

DANE COUNTY DRAINAGE DISTRICT 29

November 10, 2021

Findings of Inspections, Hearings and Notes from Leonard Massie – Secretary of Dane County Drainage Board. The following discussion are the view of Leonard Massie which have not been adopted by the Dane County Drainage Board.

A 3-foot diameter corrugated culvert was installed in Norway Grove School Road by the Town of Vienna. The culvert replaced a 1-foot plastic pipe that existed as part of an agreement between the Town of Vienna and the Dane County Drainage Board. The culvert was installed to eliminate flooding of Norway Grove School Road primarily to enable emergency vehicles to use the roadway at any time. The culvert moves surface runoff water from the Madison Sand and Gravel (MS&G) quarry on the north side of the road onto Madison Sand and Gravel land on the south side of the road.

Surface runoff from the watershed now takes a different route through the quarry than that followed earlier. The runoff does not cross Norway Grove School Road through the 6-foot by 9-foot pipe arch further west of the 3-foot corrugated pipe. There is surface runoff from cropland and woodland west of County Highway I that joins the flow from the 3-foot diameter culvert, crosses CTH I and ¼ the mile later will enter the main ditch of District 29.

Scott Anderson, consulting engineer from Snyder Associates, recommended that the culvert be a 4-foot tube. The Town Board had already approved the 3-foot diameter corrugated pipe. Anderson calculated the flow capacity of the 3-foot culvert on a 1% slope to be 34.7 cfs (cubic feet per second). He calculated the capacity of the 4-foot diameter pipe to be 74.7 cfs.

My calculations of the flow capacity of the 3-foot corrugated pipe is 29 cfs. I cannot duplicate Anderson's calculation. I also calculated the flow capacity of the 1-foot diameter plastic tube to be 1,13 cfs. So, my calculations would show the total possible flow would be 31.26 cfs (1 culvert and 2 plastic pipes). The actual flow will be less than the calculated flow of 31 cfs because pipes do not flow full unless they are pressurized. I would expect the actual flow to be about 27 cfs to 28 cfs or roughly 90% of pressurized flow.

Examining the plans for the main ditch in District 29 finds the following for a 10-year, 24-hour storm of 4.5 inches on the watershed:

Sta is a station which is 100 feet. Station 0+00 is at Cuba Valley Road.

- 1) The approved plan for the main ditch shows a bottom width of 6-feet and side slopes of 3:1. In my view, the recent clean-out of the channel did not restore the 6-foot bottom, nor deal with the vertical bank on the west side of the ditch south of Daley Road.

- 2) Out-of-bank flow would occur from Sta 83+55 to Sta 89+00 and Sta 98+00 to Sta 103+00 (essentially located north of Daley Road). A
- 3) A 4-foot corrugated culvert was installed through Daley Road (Sta 82+75 to Sta 83+55). The 4-foot culvert acts as a flow control structure for surface runoff and on-farm drainage systems coming down channel to Daley Road. I calculated the maximum flow through the 4-foot diameter culvert to be 55.8 cfs.
- 4) Major flooding could occur north of Daley Road because the road embankment is 12-feet high (bottom of ditch to paved roadway) and total volume of water exceeds the capacity of the 4-foot diameter culvert.
- 5) Flow would be at the top-of-bank from Sta 44+00 to Sta 59+00.
- 6) Flow would be out-of-bank from Sta 0+00 to Sta 25+00. The area along both sides of the ditch is not tilled.
- 7) A 4-foot diameter culvert is located in a field road at Sta 44+58 to Sta 45+08.

The Dane County Drainage Board has received a request to add Madison Sand and Gravel to District 29 because they have connected a private drain to the main district ditch by installing the 3-foot culvert through Norway grove School Road. After the recent hearing, I find the following:

- 1) Madison Sand and Gravel (MS&G) has not connected a private drain to the District 29 main ditch. MS&G has not done anything.
- 2) The Town of Vienna has installed a 3-foot diameter corrugated culvert and two (2) 1-foot plastic tubes through Norway Grove School Road where the agreement between the Town and the Dane County Drainage Board mandated a 1-foot pipe.
- 3) The agreement between the Town of Vienna and the Dane County Drainage Board must be changed to reflect the installation of the 3-foot diameter culvert across Norway Grove School Road and resulting flow of about 30 cfs.
- 4) Not known is whether the Town has modified their Storm Water Management Plan to show the 3-foot diameter culvert through Norway Grove School Road.