

MEMORANDUM

To: Groundwater Advisory Council
From: H. Bokuniewicz
Re: Minutes of the meeting of 14 September 2009
Date: October 2, 2009

PRESENT

R. Alvey
N. Bartilucci
H. Bokuniewicz
S. Colabufo
S. Jones
D. Paquette
K. Roberts
W. Spitz
S. Terracciano

REGRETS

M. Alarcon
L. Koppelman
R. Liebe
R. Mazza
M. Nofi
A. Rapiejko
K. Willis

1. The minutes of the meeting of June 15, 2009 were distributed with editorial comments.
2. The Suffolk County Water Authority is involved in providing educational message boards at Mt. Sinai Heritage Park where there are two large recharge basins. A basic message is that storm water should be considered a natural resource because it is a source of aquifer recharge. Mr. Fred Drewes, a retired professor has been consulting on this effort and professional comments and advice from this Council are welcomed. The educational boards will have water pipe borders with a valve that kids can turn.

Control of storm-water runoff continues to be an important topic, but Federal and State storm-water run-off programs tend to focus on surface water rather than recharge. The Clean Water Act concentrates on surface water although the State had added groundwater to the list. There are over 3000 recharge basins on Long Island. In Suffolk County, the number of recharge basins is increasing. In addition, water supplies must manage blow-off and backwash basins. The basins were originally designed as an efficient way of disposing of storm water developed by the Nassau County Department of Public Works 70 years ago. It was thought, however, that perhaps the optional design might be revisited. Some of the basins are recharging water to the deep recharge zone. The USGS has done research on these basins, by Henry Chu for example, in part, under the National Urban Runoff Program. Questions are raised but there are not many studies of their hydrological significance. Most basins are in developed areas. During the growing season, increased evapotranspiration would tend to decrease recharge although runoff from irrigation systems might tend to increase recharge. New studies might be done to compare contamination in the 1980s to conditions now. (In Albany, David Graves of the DOT is a specialist in environmental issues of runoff control). Previous work concluded that the basins were not an important source of contamination, although about 10 years ago Brian Schneider, during the DPN program to augment stream flow in south shore

streams, took cores in ponds and could easily see records in the sediments of contaminant increases, like increases in metals concentrations, PAH's and metals associated with tire wear.

The control of floatables has been an issue. Layers of plastic bottles, even some hypodermic needles, can be found at the bottom of some basins. Clean up has been erratic in part because of complicated jurisdictions over either individual basis or chains of recharge basins. In one case, fish were stocked in Hempstead Lake, and adding water from recharge basins was considered but gates from upstream couldn't be opened for concern of introducing floatables from road run-off. In 2006, Nassau County put forth a bond to modify curb inlets to exclude floatables but the additional maintenance was a serious issue.

Some basins have been remade as ecological basins providing, for example, habitat for the tiger salamander. Some consideration has been given to the use of porous pavements but these may be clogged by salt or other contaminants. The use of on-site storm water treatment was also considered. In discussion, the suggestion was made that perhaps the use of particular vegetation might be tailored to provide contaminant remediation as is being studied by Lee Newman at Brookhaven National Lab.

3. Caitlin Young and Gil Hanson have prepared a report on the past year's denitrification study. They concluded that the thickness of the vadose zone and the travel-time to the water table combine to control the amount of denitrification that occurs. In the future, they intend to address questions, such as:
 - A. What is the effect of vadose zone thickness on denitrification? Can we model it?
 - B. Is ammonium adsorption onto sediments and organic matter where much of nitrogen loss is occurring in the system?
 - C. What is the maximum amount of dissolved oxygen allowable to still have denitrification? Is it possible that oxic conditions are cyclic and this effects denitrification in our system?
 - D. What are the dissolved organic carbon requirements for denitrification in Long Island aquifers? Is small distance from cesspool to water table actually a *good* thing in terms of denitrification?

Answers to these questions can assist the water suppliers in making future decisions regarding which communities would benefit most from water treatment and public sewer installation. This work could also help predict which communities will face nitrate contamination as water supplies transition from old agricultural contamination to new housing sewer contamination.

The nitrogen budget model for the drainage basins into Great South Bay, which was done for the Nature Conservancy, had 31% of the nitrogen load on land being contributed by atmospheric deposition; 55% from sewage and 15% from fertilizer. However, they estimate that 84% of the atmospheric nitrogen is lost, almost all before it reaches the water table. They had similar but smaller losses for sewage nitrogen and fertilizer

nitrogen. They didn't have a number for the composition in the aquifer but they assume a 10% loss of all sources in the aquifer. Still, by these calculations some 20% of nitrogen in groundwater is atmospheric, almost 70% from sewage and only about 10% from fertilizer. The DEC is reassessing TMDL for Long Island Sound. This needs to be done in consideration of inputs from groundwater seepage and the Connecticut River. Although it was based on nitrogen, perhaps it probably should be focused on pathogens and floatables. Nitrogen, however, is what is regulated in the TMDL. Focusing on further control of sewage treatment plants, while most controllable, is probably not the greatest impact.

We should consider setting up a conference on the nitrogen budget to LIS. I will discuss this with Larry Swanson. Enough nitrogen probably gets into the system from all sources to cause dissolved oxygen problems when climactic conditions are right.

4. At Stony Brook University we have publicized internships with USGS, Dvirk and Bartilucci, EPA and the Suffolk County Water Authority. We had heard reports from engineering students that had worked with Joe Roccaro and now a student from Geosciences is working with Rob Alvey in the EPA.

The internships can be paid or unpaid but the students receive university credit in either case. A recent program may be able to pass funding through for interns working in the private sector.

5. The DEC report on water reuse has still been not released. It is a "hot topic" nationally, although there is not much interest on Long Island. We will encourage that report to be released. There remains interest in recycling in "green" buildings, and recycling water by car washes if nothing else. In NYS, perhaps four or five golf courses will reuse water irrigation.
6. We had considered mounting a session on geothermal systems at the University's upcoming (November 18 and 19) Advanced Energy Conference <www.org/conference09>, but that did not materialize. As we said earlier, Shelter Island has banned geothermal systems, but some large systems are proposed elsewhere. In Nassau County, a new home in a five-acre zone, intends to put in 18 wells running at 2 to 3 gallons per minute. The DEC is exploring the issues around its regulatory authority on geothermal systems under Article 15. Vito Minei has drafted guidance based on waste water septic systems. There will be a meeting to consider this issue between the Suffolk County Department of Health Services, the USGS and The Groundwater Institute.

There is interest at a seminary in Manhattan in using geothermal energy from Manhattan's fractured rock aquifer perhaps, however, utilizing deep wells to extract geothermal heat.

7. BNL is completing an assignment for a 30 MW solar farm. BNL also continues to work on groundwater remediation but at least one plant is shutting down having met its clean-up goals.
8. In the course of The Suffolk County Comprehensive Study, The Suffolk County Department of Health Services found that some, privately operated, package STP's were not being properly maintained, but when taken over by The County Department of Public Works, they are now meeting standards. A basic question had been whether housing

density, as, for example, for an expanded workforce, could be increased without sewerage. This does not appear to be the case.

9. The next meeting will be on **Monday 19 October** at the offices of Dvirka and Bartilucci in Woodbury 9:30-11:00 AM.

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Revised October 20, 2009