/5/2014	7.27
9/3/2015	7.35



WELL NUMBER: AA Bd 156

PERMIT NUMBER: AA-81-3462

LOCATION: Baltimore-Annapolis Bike Trail, 0.3 mi. north LAT. 39° 09' 22", LONG. 76° 37' 10"

of Aquahart Rd., Glen Burie

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 173 ft;

Casing diameter: 6 in. to 160 ft; 4 in. from 170 to 173 ft;

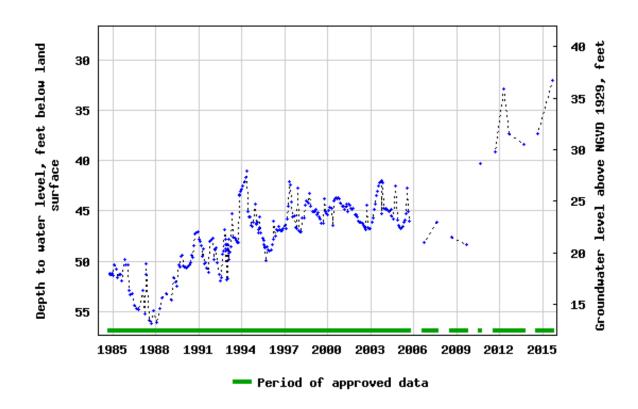
Screen diameter: 4 in. from 160 to 170 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 68.99 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 2.26 ft above land surface.

PERIOD OF RECORD: October 1984 to current year.

	Water
Date	level
9/5/2014	37.33
9/3/2015	32.09



WELL NUMBER: AA Bd 157 PERMIT NUMBER: AA-81-3464

LOCATION: Rippling Woods Elementary School, Glen Burnie LAT. 39° 07' 37", LONG. 76° 37' 44"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 180 ft;

Casing diameter: 6 in. to 167 ft;

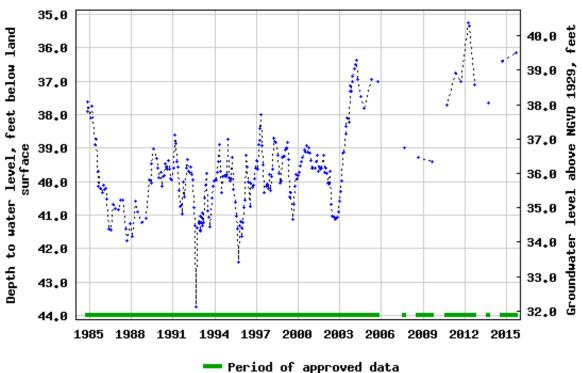
Screen diameter: 4 in. from 167 to 177 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 75.75 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 2.5 ft above land surface.

PERIOD OF RECORD: March 1985 to current year\*.

	Water
Date	level
9/5/2014	36.41
9/3/2015	36.15



WELL NUMBER: AA Bd 158 PERMIT NUMBER: AA-81-3459

LOCATION: Center for Applied Technology, Glen Burnie LAT. 39° 07' 44", LONG. 76° 37" 00"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 187 ft;

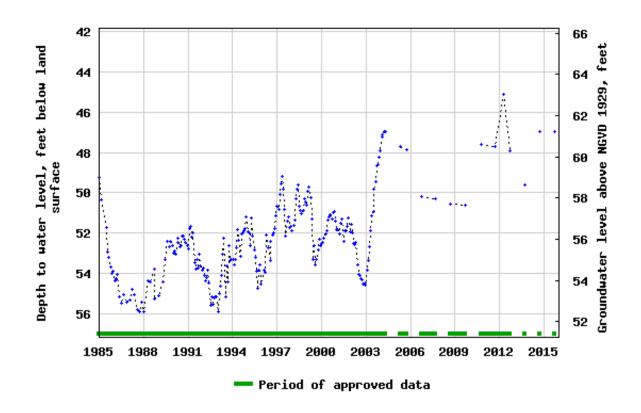
Casing diameter: 6 in. to 174 ft;

Screen diameter: 4 in. from 174 to 184 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 108.25 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 2.6 ft above land surface.

PERIOD OF RECORD: January 1985 to current year.

_	Water
Date	level
9/5/2014	46.97
9/9/2015	46.94



WELL NUMBER: AA Bd 159 PERMIT NUMBER: AA-81-3949 LOCATION: Rippling Woods Elementary School, LAT. 39° 07' 37", LONG. 76° 37' 44"

near Glen Burnie

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 100 ft;

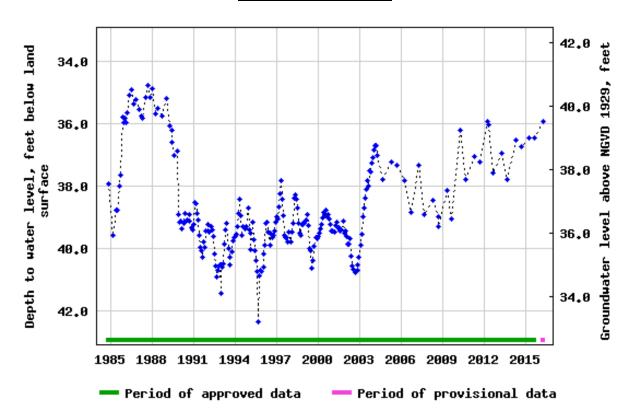
Casing diameter: 6 in. to 89 ft;

Screen diameter: 4 in. from 89 to 99 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 75.48 ft above NGVD of 1929. MEASURING POINT: Top of casing 2.5 ft above land surface.

PERIOD OF RECORD: 1984 to current year.

	Water
Date	level
9/3/2015	36.45
4/15/2016	35.93



WELL NUMBER: AA Bd 160 PERMIT NUMBER: AA-81-3461 LOCATION: Queenstown Park, near Glen Burnie LAT. 39° 09' 08", LONG. 76° 39' 44"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 118 ft;

Casing diameter: 6 in. to 105 ft;

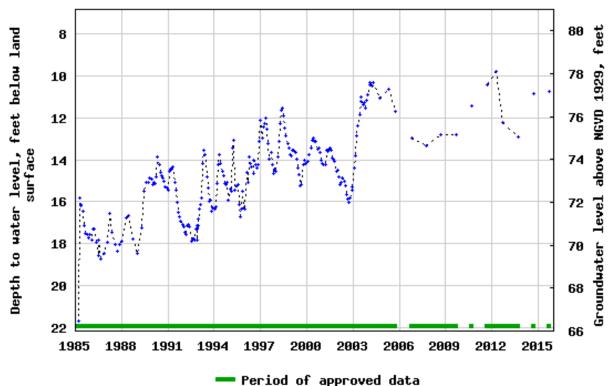
Screen diameter: 4 in. from 105 to 115 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 88 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 2.5 ft above land surface.

PERIOD OF RECORD: March 1985 to current year.

Date	Water level
9/5/2014	10.86
9/9/2015	10.75



WELL NUMBER: AA Cb 1 PERMIT NUMBER: AA-03-5695 LOCATION: Patuxent Wildlife Refuge Center LAT. 39° 03' 03", LONG. 76° 46' 32"

AQUIFER: Patuxent Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 505 ft;

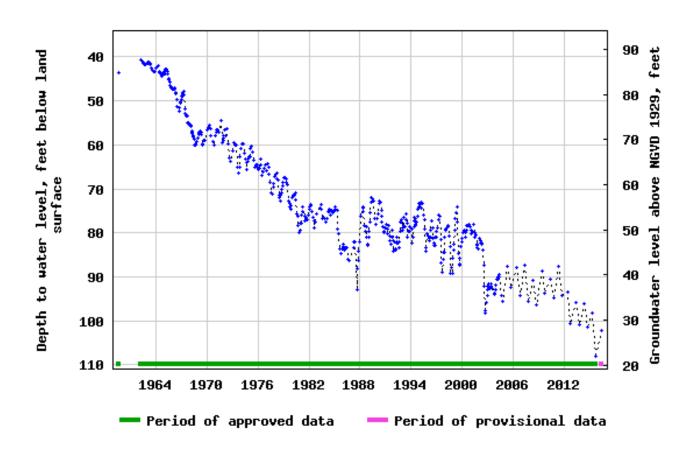
Casing diameter: 6 in. to 485 ft;

Screen diameter: 6 in. from 485 to 505 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 129.10 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 3.35 ft above land surface.

PERIOD OF RECORD: March 1962 to current year.

	Water
Date	level
9/10/2015	107.98
4/15/2016	102.11



WELL NUMBER: AA Cc 82

PERMIT NUMBER: AA-04-6965

LOCATION: King Heights Water-Treatment Plant

LAT. 39° 04' 22", LONG. 76° 41' 45"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 458 ft;

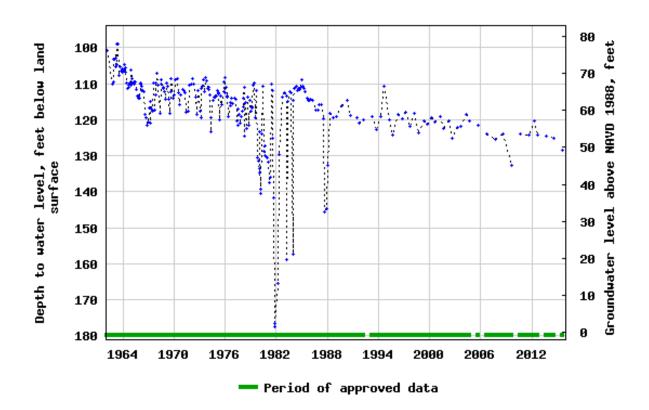
Casing diameter: 1 in. to 455 ft;

Screen diameter: 1.25 in. from 455 to 458 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 178.39 ft above NGVD of 1929. MEASURING POINT: Top of casing 0.5 ft above land surface.

PERIOD OF RECORD: 1962 to current year.

	Water
Date	level
8/28/2014	125.13
8/31/2015	128.37



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WELL NUMBER: AA Cc 89 PERMIT NUMBER: AA-65-0672 LOCATION: Crofton Water-Treatment Plant LAT. 39° 00' 10", LONG. 76° 41' 57"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 605 ft;

Casing diameter: 20 in. to 525 ft; 10 in. to 260 ft; 8 in. from 260 to 575 ft;

Screen diameter: 8 in. from 575 to 605 ft. INSTRUMENTATION: Periodic measurements.

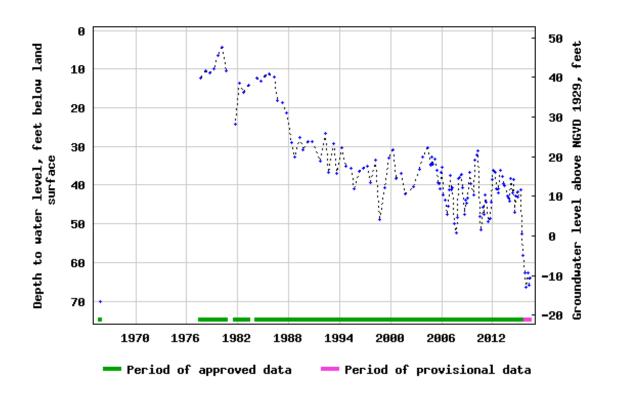
DATUM: Altitude of land surface is 53 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 3.6 ft above land surface.

PERIOD OF RECORD: 1977 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	58.26
10/8/2015	62.66
12/9/2015	66.28
2/12/2016	62.64
4/5/2016	65.77
6/7/2016	64.03



WELL NUMBER: AA Cc 102 PERMIT NUMBER: AA-72-0907 LOCATION: Crofton Water-Treatment Plant LAT. 39° 00' 04", LONG. 76° 42' 00"

AQUIFER: Patuxent Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 960 ft;

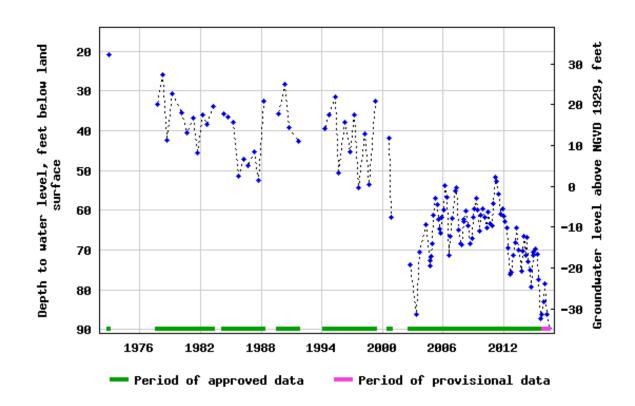
Casing diameter: 20 in. to 820 ft; 10 in. to 850 ft; Screen diameter: 10 in. from 850 to 960 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 54 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 3.3 ft above land surface.

PERIOD OF RECORD: 1972 to current year.

	Water
Date	level
8/12/2015	87.35
10/8/2015	86.08
12/9/2015	82.97
2/12/2016	78.52
4/5/2016	86.29
6/7/2016	89.71



WELL NUMBER: AA Cc 115

LOCATION: Crofton Meadows Water-Treatment Plant

PERMIT NUMBER: AA-73-9755

LAT. 39° 01' 03", LONG. 76° 40' 26"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 671 ft;

Casing diameter: 4 in. to 661 ft;

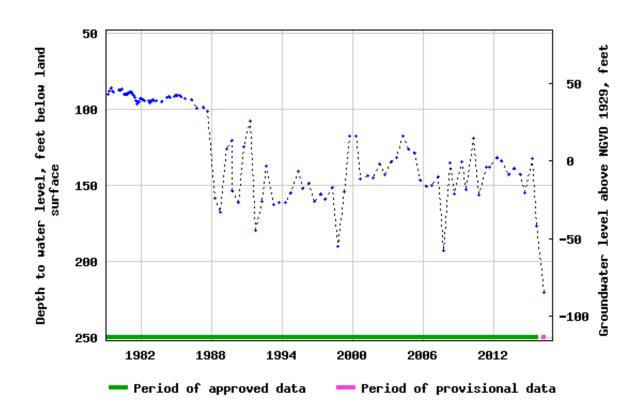
Screen diameter: 4 in. from 661 to 671 ft; INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 134.38 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 3.55 ft above land surface.

PERIOD OF RECORD: 1979 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/31/2015	176.82
4/15/2016	220.09



WELL NUMBER: AA Cc 116 PERMIT NUMBER: AA-73-9756 LOCATION: Crofton Meadows Water-Treatment Plant LAT. 39° 01' 03", LONG. 76° 40' 26"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 483 ft;

Casing diameter: 4 in. to 473 ft;

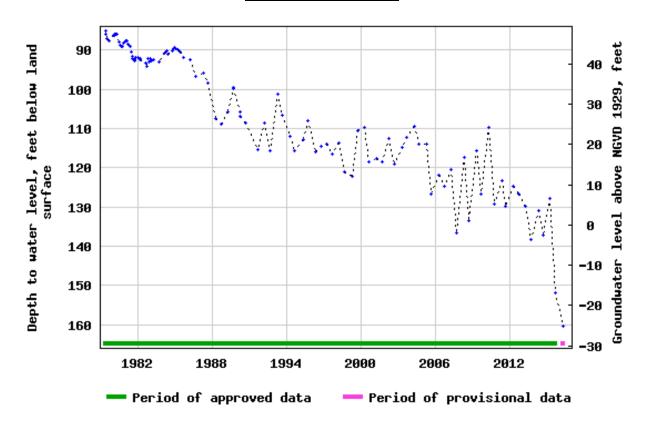
Screen diameter: 4 in. from 473 to 483 ft; INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 134.35 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 3.0 ft above land surface.

PERIOD OF RECORD: 1979 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water level
8/31/2015	152.05
4/15/2016	160.55



WELL NUMBER: AA Cc 135

LOCATION: Crofton Meadows Water-Treatment Plant

PERMIT NUMBER: AA-93-0998

LAT. 39° 01' 26", LONG. 76° 40' 30"

AQUIFER: Patuxent Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,100 ft.

Casing diameter: 4 in. to 299 ft; 2 in. from 299 to 985 ft, and 1,035 to 1,070 ft;

Screen diameter: 2 in. from 985 to 1,035 ft, and 1,070 to 1,100 ft.

INSTRUMENTATION: Periodic measurements.

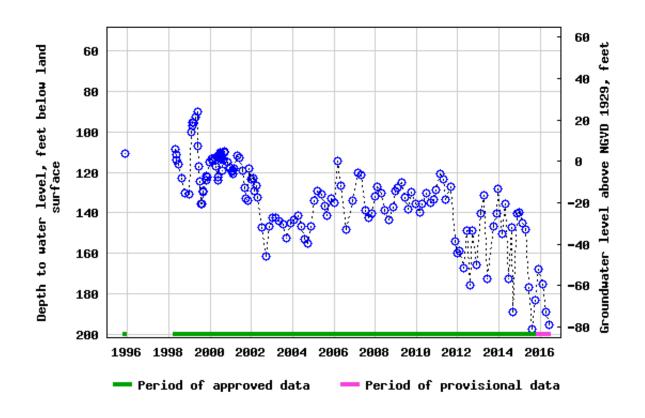
DATUM: Altitude of land surface is 114.81 ft above NGVD of 1929.

MEASURING POINT: Top of 6-inch steel flange 3.48 ft above land surface.

PERIOD OF RECORD: 1997 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	197.04
10/9/2015	183.25
12/9/2015	167.73
2/12/2016	175.06
4/5/2016	189.12
6/7/2016	195.01



WELL NUMBER: AA Cc 137 PERMIT NUMBER: AA-93-0993 LOCATION: Crofton Meadows Water-Treatment Plant LAT. 39° 01' 26", LONG. 76° 40' 29"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 690 ft.

Casing diameter: 4 in. to 300 ft; 2 in. from 300 to 476 ft, 506 to 536 ft, and 576 to 606 ft;

Screen diameter: 2 in. from 476 to 506 ft, 536 to 576 ft, and 606 to 686 ft.

INSTRUMENTATION: Periodic measurements.

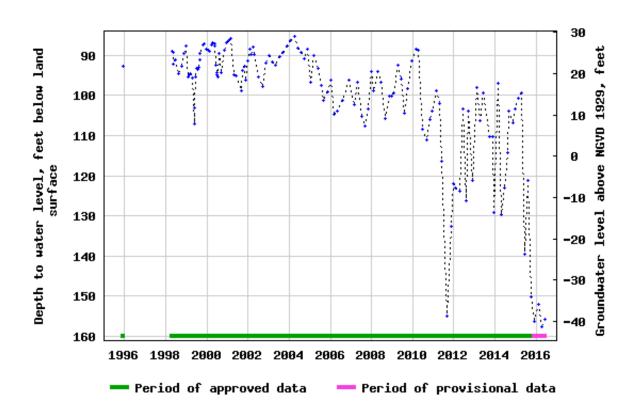
DATUM: Altitude of land surface is 117.00 ft above NGVD of 1929.

MEASURING POINT: Top of 4-inch PVC casing 2.2 ft above land surface.

PERIOD OF RECORD: 1997 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	121.12
10/8/2015	150.20
12/9/2015	156.18
2/12/2016	151.90
4/5/2016	157.64
6/7/2016	155.60



WELL NUMBER: AA Ce 117 PERMIT NUMBER: AA-73-0172 LOCATION: Severndale Water-Treatment Plant LAT. 39° 04' 50", LONG. 76° 34' 34"

AQUIFER: Patuxent Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 922 ft;

Casing diameter: 6 in. to 836 ft, 851 to 870 ft, and 890 to 907 ft;

Screen diameter: 6 in. from 836 to 851 ft, 870 to 890 ft, and 907 to 922 ft.

INSTRUMENTATION: Periodic measurements.

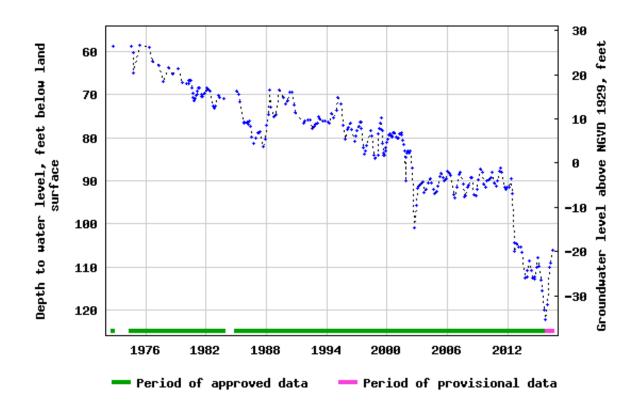
DATUM: Altitude of land surface is 86.0 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 0.5 ft above land surface.

PERIOD OF RECORD: 1977 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	120.06
10/8/2015	122.22
12/9/2015	118.73
2/12/2016	109.96
4/5/2016	109.10
6/7/2016	106.00



WELL NUMBER: AA Cf 99 PERMIT NUMBER: AA-70-0199 LOCATION: Traffic Engineering Building, Broad Neck LAT. 39° 01' 50", LONG. 76° 28' 30"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 220 ft.

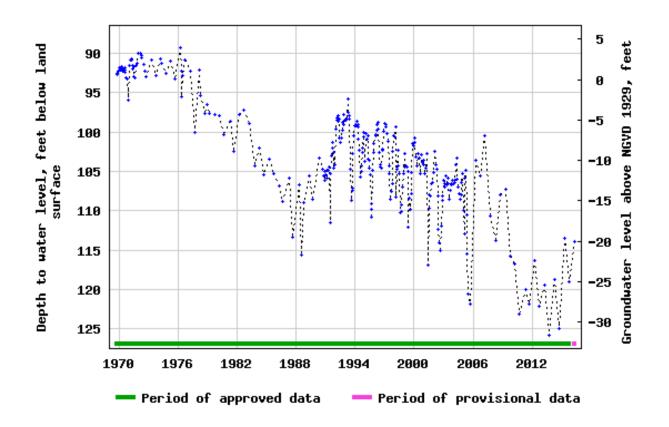
Casing diameter: 2 in. to 210 ft.

Screen diameter: 2 in. from 210 to 220 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 93.70 ft above NGVD of 1929. MEASURING POINT: Top of casing 3.60 ft above land surface.

PERIOD OF RECORD: January 1971 to current year.

	Water
Date	level
9/18/2015	119.03
4/8/2016	113.87



WELL NUMBER: AA Cf 134 LOCATION: Amberly Water-Treatment Plant PERMIT NUMBER: AA-70-0171 LAT. 39° 01' 21", LONG. 76° 27' 05"

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 590 ft.

Casing diameter: 24 in. to 370 ft; 16 in. from 270 to 360 ft, 363 to 370 ft, 392 to 455 ft, 495 to 502 ft, 528 to 542 ft, 560 to 566 ft, and 580 to 590 ft.

Screen diameter: 16 in. from 360 to 363 ft, 370 to 392 ft, 455 to 495 ft, 502 to 528 ft, 542 to

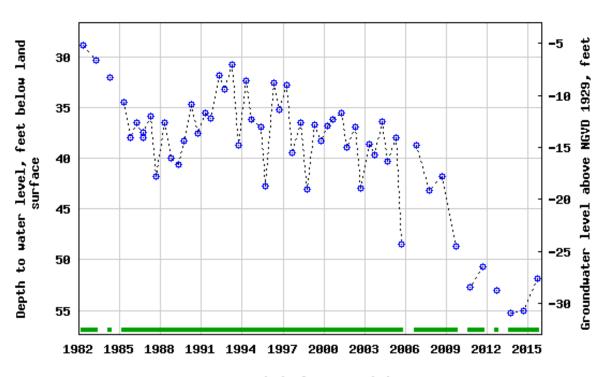
560 ft, and 566 to 580 ft.

INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 24 ft above NGVD of 1929. MEASURING POINT: Top of riser pipe 1.45 ft above land surface.

PERIOD OF RECORD: January 1982 to current year.

	Water
Date	level
9/8/2014	55.07
9/3/2015	51.90



- Period of approved data

WELL NUMBER: AA Cf 137 PERMIT NUMBER: AA-86-0401 LOCATION: Arnold Water-Treatment Plant LAT. 39° 02' 05", LONG. 76° 29' 27"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,030 ft.

Casing diameter: 6 in. to 543 ft, 4 in. from 543 to 791 ft, 816 to 826 ft, 856 to 876 ft, 896 to

916 ft, and 966 to 976 ft.

Screen diameter: 4 in. from 791 to 816 ft, 826 to 856 ft, 876 to 896 ft, and 916 to 966 ft.

INSTRUMENTATION: Periodic measurements.

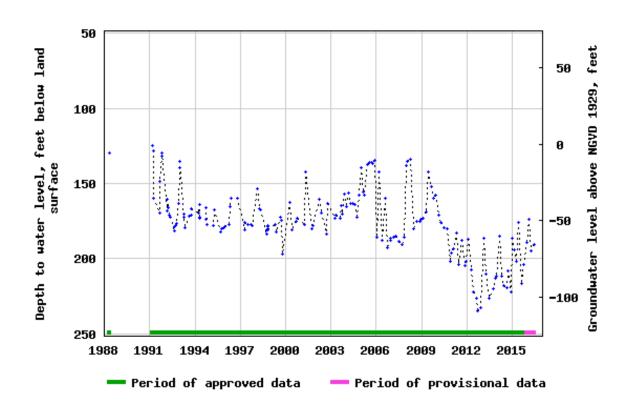
DATUM: Altitude of land surface is 124 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 0.5 ft above land surface.

PERIOD OF RECORD: 1989 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	216.71
10/8/2015	203.92
12/9/2015	189.24
2/12/2016	173.85
4/5/2016	195.16
6/7/2016	190.57



WELL NUMBER: AA Cf 166 PERMIT NUMBER: AA-95-3107 LOCATION: Arnold Water-Treatment Plant LAT. 39° 01' 54", LONG. 76° 28' 29"

AQUIFER: Patuxent aquifer in the Patuxent Formation of Lower Cretaceous age. WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,535 ft.

Casing diameter: 6 in. to 420 ft, 4 in. from 420 to 1,320 ft, 1,340 to 1,360 ft, and 1,400 to 1,500 ft.

Screen diameter: 4 in. from 1,320 to 1,340 ft, 1,360 to 1,400 ft, and 1,500 to 1,530 ft.

INSTRUMENTATION: Periodic measurements.

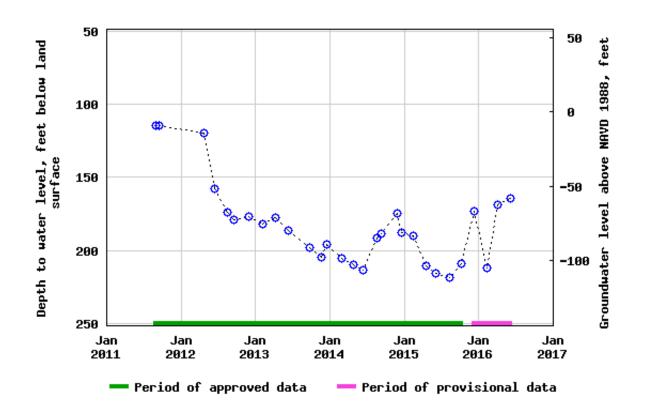
DATUM: Altitude of land surface is 106 ft above NGVD of 1929.

MEASURING POINT: Top of access cover at land surface.

PERIOD OF RECORD: 2011 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
8/12/2015	218.37
10/8/2015	208.89
12/9/2015	173.06
2/12/2016	211.72
4/5/2016	169.00
6/7/2016	164.56



WELL NUMBER: AA Cf 167 PERMIT NUMBER: AA-95-3108 LOCATION: Arnold Water-Treatment Plant LAT. 39° 01' 54", LONG. 76° 28' 29"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,505 ft.

Casing diameter: 6 in. to 420 ft, 4 in. from 420 to 750 ft, 775 to 815 ft, 840 to 855 ft, 865 to

880 ft, 890 to 915 ft, 925 to 935 ft, 945 to 960 ft, and 1,000 to 1,032 ft.

Screen diameter: 4 in. from 750 to 775 ft, 815 to 840 ft, 855 to 865 ft, 880 to 890 ft, 915 to 925 ft, 935 to 945 ft, 960 to 1,000 ft, and 1,032 to 1,047 ft.

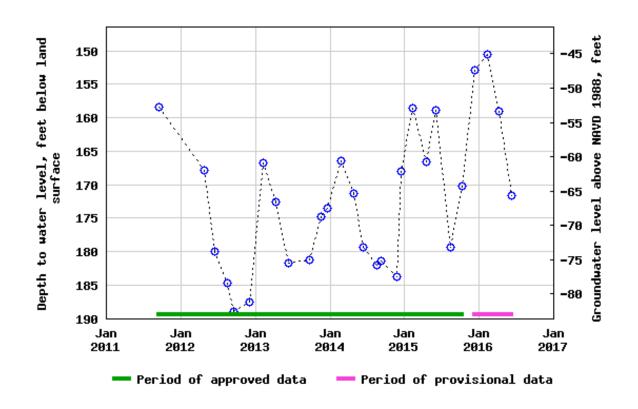
INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 124 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 0.5 ft above land surface.

PERIOD OF RECORD: 1989 to current year.

	Water
Date	level
8/12/2015	179.33
10/8/2015	170.14
12/9/2015	152.94
2/12/2016	150.50
4/5/2016	158.99
6/7/2016	171.68



WELL NUMBER: AA Cg 22 PERMIT NUMBER: AA-73-8606 LOCATION: Sandy Point State Park LAT. 39° 01' 23", LONG. 76° 24' 16"

AQUIFER: Patuxent Formation of Lower Cretaceous age.

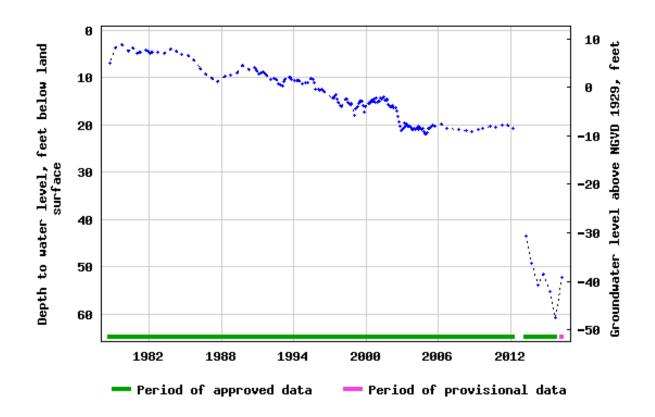
WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,760 ft. Casing diameter: 10 in. to 163 ft; 4 in. to 1,735 ft, and from 1,755 to 1,760 ft.

Screen diameter: 4 in. from 1,735 to 1,755 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 12.61 ft above NGVD of 1929. MEASURING POINT: Top of casing 3.44 ft above land surface.

PERIOD OF RECORD: 1979 to current year.

	Water
Date	level
9/18/2015	60.80
4/8/2016	55.15



WELL NUMBER: AA Cg 23 PERMIT NUMBER: AA-73-8959 LOCATION: Sandy Point State Park LAT. 39° 01' 23", LONG. 76° 24' 16"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 986 ft.

Casing diameter: 10 in. to 163 ft; 4 in. to 968 ft and 978 to 986 ft.

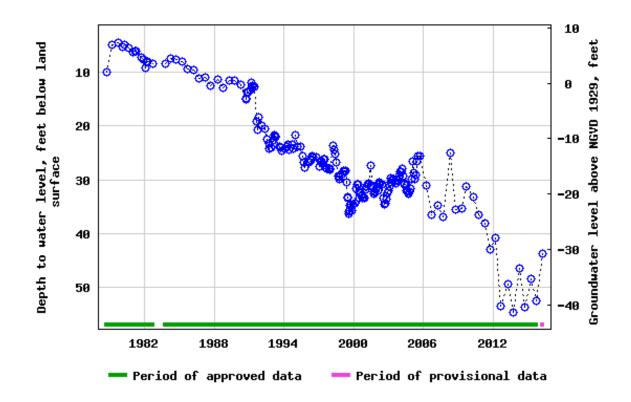
Screen diameter: 4 in. from 968 to 978 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 12.57 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 3.43 ft above land surface.

PERIOD OF RECORD: 1978 to current year.

	Water
Date	level
9/18/2015	52.53
4/8/2016	43.73



WELL NUMBER: AA Cg 24 PERMIT NUMBER: AA-73-8960 LOCATION: Sandy Point State Park LAT. 39° 01' 23", LONG. 76° 24' 16"

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 664 ft.

Casing diameter: 12 in. to 68 ft; 6 in. to 158 ft; 4 in. from 158 to 605 ft, 615 to 648 ft, and 658

to 664 ft.

Screen diameter: 4 in. from 605 to 615 ft, and 648 to 658 ft.

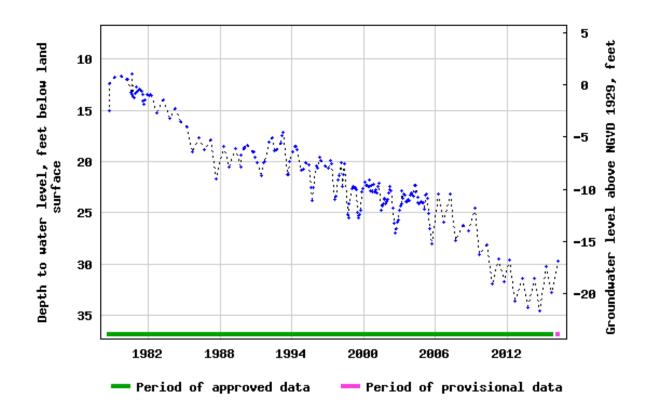
INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 12.68 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 3.16 ft above land surface.

PERIOD OF RECORD: 1978 to current year.

	Water
Date	level
9/18/2015	32.75
4/8/2016	29.68



WELL NUMBER: AA Dd 42 PERMIT NUMBER: AA-71-0231 LOCATION: Route 50 and Howard Grove Road LAT. 38° 58' 08", LONG. 76° 37' 35"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 275 ft.

Casing diameter: 4 in. to 190 ft; 2 in. from 220 to 225 ft, and 235 to 265 ft. Screen diameter: 2 in. from 190 to 200 ft, 225 to 235 ft, and 265 to 275 ft.

INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 105.48 ft above NGVD of 1929. MEASURING POINT: Top of casing 0.72 ft above land surface.

PERIOD OF RECORD: 1970 to current year.

	Water
Date	level
9/10/2014	102.07
9/17/2015	103.66



WELL NUMBER: AA De 1 PERMIT NUMBER: --

LAT. 38° 59' 15", LONG. 76° 34' 03" LOCATION: City of Annapolis

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 237 ft.

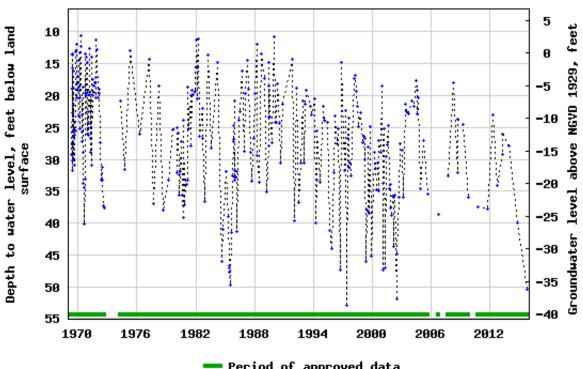
Casing diameter: 10 in. to 207 ft.

Screen diameter: 6 in. from 207 to 237 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 13.72 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 2.0 ft above land surface.

PERIOD OF RECORD: 1969 to current year.

	Water
Date	level
10/02/2014	39.92
9/28/2015	50.45



Period of approved data

WELL NUMBER: AA De 95 PERMIT NUMBER: AA-68-0175 LAT. 38° 58' 53", LONG. 76° 33' 30" LOCATION: Broad Creek Water-Treatment Plant

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 480 ft.

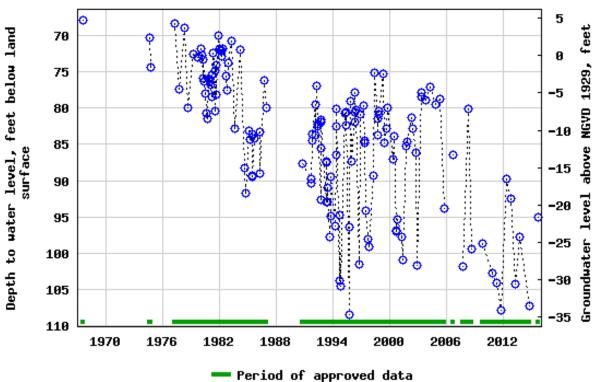
Casing diameter: 6 in. to 465 ft.

Screen diameter: 6 in. from 465 to 480 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 71.28 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 5.3 ft above land surface.

PERIOD OF RECORD: 1974 to current year.

	Water
Date	level
9/10/2014	107.29
9/17/2015	95.01



WELL NUMBER: AA De 124
PERMIT NUMBER: AA-73-5055
LOCATION: Central Avenue well field
LAT. 38° 55' 28", LONG. 76° 33' 46"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 480 ft;

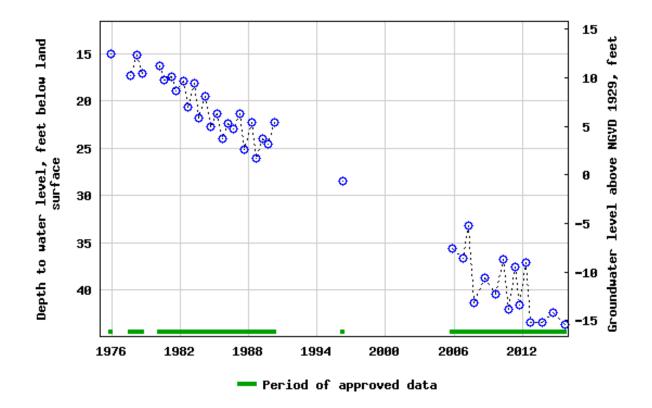
Casing diameter: 2 in. to 350 ft;

Screen diameter: 2 in. from 350 to 480 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 27.84 ft above NGVD of 1929.

PERIOD OF RECORD: 1977 to current year.

	Water
Date	level
9/4/2014	42.42
9/2/2015	43.63



WELL NUMBER: AA De 128 PERMIT NUMBER: AA-73-8278 LAT. 38° 55' 30", LONG. 76° 33' 47" LOCATION: Central Avenue well field

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 708 ft;

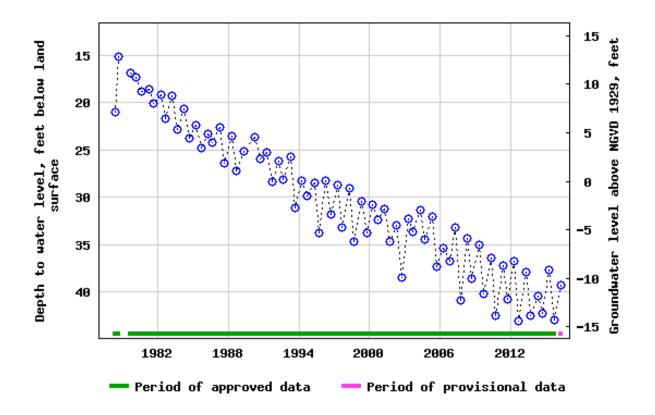
Casing diameter: 24 in. to 547 ft; 12 in. to 554 ft, and 644 to 686 ft; Screen diameter: 12 in. from 554 to 644 ft, and 686 to 708 ft.

INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 28.31 ft above NGVD of 1929. MEASURING POINT: Top of 24 in. casing 3.65 ft above land surface.

PERIOD OF RECORD: 1978 to current year.

	Water
Date	level
9/2/2015	43.00
4/18/2016	39.32



WELL NUMBER: AA De 206 PERMIT NUMBER: AA-88-9908 LOCATION: Broad Creek Water Treatment Plant LAT. 38° 58' 33", LONG. 76° 33' 28"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,013 ft;

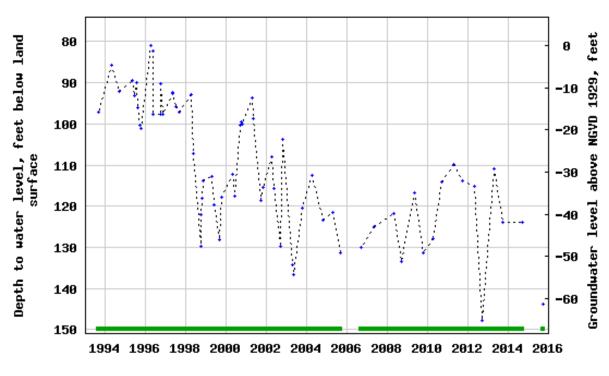
Casing diameter: 4 in. to 288 ft; 2 in. from 288 to 775 ft;

Screen diameter: 2 in. from 775 to 1,013 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 82 ft above NGVD of 1929. MEASURING POINT: Top of hole in flange 2.8 ft above land surface.

PERIOD OF RECORD: 1993 to current year.

	Water
Date	level
9/10/2014	123.91
9/17/2015	143.92



Period of approved data

WELL NUMBER: AA De 219

PERMIT NUMBER: AA-94-8258

LOCATION: City of Annapolis

LAT. 38° 59' 15", LONG. 76° 33' 53"

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 520 ft;

Casing diameter: 24 in. to 436 ft; 12 in. from 367 to 427 ft.

Screen diameter: 12 in. from 427 to 432 ft, 440 to 460 ft, 466 to 472 ft, 476 to 482 ft, 492 to 500 ft,

and 506 to 515 ft.

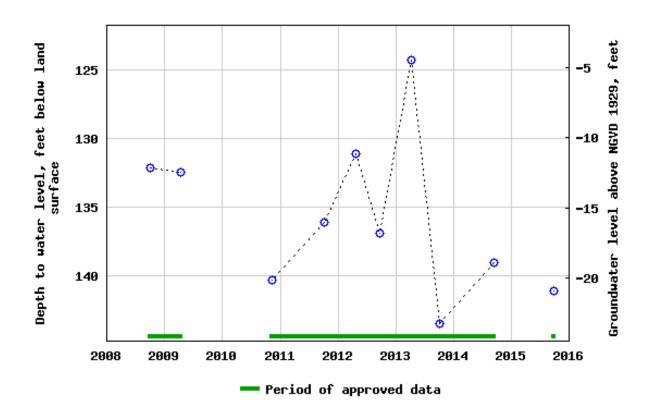
INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 120 ft above NGVD of 1929.

MEASURING POINT: Top of 2-inch measuring tube 3 ft above land surface.

PERIOD OF RECORD: 2010 to current year.

	Water
Date	level
9/12/2014	139.08
9/25/2015	141.10



WELL NUMBER: AA De 232 LOCATION: City of Annapolis PERMIT NUMBER: AA-95-4626 LAT. 38° 59' 18", LONG. 76° 33' 53"

AQUIFER: Lower Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 1,173 ft;

Casing diameter: 24 in. to 829 ft; 14 in. from 739 to 834 ft, 856 to 871 ft, 878 to 886 ft, 894 to 902 ft, 936 to 958 ft, 970 to 1,009 ft, 1,014 to 1,070 ft, and 1,120 to 1,130 ft.

Screen diameter: 14 in. from 834 to 856 ft. 871 to 878 ft. 886 to 894 ft. 902 to 936 ft. 958 to 970 ft. 1,009 to 1,014 ft, 1,070 to 1,120 ft, and 1,130 to 1,146 ft.

INSTRUMENTATION: Periodic measurements.

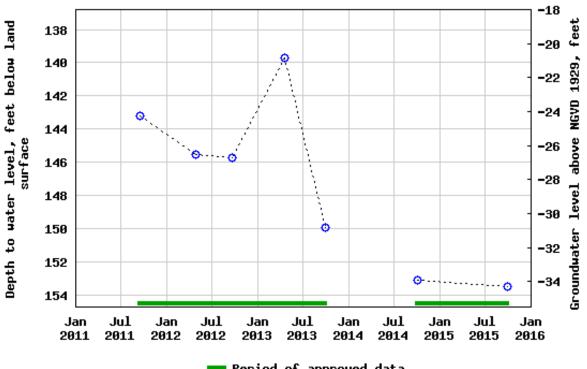
DATUM: Altitude of land surface is 119 ft above NGVD of 1929.

MEASURING POINT: Top of 2-inch measuring tube 1.8 ft above land surface.

PERIOD OF RECORD: 2011 to current year.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
10/2/2014	153.09
9/28/2015	153.45



Period of approved data

WELL NUMBER: AA Df 19 PERMIT NUMBER: --

LOCATION: U.S. Navy Radio Station LAT. 38° 59' 22", LONG. 76° 27' 04"

AQUIFER: Upper Patapsco aquifer in the Patapsco Formation of Lower Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 590 ft;

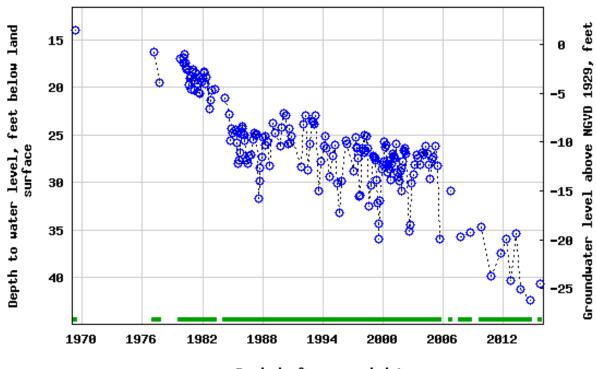
Casing diameter: 10 in. to 565 ft;

Screen diameter: 10 in. from 565 to 590 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 15.84 ft above NGVD of 1929. MEASURING POINT: Top of flange 2.5 ft above land surface.

PERIOD OF RECORD: 1977 to current year.

	Water
Date	level
9/10/2014	42.37
9/17/2015	40.63



- Period of approved data

WELL NUMBER: AA Df 20 PERMIT NUMBER: --

LOCATION: U.S. Navy Radio Station

LAT. 38° 59' 16", LONG. 76° 27' 07"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 255 ft.

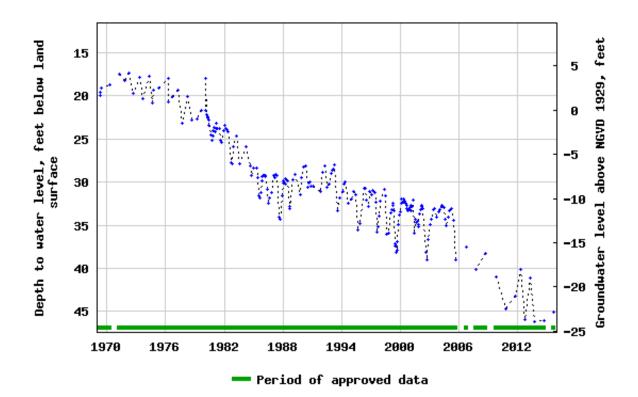
Casing diameter: 10 in. to 150 ft; 8 in. from 135 to 233 ft;

Screen diameter: 8 in. from 233 to 253 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 21.62 ft above NGVD of 1929. MEASURING POINT: Top of recorder platform 3.0 ft above land surface.

PERIOD OF RECORD: 1969 to current year.

	Water
Date	level
9/10/2014	46.01
9/17/2015	45.03



WELL NUMBER: AA Df 79 PERMIT NUMBER: AA-03-7867 LOCATION: U.S. Naval Academy LAT. 38° 59' 05", LONG. 76° 29' 36"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 705 ft.

Casing diameter: 6 in. to 300 ft; 320 to 572 ft, and 592 to 675 ft;

Screen diameter: 6 in. from 300 to 320 ft, 572 to 592 ft, and 675 to 695 ft.

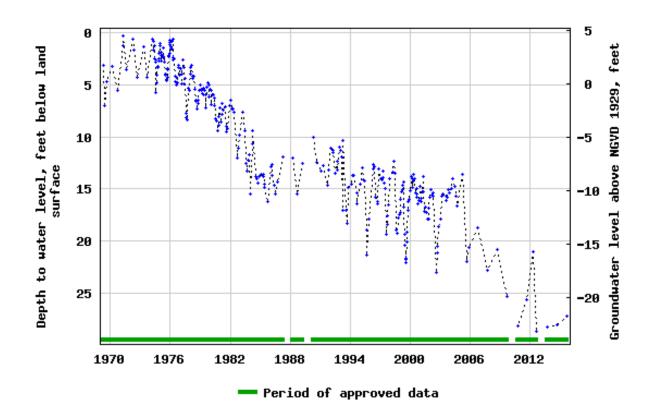
INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 5.17 ft above NGVD of 1929.

MEASURING POINT: Top of recorder platform 2.8 ft above land surface.

PERIOD OF RECORD: 1969 to current year.

Date	Water level
9/2/2014	28.03
9/1/2015	27.15



44

WELL NUMBER: AA Fe 92 PERMIT NUMBER: AA-94-5386 LOCATION: Deale Athletic Field LAT. 38° 46' 44", LONG. 76° 33' 12"

AQUIFER: Aquia Formation of Upper Paleocene age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 205 ft.

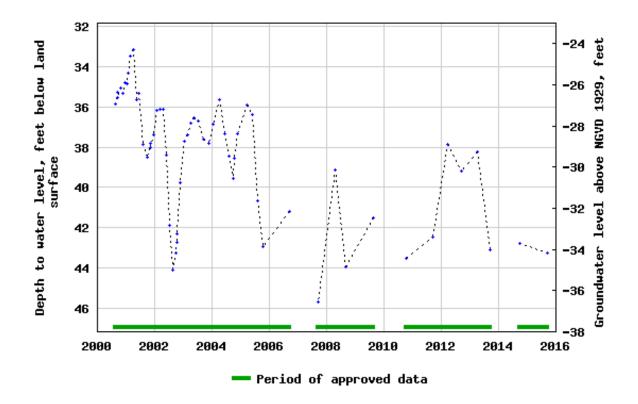
Casing diameter: 4.5 in. to 170 ft, and 200 to 205 ft.

Screen diameter: 4.5 in. from 170 to 200 ft. INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 9 ft above sea level from topographic map. MEASURING POINT: Top of recorder platform, 3.0 ft above land surface.

PERIOD OF RECORD: September 2000 to current year.

	Water
Date	level
9/22/2014	42.76
9/17/2015	43.24



WELL NUMBER: AA Fe 93 PERMIT NUMBER: AA-94-5391 LOCATION: Deale Athletic Field LAT. 38° 46' 44", LONG. 76° 33' 12"

AQUIFER: Magothy Formation of Upper Cretaceous age.

WELL CHARACTERISTICS: Drilled, observation, artesian well, depth 470 ft.

Casing diameter: 4.5 in. to 429 ft, 449 to 454 ft, and 464 to 470 ft.

Screen diameter: 4.5 in. from 429 to 449 ft, and 454 to 464 ft.

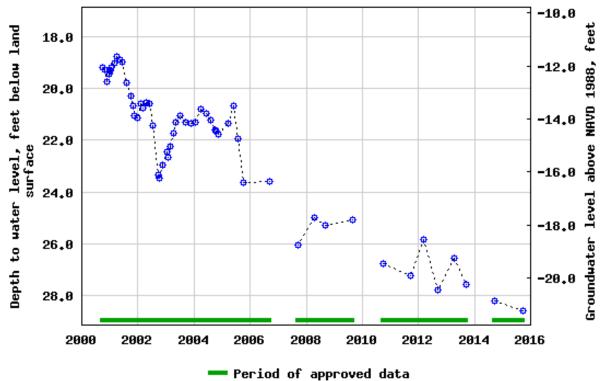
INSTRUMENTATION: Periodic measurements.

DATUM: Altitude of land surface is 9 ft above sea level from topographic map. MEASURING POINT: Top of recorder platform, 3.35 ft above land surface.

PERIOD OF RECORD: September 2000 to current year.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

	Water
Date	level
9/22/2014	28.19
9/17/2015	28.61



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GAGE NUMBER: 01589500 LOCATION: Sawmill Creek DRAINAGE AREA: 4.97 mi<sup>2</sup>.

GAGE: Water-stage recorder and concrete control. Datum of gage is 26.07 ft above NGVD of 1929. PERIOD OF RECORD: May 1944 to September 1952. Annual maximum, water years 1965-70. September 1983 to current year.

