Project Name	Groundwater Elevations	**Date**	11/7/ 2016
To / Contact info	BCWD Managers		
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Regarding	2016 Groundwater Elevation and Trends		

Background

EOR has measured groundwater elevations in wells in the BCWD since 2012. DNR also measures groundwater elevations in three observation wells. The measurements help identify trends in groundwater elevations that relate to groundwater/surface water interactions in Brown's Creek and other groundwater-dependant natural resources.

Analysis

Residential Wells

Groundwater elevation data from the residential wells (and DNR observation wells) are shown on Table 1 and Figure 1. Groundwater elevations generally increased from 2014 to 2015 by an average of about 2.3 feet. This is an unusually large rise that was undoubtedly related to the near record amount of rain during the late summer months.

DNR Observation Wells

DNR measures water elevations monthly in three observation wells:

- Brown's Creek Park – Deep well completed in the Jordan aquifer
- Brown's Creek Park – Shallow well completed in the Quaternary (glacial) aquifer
- Withrow School – Well completed in the Prairie du Chien aquifer

Groundwater elevation data from the DNR observation wells are shown on Figure 2. The data show a generally increasing trend since June 2010. The DNR recently repaired the Brown's Creek Park – Deep well. Data collected from September 2007 – June 2016 may have been incorrect due to sand and other debris clogging the well. BCWD should evaluate the data collected in 2017 to determine whether previous data from the well is a reliable representative of actual ground water elevations in the aquifer.

Golf Course Wells

We were able to measure all of the golf course wells this year. Two new wells at Logger's Trail golf course were added to the list. The two wells are small capacity wells that supply the clubhouse and the maintenance shop and are not used for irrigation.

Recommendations

BCWD should continue to collect groundwater elevation data on an annual basis. The long-term data and analyses are important for understanding conditions throughout the District, particularly the thermal impairment of Brown's Creek. The data will also be useful for calibrating and refining the groundwater model of the North and East Metropolitan Area currently being developed by the US Geological Survey.

Table 1. Groundwater Elevations

Unique Number	Name	March 2012 Water Elevation	August 2012 Water Elevation	2013 Water Elevation	2014 Water Elevation	2015 Water Elevation	2016 Water Elevation		Change since last measure
Approximate Date		Mar-12	Aug-12	Aug-13	Aug-14	Sep-15	Oct-16		
Golf Course Wells									
515171	Applewood Hills	889.55	887.97	887.34			891.84		4.50
151580	Oak Glen Country Club	825.12	819.62				825.50		5.88
151581	Oak Glen Country Club	827.51					829.71		2.20
208038	Stillwater Country Club	756.91	749.66				769.17		19.51
Sawmill 1	Sawmill Golf Club	906.75	904.38				910.31		5.93
Sawmill 2	Sawmill Golf Club	905.55	898.50				908.89		10.39
Sawmill 3	Sawmill Golf Club	906.38	903.59	906.36			910.27		3.91
Sawmill 4	Sawmill Golf Club						963.06		
566145	Logger's Trail Golf Course		898.91	900.21			904.41		4.20
667998	Logger's Trail Golf Course						911.29		
761112	Logger's Trail Golf Course						900.53		
Domestic Wells									
428563	Ed and Laurie Francis	897.43	893.03	896.14	898.01	897.56	900.51		2.95
410987	Dan and Lori Gunderson	901.56	899.90	900.01	900.99	901.89	904.96		3.07
196839	Louis J. Bruno	862.84	857.03	860.70			862.92		2.22
Leiser	Craig Leiser	929.57	929.36	929.84	932.13	931.27	932.63		1.36
James	Alan and Molly James	936.71	936.47		939.00	937.59	939.62		2.03
184049	Kirk and Tracy Hillquist	938.57	938.25	940.29	940.86	939.20	942.27		3.07
Thatcher	Jyneen Thatcher	949.35	948.94	947.88	951.97	950.55	953.76		3.21
138188	Rick Vanzwol	934.14	930.59	927.24	935.48	934.74	937.89		3.15
479665	John and Michelle Weaver	904.16		900.99		899.73	907.27		7.54
493250	Mark and Sharon Olien	720.30	716.97	713.74	720.64		721.88		1.24
525197	James and Marilyn Opp			907.93	909.80	910.04	912.08		2.04
505390	Larry J and Pamela J Larson		924.70		925.98		928.67		2.69
153485	John P and Carolyn A Rydel		893.58	893.98	896.20	895.51	897.42		1.91
138904	Duane and Margaret Burmeister				828.79	827.21	829.25		2.04
406204	Stuart and Susan Grubb			938.96	939.12	939.00	941.10		2.10
DNR Observation Wells									
595649	Brown's Creek Park - Deep	861.86	861.56	861.74	862.15	862.51	866.32		3.81
623066	Brown's Creek Park - Shallow	876.40	874.48	875.43	874.91	874.03	875.53		1.50
551565	Withrow Elementary School	947.68	949.39	947.80	949.40	951.27	954.28		3.01
							Average		*2.33*

Figure 1. Groundwater Elevations – BCWD Wells

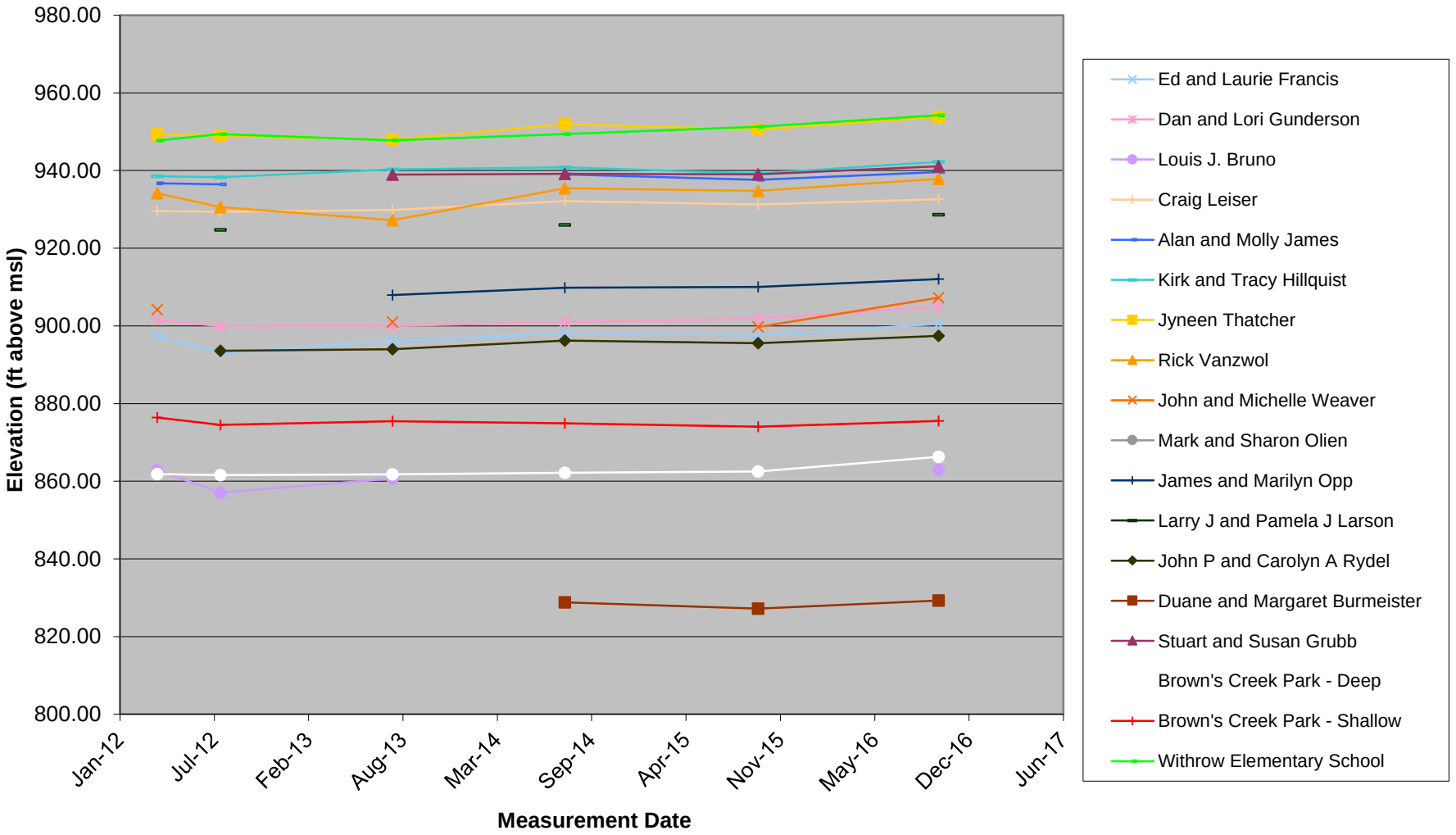
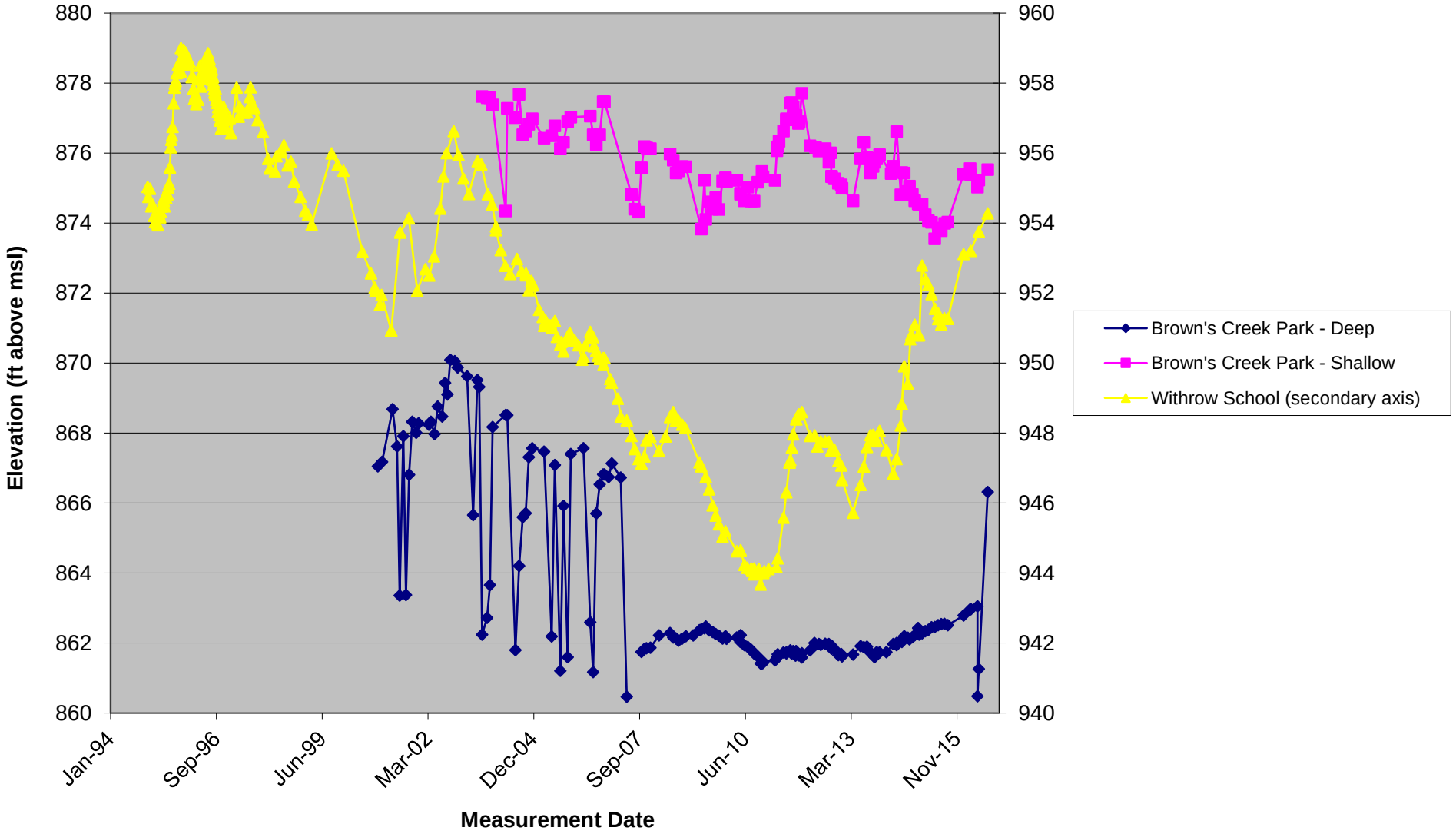
Figure 2. Groundwater Elevations – DNR Observation Wells