

American **Concrete Pipe** Association

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to the Engineering Community

DREAMS FLOAT AWAY



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Drainage Pipe Selection Deprives Residents of Money and More

Compiled from news articles published in the Washburn County Register, Shell Lake, Wisconsin

November 2002-May 2003

You've finally made it! The seemingly unreachable dream of a home on the lake has become a reality, at last. After years of struggle to reach your goals, you can relax, and enjoy yourself at your very own lake house. But what could cause this dream home to become a nightmare?



Seasonal visitors to Shell Lake used to have lots of area in front of their cabins to run and play

.... but not any more!

Believe it or not, it could be the choice of a product never seen by the average homeowner – drainage pipe.

A nightmare is exactly what residents of Shell Lake, Wisconsin have experienced as a result of a selection of drainage pipe that doesn't hold water. The results of the poor pipe performance include:

- Flooding and severe water damage to 120 of the lake's 380 residences;

- A declaration of a state of emergency for the Shell Lake area by the Governor of Wisconsin;
- The use of inmates to supply sandbags to prevent flood damage;
- Millions of dollars in water damage; and
- A class action lawsuit by the residents of Shell Lake against the design engineer, the pipe manufacturer, the contractor and the City of Shell Lake.

Shell Lake is the largest land-locked lake without an outlet in the state of Wisconsin and is approximately 2,580 acres in size.

Because the lake has no surface water outlet, the City of Shell Lake commissioned a local civil engineering firm for the design of a combination gravity/siphon discharge from Shell Lake to the Yellow River, a distance of approximately 4.4 miles. The purpose of the pipeline is to allow the city to lower the elevation of Shell Lake during periods of high water. The project bid resulted in a system of corrugated HDPE pipe with a liner.



A First-Hand Account

The pipeline system was installed in late November and after eight months of repeated attempts to

repair leaks, the pipeline is still not in operation. The repeated sessions of pipe trials after repairs has been well documented by the *Washburn County Register*, a local newspaper serving Shell Lake and the surrounding area. It is a sad tale of how lives are affected by pipe material selection. The following excerpts show the frustration of the City and local residents:

Diversion Update – Tuesday, January 14, 2003 - 9 p.m.

After four major leaks were repaired last week, the Shell Lake to Yellow River water diversion system was turned on again early Saturday morning. The system was working well, for a while, and discharging water to the river. Unfortunately, it did not last long. Within hours, four new leaks described as minor, were discovered in the fields north and south of Trout Road, an area where most of the previous leaks have occurred. The system was shut down and the water



Would Shell Lake residents approve the use of HDPE pipe if they had known the trouble it would cause?

drained from the pipe using pumps...While the delays are frustrating, remember that the City is pushing those involved with constructing the system as hard as they can to resolve the problems and provide a working product. The good news for the lake residents is the lack of precipitation – the area still has little or no snow.

Diversion Update – Thursday, February 6, 10:30 a.m.

At about 4 a.m. this morning, the Shell Lake to Yellow River water diversion system

was turned on again. Water started flowing out the end of the pipe into the Yellow River at about 7 a.m. It's now 10:30 a.m. and I just learned that at about 10 a.m., another leak was discovered in the field north of Trout Road and the system was shut down again. Will have more details later.

Diversion Update – Tuesday, February 18, 8:30 a.m.

At about 4 a.m. this morning, the water diversion system was turned on. Let's keep our fingers crossed...

Diversion Update – Tuesday, February 18, 1:00 p.m.

Again, I have bad news. At about 12 noon, the system was turned back off after a small leak was discovered, this time south of Trout Road. The DNR has made it clear they will not allow operation of the system with any leaks. Stay tuned for further updates. This was the seventh time the system has been tried.

Diversion Update – March 26.

Headline:

City Hires Firm to Review Entire Project Last Friday afternoon, the Shell Lake City Council selected the engineering firm of Ruckert/Mielke of Waukesha to perform a complete review (peer review) of the Shell Lake to Yellow River water diversion project. The City selected Ruckert/Mielke from two bids, the other being from MSA. The cost for the review is expected to be between \$7,500 and \$20,000...

Since the system will not be up in time to lower the lake before the ice goes off, the City is again enlisting the aid of inmates from Gordon Correctional Facility to fill sandbags.

Diversion Update – Wednesday, April 30

Also, according to diversion project engineer Dan Kling, work is scheduled to start next week to fix the three known leaks (yes, three...) after which, it should be tried again.

Diversion Update – Monday, May 12
...we received 2.5 inches of rain since Friday

morning. The lake is now at 1224.86' MSL. It is now estimated the water is at least at the level of the first finished floor elevation of 50 homes/cabins, and is at a point on another 70 homes/cabins where the building's foundation meets the lowest adjacent ground level (meaning it is at the structure).

Diversion Update – May 13 – No Relief in Sight...

With Shell Lake already at a record level last week, the last thing needed was more rain. But that's just what we got...

With the water diversion system still un-repaired, the only hope these residents have is to use sandbags, plastic and pumps to keep water out of their buildings. Since early last week, nearly 18,000 sandbags have been used. Most of these bags filled by a crew of ten hard-working inmates from the Gordon Correctional Facility...

It was a full house Monday evening at the regular May meeting of the City Council. Many were there to ask when the City was going to do something to solve this problem. "I don't think people realize this is an emergency," said one resident...

The Mayor explained the City is waiting until the peer review report is received before making its next move, "We are not engineers – we need their input to make a judicious decision," he said...

In the end it was apparent there is no simple, or quick solution to this problem. What is also apparent is the lake is not only a problem for the lakeshore residents, but for the Shell Lake community as a whole. "With over 75% of the City's tax base on the lake, we can not afford to not make it work," Mayor Fletcher said.

Peer Review

Desperate for solutions, the City of Shell Lake retained the firm of Ruckert/Mielke



One of the many areas where trace dyes leaked from the HDPE pipeline during testing of the pipeline during the winter months.

(R/M) to provide a peer review of the project. The peer review was intended to investigate the possible causes of the pipe system failure and propose alternatives for the repair of the project. The peer review describes some of the problems that may happen when one specifies HDPE storm sewer pipe.

- The contract documents specifically state the pipe material selected, "...pipe shall be equal to ASDN-12 [sic]" and the "Requirements for test methods, dimensions, and markings are those found in AASHTO Designation M294."
- The contract documents gave the manufacturer the chance to review the plans and recommend a different pipe product, if necessary. The

requirements in this section affirmatively states “Shop drawings shall indicate any deviations in the submittal from requirements to the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the engineer.”

According to Mr. Dan Kling, P.E., of ECG, Inc. no shop drawings for the pipe were received.

- The report pointed out some of the problems with the pipe: “Mr. Kling noted a couple of problems that occurred during installation. Some of the pipe furnished by ADS was found to contain ‘vent tubes’ that are part of the manufacturing process that were not totally welded closed at the completion of the manufacturing process... In at least one instance, pipe was delivered to the jobsite with a factory-installed gasket installed backwards. ADS stated in correspondence dated December 2002, that ‘although ADS can not be certain of the exact number of pipes that may not have total welded vent holes, we are sure that the majority of the pipe was in fact manufactured with the current manufacturing process that automatically eliminates the vent tube, and therefore, the pipe can not leak in this manner.’ Mr. Kling stated that ADS had informed him that as much as 10,000 to 210,000 feet of pipe had been manufactured with this problem and that ADS did not know how much was shipped to this project. In correspondence dated February 10, 2003 from ADS, it was noted that 2,180 feet of the original pipe supplied by ADS was subsequently replaced on this project.”
- HDPE pipe manufacturers claim that lighter weight is an advantage, but some contractors have to take drastic

measures to keep the pipe from floating. “Another problem that occurred during construction was the floating of some of the pipe during installation due to the inability of the Contractor to completely dewater the trench. According to Mr. Kling, the Contractor sliced through some of the corrugations in places thus allowing water to enter the corrugations and the pipe to sink into the trench.”

- There were other problems with the pipe supplied with pre-installed gaskets. “The pipe supplied by ADS arrived at the job site with the gaskets pre-installed on the spigot end of the pipe. Some of these gaskets arrived damaged and have to be replaced in the field by the Contractor’s personnel.”

The peer review evaluated several different repair alternatives for the project, including relaying the entire pipeline or portions of the pipeline with different pipe material, sliplining portions of the project, and repairing joints either with grout or internal sleeves or external sleeves. The recommendation for repairs included a multi-step process that could cost up to \$2,000,000 and take up to twelve months to complete.

State of Emergency

Wisconsin Governor Jim Doyle declared a state of emergency for the Shell Lake area, instructing state agencies to continue the work they have provided to date and to explore additional options to assist the Shell Lake community efforts, including:

- Awarding a \$10,000 Wisconsin Housing and Economic Development Agency Disaster Relief Grant to the City of Shell Lake for general disaster and housing assistance.
- Assisting the City in establishing eligibility for up to \$2 million in low interest loans to acquire homes most adversely affected to allow those residents to relocate.

- Identifying financing options and low interest loans to assist with the permanent repairs to the project.
- Making available Department of Administration housing assistance grants for up to \$25,000 for low-income families who have been

filed a lawsuit against the City of Shell Lake, Wisconsin DNR, Thompson Sand & Gravel, Bob Thompson and Sons, Advance Drainage Systems (ADS), Daniel Kling and ECG Inc.

Count 1 of the lawsuit is against the consulting firm, ECG, Inc. for negligence. It alleges that ECG negligently designed and engineered the project, approved unnecessary or harmful changes to the original plan, negligently approved products from ADS and the construction and installation performed by Thompson, and negligently retaining, training and supervising persons working on the project.

Count 2 of the lawsuit cites the negligence of ADS. It alleges negligent manufacturing of pipe products, supplying pipe products that were defective and unsuitable for the intended application, certifying unsuitable product for use without sufficient basis, and failing to provide adequate testing, inspection, training and supervision.

Resident's Reactions

As expected, examples of resident reactions are abundant. Rather than including all letters to the *Washburn County Register*, this

Dispatch includes a letter from one Shell Lake resident that could describe the frustration of all Shell Lake residents.

The Final Chapter

Dear Editor,

We returned home from Shell Lake last night after moving all contents from our cabin and garage to storage units at Bashaw Valley Storage.

This puts the final chapter on a story that



Governor Jim Doyle of Wisconsin (center) and Mayor Fletcher (right) of Shell Lake inspecting property damage.

- affected by the flooding.
- Providing assistance to the City in obtaining emergency grants under the federal Community Development Block Grant Program. The City can apply for up to \$500,000 to address low and moderate-income housing needs caused by flooding.

Lawsuit Filed

Eventually, the residents of Shell Lake

has taken place over the past years.

My parents purchased our cabin on Rolph's Point just about 30 years ago and I grew up spending summers at Shell Lake. My husband and I bought the cabin from my parents nine years ago with the hope that we would continue to enjoy the summer lifestyle this community offers. However, this time around, my memories are not of the same summer activities I enjoyed when I was young. This time, memories include summers with trucks dumping off loads of fill so we could attempt to raise our lot level, numerous years of sandbagging to try to keep the water out of the cabin crawlspace, pumping water continually – with no less than three pumps last summer, and the extreme time and cost that went along with each. We no longer could enjoy being lakeside, as our outdoor living area was now behind the cabin toward the road – but the cabin stayed dry.

The first weekend of October 2002, we lost the battle. Eight inches of water in the cabin resulted in buckled floors, water soaked insulation, and broken sheetrock, in addition to mold, frogs and filth. We saved the cabin furnishings that we could; trusting that the diversion project would allow us to assess our options in the spring. We've watched and waited all winter and while I don't underestimate the good intent of those involved in the project, I do question the ability. It truly seems absurd to me that while sewage and public water can be successfully moved in cities all over the country, it seems a near impossibility to move this lake water.

The cabin now has a full beard of frost covering the walls from floor to ceiling; the 48 inches of crawlspace is ice from bottom to top; sheetrock has continued to crack as insulation has expanded due to moisture; cupboards, displaced by ice, sit at crooked angles; the cabin door is broken into pieces; and we have given up. Demolition is scheduled for March...

We personally have closure on our fight with the lake level, but I worry about others who don't and fear what spring and the ice thaw will bring in terms of yet more damage and cost. Another year has passed and while the circumstances have changed some, the talk is still about the same old things – the DNR, the cost and lawsuits. I wonder...if the focus was on the people affected and the community benefit realized by and from these community members, would there be more productive action toward getting the lake level problem resolved?

Sincerely,
JoAnn Yohn

Engineers typically evaluate material characteristics when considering alternate pipe materials, such as service life, hydraulics and installation costs. Shell Lake is an example of how the selection of a pipe material can affect human lives, for better or worse. All drainage projects impact the lives of real people – every day. When making a decision on what pipe to use, consider how the decision affects lives.



The failed HDPE pipeline at Shell Lake is now being slip lined with another pipe product to help alleviate flooding problems for residents ... finally.



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