2017 AUGLAIZE COUNTY ENGINEER'S ANNUAL REPORT Douglas Reinhart, P.E., P.S. Auglaize County Engineer

The Ohio Revised Code requires that each Ohio County Engineer publish an annual report to the Commissioners outlining the general condition of the roads and bridges in their county. I feel it's important this report be compiled regardless of the mandate for the following reasons: The taxpayers of Auglaize County need to see where and how their tax dollars are being spent; they can associate a cost to the improvements they have witnessed as they travel the county roadways; each report sets a benchmark for this department's achievements so we can strive to be more efficient and statistically out-perform prior years performances.

Special "THANKS" to all my employees for their efforts during 2017 and making me look good once again. We have a very skilled workforce with an excellent work ethic. Thanks also to all the landowners who owned ground adjacent to our projects. Their cooperation allowed us to work on their property (many times outside the road right-of-way) and aided in completing the projects safely and efficiently.

STATUS OF AUGLAIZE COUNTY'S BRIDGES

A bridge in Ohio is defined as any structure with a bridge opening of 10' or greater. Currently Auglaize County is responsible for 347 bridges located on the County and Township highway systems. Throughout the State of Ohio, there exists 44,516 bridges with 9,416 bridges being rated either functionally obsolete (FO) or structurally deficient (SD) which is 21% (one in five) of bridges in Ohio. I am proud to report Auglaize County has just three (less than 1%) with such classifications and none of these currently have load limit restrictions limiting the crossing of school buses, farm to market or fire-fighting equipment. 33 years ago there existed 42 bridges in this county that had severe load limit restrictions.

The three deemed FO or SD in this county are planned for replacement over the next several years using a combination of local, state and federal funds. However, without increased funding (as outlined later in this report) these numbers will be extremely difficult to maintain.

STATUS OF AUGLAIZE COUNTY ROADWAYS

This department is responsible for the maintenance of 350 miles of roadways across this county. Except for a few streets in 100 year old subdivisions, all those roadways have a 20' wide and greater pavement width which is unique for Ohio. Hotmix asphalt on one mile, 20' wide @ 1 ¼'' depth now costs \$ 66,465. As a result, just 10.61 miles were resurfaced with hotmix in 2017 which equates to a 33 year rotation. Because construction inflation has outdistanced funding, during the past five years the County averaged just eight miles of resurfacing annually. Only one mile of the 323 mile township highway system had a hotmix overlay in 2017. After a license plate fee increase in 1991 and gas tax adjustment in 1993, the following eight years saw 40.1 miles of hotmix asphalt applied annually in Auglaize County which is less than a nine year rotation.

In order to maintain the integrity, strength and profile of a pavement, a new hotmix asphalt overlay should be applied every 15 years which equates to annually paving 23 miles of Auglaize County roads per year. At the end of 2017, 25% of the county's 350 mile highway system will have a surface age in excess of 15 years. If we do not receive increased funding over the next five years, by 2022 over half the county roads will have a surface in excess of 15 years of age.



2017 RECIEPT ITEMS TO NOTE

- A. 85% of the income to operate this department comes from your annual license plate fees and state gasoline tax. The last time your plate fees were increased for road/bridge purposes was 1991 when hotmix asphalt was \$22.64/ton. Today that same ton of asphalt costs \$77.50.
- B. The last time the Ohio General Assembly increased the gas tax was 2003 when hotmix was \$22.70/ton. The gas tax is based upon gallons sold and not the retail price at the pumps. Due to more fuel efficient vehicles, and vehicles using batteries, propane, natural gas, etc. that are not being taxed, since 2006 income from gasoline tax has risen by only 1% while construction inflation has increased by over 60% during that same period of time.
- C. The 0.6% of the budget that comes from the Commissioners County General Fund (real estate taxes and sales tax) assists with paying for just a portion of the operation of the map office in the Administration Building. None of your real estate taxes or sales tax is used for the maintenance or improvements to Auglaize County's roads or bridges.
- D. The work this department completes on the permanent maintenance ditches and roadway improvements for the township trustees has risen each year and now results into 12.6% of the annual income. Without this extra income, what little paving program we now have would be non-existent.

2017 EXPENDITURES



- A. To show the department has made an effort to hold expenditures, in 2003 employee's salaries and benefits amounted to 50.2% of the expenditures that year. In 2017 those same two line items amounted to 47.1%.
- B. Repairs to the department's equipment exceeded the dollars spent for new equipment which is not a positive trend. Because of stagnated income, the 5.7% of the budget dedicated for new equipment is not providing sufficient funds for timely replacements. Currently, 56% of all the motorized equipment owned by the department are in excess of 10 years of age. More funds could be dedicated but the results would be that the road and bridge programs would be reduced even more.
- C. "Training" includes costs for continuing education mandates for the engineering staff and the 20 employees who possess an Ohio Pesticide Operators License.

2017 ROAD IMPROVEMENTS

The asphalt industry calls a hotmix roadway a "flexible pavement". However, as the surface of that pavement ages, it oxidizes, becomes brittle and exhibits no flexibility. The surface then cracks and opens to allow water to penetrate into the different layers of hotmix and eventually into the base aggregate. Early in my career, a seasoned and very wise engineer told me that there are three things that will ruin a pavement and they are: water, water and water! My employees will tell you they are tired of hearing me repeat that message. Keeping the surface of the roadway free of cracking can be accomplished two ways. One is to place a new layer of hotmix at \$ 66,645 per mile or perform a chip seal which seals the cracks and provides a new wearing surface that impacts the budget by \$10,800 per mile (material and fuel costs). With a limited budget and 350 miles of pavement to maintain, the chip-seal program has been more commonplace in the past and unless new funding is provided by the Ohio General Assembly, will continue to be the mainstay to maintain the integrity of our roadways and keep the number of potholes and failures to a minimum. To chip-seal a roadway may seem simple to the general public, but there are actually nine steps (shown below) to a successful sealing program.

WHAT WILL IT TAKE TO SOLVE THE CURRENT FUNDING CRISIS?

As stated on the opening page, 85% of the income to maintain the county's road and bridge system comes from license plate fees and gasoline tax. The last time the plate fees were increased for roads and bridges was 1991. The last increase by the Ohio General Assembly to the state's gasoline tax was 2003. Since just 2003, hotmix asphalt has increased 244% and stone by 110%. For the long range, legislators need to look at a vehicle miles traveled (VMT) fee and not a gasoline tax since more vehicles every year are propelled by batteries, propane, natural gas, etc.. No income for roads and bridges is realized from those vehicles. I hate being a pessimist, but I'm not confident Ohio's legislators will be one of the lead states to make this a reality. For counties with smaller populations such as Auglaize County, a short term fix would be an adjustment in the gas tax. Adding just one penny a year onto the current gas tax, doing so for three years, and dedicating that income to just county highway departments, that three cent increase would provide an additional \$ 1.8 million dollars annually to each of the 88 counties in Ohio based upon the current formula.



9 STEPS TO A SUCCESSFUL SEALING PROGRAM

<u>PHOTO #1</u>: Level existing road crossings, seal radii at intersections and patch locations where structural failures occur prior to the sealing. <u>PHOTO</u> <u>#2</u>: Place signage to provide notice to the traveling public. <u>PHOTO #3</u>: Power broom pavement to clean and remove all dirt/debris. <u>PHOTO #4</u>: Apply 180° liquid asphalt emulsion @ 0.42 gal./sq.yd.. <u>PHOTO #5</u>: Place a single layer of #8 limestone @ 21 lb./sq.yd.. <u>PHOTO#6</u>: Rubber tired roller imbeds stone into the liquid asphalt before it cools and hardens. <u>PHOTO#7</u>: Power Broom the next day to remove loose stone (and then power broom again prior to step #8). <u>PHOTO #8</u>: 2-4 Weeks after initial sealing, a second "fog seal" of liquid emulsified asphalt is applied at 0.08 gal./sq.yd. to seal in all loose stone and dust. <u>PHOTO#9</u>: After the fog seal, the roadway is provided with new centerline striping to complete the process.

2017 ROAD IMPROVEMENTS (CONT.)

Just to get a concept of how large the 350 mile County highway system is: a 20' and greater pavement width equates to 850 acres of asphalt; the total road right-ofway this department is responsible for is the equivalent of a 2,200 acre tract of ground; mowing tractors made an average of four rounds equates to 2,800 lineal miles of roadside; the 19 dump trucks used for snow plowing and construction projects logged in 138,400 miles during 2017. Along with the 350 miles of roads and 347 bridges, the department now maintains over 360 miles of rivers, streams and subsurface tile mains that have been reconstructed through ditch petitions.

The winter of 2016/17 was milder than normal and should have resulted in a major savings for summer construction. However, the ice storm of December 16^{th} , 2016 saw over 1,400 tons of salt/sand (700 tons of pure salt) applied for just that event. By the end of the winter a total of 2,860 tons of mix (1,430 tons of pure salt) which is near the yearly average for the county's 350 mile system.



53 culvert crossings through roadways by county forces were completed during 2017. Reinforced concrete pipe (upper left photo) is being used for surface drainage flow because of its longevity and load carrying capacity. Polyethylene plastic pipe is being used for subsurface drainage (upper right photo) because of its flow characteristics and numerous premanufactured fittings to allow for turns and "T" connections. 2017 saw a total of 11,690 feet (2.21 miles) of new storm sewers installed along and through the county roadways along with 105 new catch basin inlets.

Since only 10.61 miles of highway were resurfaced with hotmix, the patching and sealing programs were increased to record levels. The ongoing replacement of the century old drainage infrastructure within the road right-of-way also neared a yearly high for 2017. Listed below are the yearly totals for the numerous projects completed this year along with the **10-year totals shown in bold parenthesis**

<u>A</u>.450 miles of county and township roadways along with 160 miles of permanent maintenance ditches were treated for control of noxious weeds and woody plants.

<u>**B**</u>.1,285 tons of berm stone was placed in conjunction with the county resurfacing project (ten year total = 14,140 tons).

<u>C</u>.11,690 feet of new storm sewers (ten year total = 122,800' (23 miles)) were installed along with 105 catch basin inlets (ten year total = 727) within the road right-of-way.

<u>**D**</u>.Over 5,500 tons of recycled asphalt was used for road crossings, safety improvements and shoulder repairs (eight year total = 26,900).

<u>E</u>.47.3 miles of county roadways were full or strip sealed in 2017 using 186,370 gallons of liquid asphalt (ten year total = 1,792,240 gal.) along with 5,686 tons of cover aggregate (ten year total = 59,740 tons.). 29,100 gallons of a second "fog seal" application was placed on all roads that were full sealed. Townships hired this department to seal 21.2 miles of their system by applying another 108,330 gallons of liquid asphalt and 2,880 tons of cover aggregate and 19,000 gallons of fog seal.

<u>F.</u>2,860 tons of salt/sand mix was applied to county highways for snow and ice control during the 2016/17 winter (ten year totals = 28,930 tons).

<u>**G.**</u>10,034 gallons of liquid asphalt and 250 tons of aggregate was placed using a "durapatcher" (see photo #1 on page 2) repairing new road crossings and reinforcing pavement failures. (eight year total = 66,630).

<u>H</u>.37,150 # (18.6 tons) of polymerized crack patch material was applied during 2017 (ten year total = 249,000# (124.5 tons)).

2017 RESURFACING PROGRAM

Road Name	Length	Location To	ns/Hotmix	Cost
Geyer Drive	1.7 miles	Geyer Road East	1,361	\$ 112,596
Clover Four	3.13 miles	66Å to Mercer Line	2,510	\$ 207,101
Townline Kossuth	2.0 miles	SR#197 south	1,590	\$ 131,991
Kruse Road	0.5 miles	Moul. Ft. Amanda E	Last 415	\$ 34,085
Waynesfield Road	2.78 miles	Waynesfield to SR#3	33 2,224	\$ 186,386
Eiting Road	0.5 miles	Minster Egypt South	n 400	\$ 33,058
0	10.61 mile	s	8,500 tons	\$ 705,217

LOGJAM REMOVAL



Since the completion of the 62 mile long log jam removal petition project, the Auglaize River is now on a permanent maintenance plan. The county's excavator (above photo) removed a new jam located just upstream of Townline Lima which was holding water back approximately three feet.

The below photo covers the preventive maintenance measures taken on an 11 yearold pavement on Oakwood Drive in the Pleasantview Subdivision. When the pavement has a structural issue, the durapatch machine first performs the needed repairs by adding layers of asphalt and stone to seal the pavement and provide the needed strength. The longitudinal cracks are then blown clean of debris with the use of an air compressor and finally the cracks are filled with 300° crack sealant.



The above photos shows the county backhoe working jointly with the I & O railroad and Clay Township Trustees to provide a smoother crossing on Weimert School Road.



In March, Clay Rodeheffer retired with 26 years of service. For his first 19 years Clay worked on the bridge crew operating the excavator. Special "Thanks" for all his years of dedicated service.

DRAINAGE PETITIONS

When a drainage petition is filed with the County Commissioners it is the duty of this department to perform aspects of surveying all and engineering for that project which includes (A) Establishing the watershed boundary and determining the acres drained by each parcel with current listing of landowners and addresses; (B) preparing the petition and bond for the landowners to sign and file; (C) drafting and sending notices to notify all effected owners of the public viewing and first hearing; (D) prepare and present a preliminary engineer's report; (E) if approved at the first hearing, then a complete survey, design, plan preparation, construction estimate and parcel assessments are determined; (F) notifications are then sent to all parcel owners of their assessment and date for a final hearing; (G) prepare and make a presentation at the final hearing of the construction plans and design, assessment determination, projected construction dates and maintenance plan; (H) if approved by the commissioners this office then prepares the bid documents; (I) advertises and notifies all contractors; upon award by the commissioners prepares all contract and bond documents; (J) stakes and inspects project as it is constructed and approves/processes invoices for contractor payment;(K) "as built" plans are then drafted; (L) the project is then placed on a maintenance plan administered by this department.



The Northtown Ditch (above) located on the north side of Waynesfield was constructed during 2017 through a ditch petition. The \$ 175,329 project included the installation of 4,400 feet of 10" through 30" diameter subsurface tile plus a stormwater detention pond (below). Cleanup of the project will be completed in the spring.



2017 BRIDGE AND CULVERT IMPROVEMENTS

The County Bridge Crew had a very busy 2017 which included the installation of three 3-sided concrete boxes manufactured at the garage; improving two structures by placing new concrete decks using county precast concrete beams; extensively rehabilitating three long span structures and replacing a bridge deck with a prestressed concrete deck. The costs associated with those projects listed below includes the labor, equipment, materials and any contracts let.



The Santa Fe Line project north of Buckland Holden included the replacement of a failing multiplate steel pipe with a three-sided concrete box (upper left photo) manufactured at the garage over the previous winter. The new installation was 105' north of the existing pipe to provide better alignment for the stream (upper right photo) and wider safety shoulders for the roadway. Special "THANKS" to all the adjacent landowners for their cooperation and allowing the crews the needed room to efficiently work and the dirt for the bridge and widening project.



The Bowsher Road bridge north of National Road (upper photos) was constructed 43 years ago using steel beams and a wooden deck. By rehabilitating now, the beams still exhibited the needed structural strength and were left in place. Work included concreting the ends of the beams into the existing walls; cleaning and covering the beams with an epoxy paint; installing a new wood deck, placing a waterproofing fabric along with a new overlay of hotmix on the deck. This rehabilitation amounted to an estimated 1/3 of the cost of total replacement of the structure and should add another 43 years to the life of this bridge.

2017 BRIDGE AND CULVERT REPLACEMENTS

Location(Road)	Description/Span/Length	<u>Cost</u>
Santa Fe Line North of Buck. Hold	len 48' of 14' x 7' (County) boxes	\$ 73,246.
Allen County Line West of Santa H	Fe Rd. 44' of 14' x 7' (County boxes	\$ 60,723.
Fairmont East of Boundry	48' of 14' x 7' (County) boxes	\$ 45,337.
Winemiller Road north of Southlan	nd 21' county beams/existing walls	\$ 29,913.
Conant Road north of National	25' county beams/existing walls	\$ 30,250.
Southland West of Plattner	54' prestressed beams/existing walls	\$118,641.*
Bowsher north of National	Rehabilitated 65' span deck	\$ 52,228.
Glynwood over St. Marys River	Rehabilitated 135' span truss	\$301,345.*
33A west of Wapakoneta	Rehabilitated 125' span concrete deck	<u>\$ 48,962.</u>
*Includes contracts let for r	ortions of the work	\$760 645





The above photos show some of the steps during the rehabilitation of the 135' span steel truss on The Glynwood road over the St. Marys River. New floor beams and stringers were installed followed by new decking, a concrete overlay (upper right photo) and waterproofing membrane. The project was partially funded by a 0% interest loan from the Ohio Public Works Commission.