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# Water, water everywhere ...

## But drought preparation is critical

By Lois Josefson

During the mid 90's, regional news reports brought to public attention the trials and tribulations of those affected by the rising water in North Dakota's Devils Lake. Since that time, what is now over a decade-long wet cycle is raising the water table throughout the region, flooding low lying roads, creating water seepage in previously dry basements, causing problems with shallow municipal sewer systems, and devastating the lakeshore.

In each of these instances it is to engineers that we turn for direction.

"In the case of lakeshore development, there are at least three steps a future homeowner can take to protect himself from the impact of water table fluctuation," says Chris McConn, P.E. of Interstate Engineering.

When a proposed property development will create an acre or more of impervious surface, a Storm Water Pollution Prevention Plan (SWPPP) is a required part of the development documentation. The Plan



Chris McConn, P.E., Interstate Engineering, Fergus Falls, MN

defines the required steps that need to be taken to alleviate water runoff ramifications and water based erosion on the property, those steps can be taken entirely by the developer or the developer can specify that lot owners will fulfill some of the requirements in the future.

"Landowners can be taken by surprise in this regard," explains McConn, an environmental engineer in Interstate's Fergus Falls (MN) office. "Purchasers should ask for details regarding their obligations under the SWPPP for the development before they make the commitment to buy."

Existing lake structures and previously platted property were not always subject to the setback and construction requirements regarding elevation above water tables and septic system placement that are currently in place.

As a result, "purchasers of property need to do their own research regarding construction requirements and historical lake elevations rather than relying on representations of sellers and realtors or on their personal viewing of the property," emphasizes McConn. "In addition, it is important to have a picture of what the elevation is around the entire perimeter of the lake in question and around nearby lakes. The lowest portion of those perimeters is what will be most heavily impacted by rising lake levels."

County offices are the source of information for construction requirements and lake elevation data is available at the Minnesota Department of Natural Resources (DNR) Web site.

Of the many influences on lake elevation, one of the most important is whether the lake is a closed system or whether it has a river



Jeff Volk, V.P., Moore Engineering, West Fargo, ND

running through it. In the latter, the potential to adjust high water is greater through outlet controls. When the system is closed and the underground water table rises to intersect the base of the lake, the lake level can fluctuate significantly.

"The impact of rising water tables isn't limited to lakeshore owners and local government units who have to deal with and pay for rural road construction; it can also be a problem inside city limits," explained Jeff Volk, P.E. with Moore Engineering of West Fargo, ND. "We are working with communities whose aging sewer systems run at a depth that has been inundated by the water table. When that happens, the spaces between the clay tiles in these older systems can allow water or silt to enter the system, causing flow capacities that overwhelm the community's treatment facility and back flow as well. These same water table levels are impacting building basements and causing problems never recorded as having

been previously experienced."

"The engineering procedures around an existing building to address this circumstance are the same as what they would be in new construction: installing a drainage system around the structure and sump pump. This is the same way cities have had to deal with their (now shallow) sewage systems," says Volk, director of the water division within Moore Engineering. "We have installed drainage tile along and below the sewer lines to bring the water table down and we have placed sump pumping systems in city streets."

Water table issues that our region currently faces are not grounds for finger pointing. Communities built on the clay of the Dakotas early in this century had no point of reference for water tables being at current levels.

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Professor Leon Osborne

"An issue we face as engineers is determining to what frequency we should plan when designing projects. If we plan for 50-year events or 100-year events on projects that have a slim chance of encountering those, we will have overbuilt the project and will have raised its cost unnecessarily. Likewise, if we under-design a project, the collateral and reconstruction costs drive up expense as well," adds Volk. "When working with public bodies to determine the weather frequency to which a project should be designed, we often refer to studies of climatic patterns as one factor for consideration. Currently, for example, we are in a wet cycle and have been since 1993 in our region."

Dr. John Enz, professor and agricultural meteorologist at North Dakota State University in Fargo, confirms this current wet cycle yet he simultaneously points to the limitation of reliance on weather patterns.

"As much as we can look to history and see repetitive periods, there is no direct correlation between history and predictability of future climate patterns," Enz states. "That said, I am fully confident that there will again be, here in our region, a drought of the magnitude of 1930's. With the population and industrial growth in western Minnesota and eastern North Dakota over the last three-quarters of a century, the impact of a major drought will be very significant."

Professor Leon Osborne, director of the Regional Weather Information Center at the University of North Dakota in Grand Forks, echoes these sentiments, stating, "It is a challenge in the midst of a period of increasing precipitation that began in 1977 to plan for a future that will have less water. I remember the reaction I received in the wake of the devastation from the 1997 floods when I stated at a public meeting, 'We are probably more in need of planning for the Red River running dry than we are for another event like that which we just experienced.'"

"Planning for the future is taking place, but I fear that the water table and precipitation baselines being used are too generous. It is my belief that we are at or past the midpoint of this period of sufficient to generous precipitation. We have perhaps 25 years to prepare for a very different scenario. That seems like a long time, but in reality due to the magnitude of the issues involved it is not and we need to begin preparing now," states Osborne.

(Lois Josefson is a writer and sales representative for Prairie Business magazine based in Fergus Falls and covering much of western Minnesota. She can be reached at 218-205-9519 or lrlh4@prtel.com.)

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