

Office of the Lucas County Engineer

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FINAL REPORT OF THE ENGINEER

March 31, 2026

BIG COOLIE DITCH WATERSHED PETITION #1095

Background

On November 12, 2024, the Board of Lucas County Commissioners and the Lucas County Engineer have been given notice of the filing a petition by the Board of Jerusalem Township Trustees for an improvement to watercourses within the Big Coolie Ditch Watershed using a combination of methods provided in the Ohio Revised Code Section 6131.01 (C) 1 through 5 necessary for the disposal of surplus water on the course hereinafter set forth:

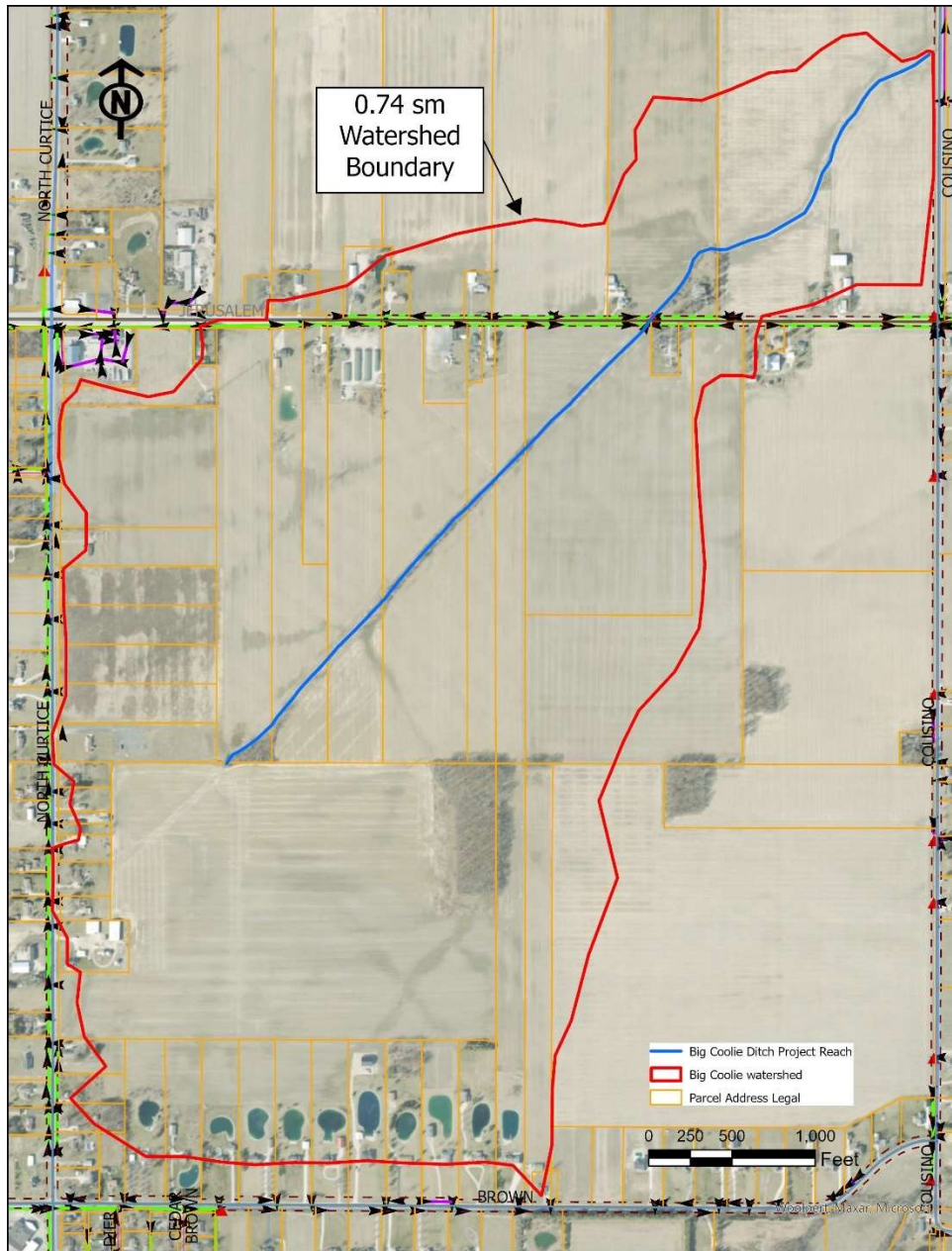
***Big Coolie Ditch:** Commencing at its terminus with the west side of Cousino Road at a location approximately 1600 feet north of the Cousino Road and Jerusalem Road intersection, thence commencing southwest for a distance of approximately 6,135 feet to the terminus of the existing open ditch located approximately 1000 feet east of North Curtice Road and 2600 feet south of Jerusalem Road.*

Ditch Report

Grant Funded Self-Forming Ditch Project

In addition to being placed under petition and permanent maintenance, the area described below is the proposed location of a H2Ohio grant funded self-forming ditch project (the grant application approval is still pending however is anticipated to be approved by the end of March). This location receives direct runoff from agricultural parcels. As such, this water often times carries both nutrients and sediment from the fields into the ditches, which is then carried downstream toward Lake Erie.

A 1.2-mile segment of Big Coolie Ditch as shown below is the proposed location of a self-forming ditch restoration project in the 0.74 square mile petition watershed area.



This ditch has not been uniformly maintained for several decades, and in many places, the ditch exhibits a narrow or non-existent riparian area, eroded banks and heavy siltation within the channel. The siltation inhibits the free flow of water with the channel flooding adjacent agricultural properties. The flooding is especially acute during the winter months and in early spring when the ground is frozen and/or saturated.

It is the opinion of the Engineer that the existing condition of the ditch is not adequate to dispose the surplus water stated in the petition. With the completion of the proposed project, benefits will include an adequately sized channel for runoff and relief of standing water in the adjacent agricultural properties, as well as providing an adequate outlet for the watershed upstream of the proposed improvement.

During the preparation of the preliminary scope of work and cost estimate, alternatives were considered and evaluated to determine the least impactful alternative on the surrounding environment and property

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owners where in the opinion of the engineer the benefits of the project would outweigh the costs. The alternatives evaluated, explained in further detail in the Preliminary Report were as follows:

1) Removal of sediment from the bottom of the ditches, reshaping of ditch sides and bottoms:

This alternative would excavate and reshape the existing ditches removing sediment to reslope their channels in order to permit the free flow of water with 2:1 side slopes. While a lower cost alternative, based on our knowledge of the project area, we believe that re-constructing the ditches per their original drawings would result in sloughing of the side slopes and continued erosion of the channel.

The benefits and drawbacks of this alternative is as follows:

Benefits:

Improved Drainage
Lower Construction Cost

Drawbacks:

Tree Removal
Frequent Maintenance
- Adjacent Property Disruption
- Costs

2) Construct a self-forming ditch:

This alternative would construct a self-forming ditch along the aforementioned 1.2-mile stretch of Big Coolie Ditch. Self-forming ditches allow the flow in the ditch to form floodplain benches naturally in the ditch bottom to capture sediment and nutrients. These ditches are more consistent with fluvial form and process and therefore lead to greater channel stability resulting in lower maintenance costs and a lower probability of flooding adjacent properties. These naturally formed benches also can serve as wetlands during certain periods of the year, which reduce ditch nutrient loads and provide for improved water quality. While a higher initial cost alternative, the development of a self-forming ditch provides a better total cost of improvement with lower maintenance costs and improved agricultural and residential benefits due to a lower probability of flooding the adjacent properties. For the purposes of this preliminary report for determination of preliminary costs, it is assumed that the self-forming ditch will include a 16' bottom width and will also include a 10' grass buffer at the top of each bank. However, the extent and size of the profile and buffer strip may change as the project is designed. The Lucas County Engineer's Office has been informed that the H2Ohio grant from the Ohio Department of Agriculture to implement the self-forming ditch project is anticipated to be approved by the end of March.

The benefits and drawbacks of this alternative is as follows:

Benefits:

Improved Drainage
Lower Maintenance
Lower probability of flooding of adjacent properties
Improved Water Quality

Drawbacks:

Tree Removal
Larger Construction Costs
Initial Disruption for Construction
Larger footprint in areas
Easement acquisition costs

3) No project – leave existing conditions:

This alternative would result in no project being performed along the ditch and would leave the existing conditions. If this alternative would be selected, it is the opinion of the engineer that the issues with lack of drainage and standing water would continue and progressively worsen over time as the ditch continues to silt up. This would result in a lack of drainage from upstream of the ditch.

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The benefits and drawbacks of this alternative is as follows:

Benefits:

Existing Conditions

Drawbacks:

Continued excess water

Risk of complete loss of drainage

It is the opinion of the Engineer that Alternative 2 is the best alternative. The estimated construction cost for the self-forming project on Big Coolie Ditch is estimated at approximately \$886,600 which will be paid with grant funds from a H2Ohio grant from the Ohio Department of Natural Resources. In addition, the watershed will be placed on permanent maintenance after completion of the self-forming project. Future maintenance will be assessed to the benefiting landowners.

Permanent Maintenance of Big Coolie Ditch

Segments of Big Coolie Ditch have been maintained by private landowners for several decades. However, due to the age and current condition of these ditches, it is proposed that the ditch be placed under permanent maintenance. Without proper maintenance, the ditch will continue to deteriorate, resulting in reduced drainage capacity and subsequent drainage concerns for benefiting landowners.

It is the opinion of the Engineer that the ditch is currently having difficulty disposing of surplus water and will continue to pose a problem in the future without maintenance. With future maintenance, benefits will include maintaining the capacity of the channel to relieve standing water in agricultural fields, as well as providing adequate outlets along the ditch. Maintenance work on the ditch is proposed to be cleaned of sediment with minor reshaping in isolated areas that have been degraded due to erosion.

It is the opinion of the Engineer that Big Coolie Ditch should be placed under permanent maintenance. The estimate of the total benefit assessment for the ditch upon which any future maintenance costs shall be apportioned is \$1,000,000.

The benefits and drawbacks of the proposed project are as follows:

Benefits:

Improved Drainage

Maintenance of Investment

Drawbacks:

Need for future access of property

Benefits to the Watershed

Benefits will include increased crop production in terms of cultivated area within the 100-year floodplain. In addition, having a maintained stream will enable tiled drainage to work properly and will prevent flooding and overwatering of root structures, mitigating the risk of crop loss due to excess water.

Cultivated Land within 100-year floodplain in watershed – 474 Acres

Estimated Increased Crop Production and Land Value per Acre - \$171/Acre

Total Probable Annual Benefit from Increased Agricultural Production = \$81,054/year

Total Benefit over 30 years – \$2,431,600

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In addition, there is a benefit from the reduced risk of damage to structures and property due to a reduced flooding risk from restoration of stream capacity, removal of log jams, and continued maintenance. The U.S. Army Corps of Engineers estimates that projects to reduce flood risk result in \$12.26 in potential damages saved for every \$1 spent toward projects such as this one. According to the FEMA Benefit Cost Calculator, benefits from a reduction in flood elevation by one foot due to removal of sediment of ditches results in an approximate benefit of approximately \$50,000 per property in the 100-year flood plain over a 30-year period.

Number of Properties in 100-year Floodplain in watershed – 63

Approximate Benefit Per Property - \$50,000 over 30-year period

Total Benefit for Watershed due to Reduced Risk of Flooding over 30 years - \$3,150,000

Total Benefit to Watershed over a 30-year period - \$5,581,600

30-Year Benefit to Cost Ratio = 6.30

For all work to be proposed within the Big Coolie Ditch watershed, it is the opinion of the Engineer that the proposed project is feasible, that it is conducive to the public welfare, that there is sufficient outlet for the improvement, and that the benefits exceed the cost which meets the requirements given in Section 6131 of the Ohio Revised Code.



Mike Pniewski, P.E., P.S.
Lucas County Engineer