

WASHTENAW COUNTY
WATER RESOURCES COMMISSIONER



North County Line Intercounty Drain Engineering Report
Wayne and Washtenaw County

Prepared for:
North County Line Intercounty Drain Board

Prepared by:
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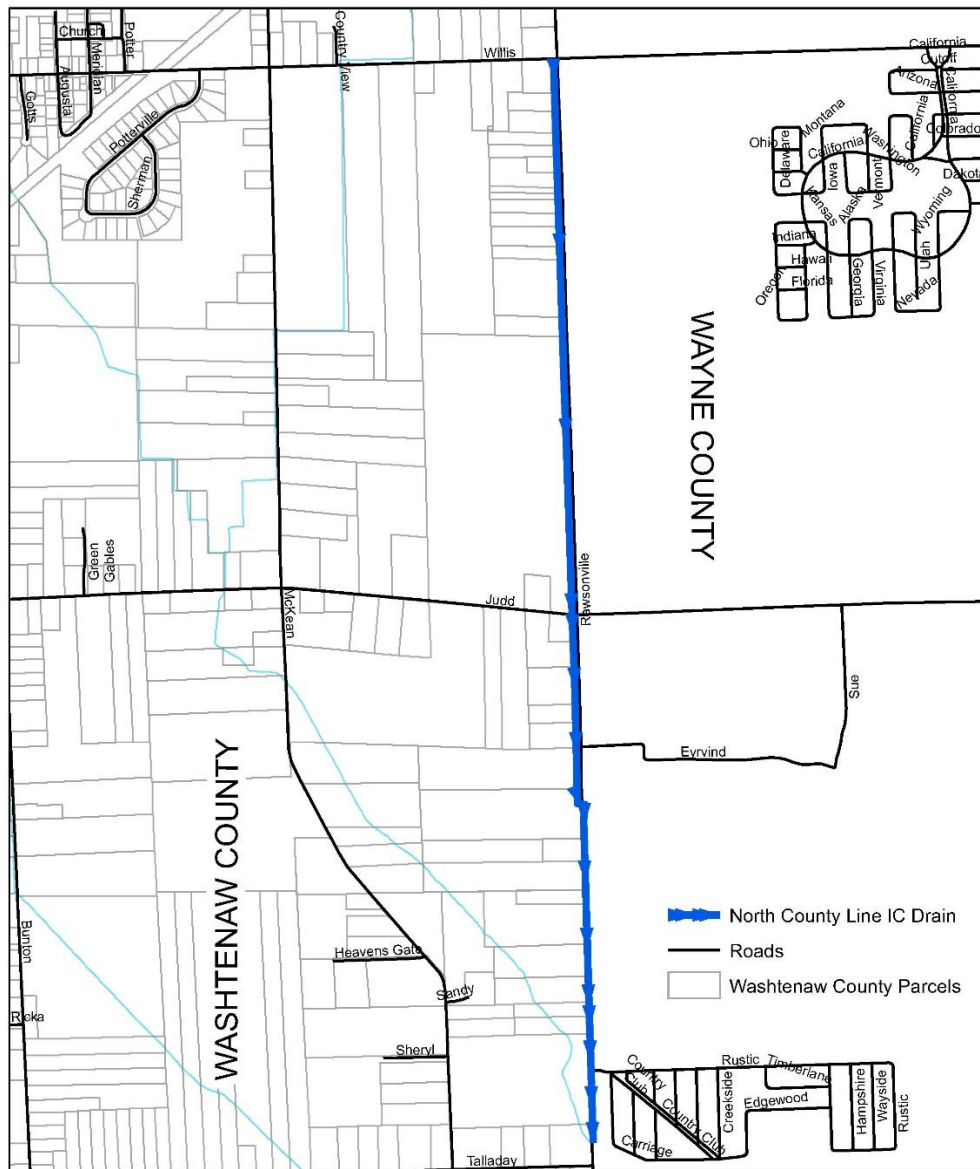
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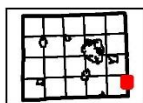


I. INTRODUCTION

A. Route and Course Map



NORTH COUNTY LINE IC DRAIN ROUTE AND COURSE



0 200 400 800 1,200 Feet
1 inch = 1,200 feet



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II. CONCLUSIONS AND RECOMMENDATIONS

A. General Description of the Drain

The North County Line Intercounty Drain was originally petitioned in 1864, and existed in some form until officially established with a county drain district in 1928. There has also been a final order of determination in 1976. It is currently a chapter 6 (intercounty) drain in accordance with the Michigan Drain Code Act 40 of 1956 as amended.

The drain consists of an open channel conveyance at its upstream point near Willis Road, traversing primarily southward along Rawsonville Road for approximately 9000 feet. The drain continues south for another 1350 feet using a combination of 15" diameter clay tile and overlying swale before it reaches its point of beginning at the Big Swan Creek north of Talladay Road.

The North County Line ICD has a drainage district consisting of 285.17 acres, with Wayne County responsible for 33 percent of any assessments (Washtenaw being liable for remaining 67 percent). Recent work has consisted of a 600 foot drain cleanout in 2019, as well as a 2000 foot cleanout in 2018. There have been over a dozen service requests resulting in reactive work over the past 10 years.

B. Overall Condition and Observed Deficiencies

The drain is in fair to poor condition, with significant sedimentation in the drain channel throughout its length. There are 37 culvert crossings of the drain in various sizes and condition, although overall in poor condition and misaligned with the drain bottom. There appears to be no consistency to the culvert sizing or hydraulic capacities. The clay tile appears to transmit storm water, although there is a history of blow holes occurring throughout. There are significant back ups during any significant storm events. Please refer to section III for more detailed observations.

C. Recommendations and Alternatives

The open channel capacity could be improved by a systematic replacement of the culvert crossings, benefitting by the establishment of a uniform slope and elimination of undersized pipe diameter restrictions. A concurrent clean out of the channel would also need to be performed simultaneously to realize all the possible benefits of the corrected culvert placement. The crossings, however, are almost entirely privately owned and are not officially part of the legally established county drain infrastructure. As such, installation and maintenance is somewhat dependent on individual property owner action who are wholly liable for all costs associated with replacement.

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Replacement could be accomplished through three means. One possibility is to perform only the open channel clean out now, and to have each culvert changed with a proper replacement through drain use permits as initiated by the property owners. This would have the benefit of keeping the costs of individually owned encroachments on the drain from being assessed to owners at large. This method could result in short to intermediate term ponding in areas where the culverts have been improperly set. It would also not eliminate current restrictions due to undersized crossings.

A second possibility would be to replace the culverts as a part of the project and incur a special benefit assessment to each property owner who owns a culvert on the drain. Alternatively, the property owners could be given an opportunity to replace their culverts themselves in conjunction with the project. Either option would benefit by the uniform renewal of the culverts, but a negative consequence could be numerous objections of those owners regarding the financial burden or the necessity of replacement in cases where the culverts are newer/not failing.

Thirdly, the culverts could be replaced as a part of the project, with the costs distributed to all stake holders. One benefit beyond the drain hydraulics being improved immediately would be the overall reduced cost of culvert replacement. The per foot culvert construction cost would most likely be smaller based upon the economies of scale in this case. This would benefit the property owners receiving a new culvert at a reduced cost, but raises the question of a fair assessment to all parties. One possible solutions to achieve an equitable assessment would be to assign a "culvert" vs. "no culvert" benefit factor to the assessment roll. A property owner's "culvert" benefit could be based upon the linear feet of culvert installed and possibly the pipe material.

Along with the open channel possibilities, the clay tile has a reduced level of service and is most likely responsible for the observed flooding in the lower end of the system. A preliminary analysis suggests a HDPE dual wall 36" diameter pipe would be necessary to achieve a 10-year level of service. Unfortunately, the amount of cover necessary for such an installation is not available even with a modest amount of fill above the pipe.

In summary, the recommended option is a replacement of the clay tile with HDPE dual wall 18" diameter pipe and restoring the open channel swale above the pipe. This would benefit the overall drain by reducing localized flooding in the downstream section (recall the upper sections still appear to be transmitting normal storm events within the banks), reduce overall project costs, and eradicates the need to determine the optimal method to have driveway culverts replaced.

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III. FIELD INSPECTION

North County Line Intercounty Drain

Inspection Report

December 17, 2019

An inspection of the North County Line Intercounty Drain, drain fund # 8919, located in sections 12 & 13 of Augusta Township along with parts of Sumpter Township in Wayne County was conducted on December 17, 2019. North County Line Intercounty Drain District was established in 1928 and is a chapter 6 drain in accordance with the Michigan Drain Code Act (Act 40 of 1956, as amended). It has a running length of approximately 10,200 feet as recently measured. Additionally, it has an easement of 60 feet (30 feet each side of centerline). The drain is in the Swan Creek watershed.

This inspection, conducted by Bob Griffin, began at the lower end (point of beginning) of the drain at the outlet into Big Swan Creek (aka Swan Creek and Pliney Harris) (photo#1) and terminated at the point of ending just south of the intersection of Rawsonville and Willis Roads. The observations of this report are as follows:

General Condition of Bank and Channel

The bank of the drain is generally in fair condition with some areas of fair to poor condition. A few small to moderate washouts were observed but no major washouts. Sediment in the channel varies from 25% to 75%. Photo #30 provides a typical look of the drain bank and channel.

Tree Falls and Other Flow Restrictions

There were a few Ash tree deadfalls observed during the inspection. These deadfalls are routinely removed by seasonal labor crews and the current deadfalls will be removed in the spring. Due to the drain being along the road, trash bottles are constantly ending up in the drain and become a flow restriction as they accumulate near culverts.

Crossings

There were 37 culvert crossings observed and all are photo documented in the accompanying PowerPoint slides. The culverts range from 12 to 48-inch diameter and are made of Corrugated Metal and Reinforced Concrete. The culverts appear to be of varying sizes and the inverts appear to be misaligned as the drain traverses. Most of the Corrugated Metal culverts are in poor and rotted condition. Most of the 12-inch culverts at the upper end are either buried or mostly buried.

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Clay Tile

Approximately 1350 feet of the lower end of the drain contains a 15-inch clay tile under the drain channel (photos 1 & 8). This tile appears to be functional but evidence of tile failures (blow holes) were observed during the inspection. This tile conveys all the drainage during low flow conditions but backs up during heavy rain events. Also, the channel above the tile appears to be misaligned with fill, especially near the entrance to Rawsonville Woods (photos 4 & 5). This misalignment of the channel has been observed to cause backups during heavy rain events.

Summary

In general, the drain appears to be in fair to poor condition with most of the obstructions coming from sediment, channel misalignment and culvert invert misalignment and under sizing. Sediment levels in the channel varied from 1 to 2.5 feet. Tree and brush growth is clear on the road side but moderate to heavy in areas on the field and yard side of the drain.

Photos can be found at the end of the packet.

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COST ESTIMATES

A. Replace Historical – open channel and piped sections

Item no.	Item	Quantity	Units	Unit Price	Total Price
1	mobilization (max 5%)	1	LS	\$ 30,000.00	\$ 30,000.00
2	pre-construction video documentation	1	LS	\$ 2,000.00	\$ 2,000.00
3	soil erosion and sedimentation control	1	LS	\$ 7,500.00	\$ 7,500.00
4	traffic control, traffic regulators, signage	1	LS	\$ 13,200.00	\$ 13,200.00
5	culvert, remove and replace, 12-in	8	EA	\$ 850.00	\$ 6,800.00
6	culvert, remove and replace, 18-in and under	1	EA	\$ 1,200.00	\$ 1,200.00
7	culvert, remove and replace, 24-in and under	4	EA	\$ 1,500.00	\$ 6,000.00
8	culvert, remove and replace, 36-in and under	4	EA	\$ 2,000.00	\$ 8,000.00
9	culvert, remove and replace, 48-in and under	20	EA	\$ 3,500.00	\$ 70,000.00
10	replace gravel driveway	4800	SF	\$ 1.25	\$ 6,000.00
11	remove downfall	5	EA	\$ 100.00	\$ 500.00
12	open channel clean out	10200	LF	\$ 15.00	\$153,000.00
13	mulch blanket	6800	SYD	\$ 10.00	\$ 68,000.00
14	open channel seeding	10200	LF	\$ 5.00	\$ 51,000.00
15	haul, dispose of spoil material to landfill	1850	CY	\$ 30.00	\$ 55,500.00
16	storm sewer, 15-in dia. HDPE dual wall	950	LF	\$ 40.00	\$ 38,000.00
17	end section, 15-in HDPE dual wall	2	EA	\$ 500.00	\$ 1,000.00
18	bypass pumping	1	LS	\$ 7,500.00	\$ 7,500.00
19	rip rap	75	SY	\$ 75.00	\$ 5,625.00
	permitting - MDEQ, WCRC	1	EA	\$ 2,500.00	\$ 2,500.00
	district delineation, route and course	1	EA	\$ 1,500.00	\$ 1,500.00
	hydraulic study	1	EA	\$ 2,500.00	\$ 2,500.00
	Engineering Design @ 12%				\$ 63,699.00
	Contract Administration @ 5%				\$ 26,541.25
	Construction Management @7.5%				\$ 39,811.88
	Contingency @ 15%				\$100,106.57
	construction cost				\$530,825.00
	total cost				\$767,483.69

[illegible]

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PHOTO POINTS NORTH OF JUDD ROAD

PHOTO POINTS SOUTH OF JUDD ROAD



1 inch = 500 feet
0 250 500 1,000 Feet



- Photo Points, Culvert Diameter
- North County Line IC Drain
- Swan Creek Piney Harris Drain
- Roads



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Water Resources Commissioner
Washtenaw County

NORTH COUNTY LINE IC DRAIN
DECEMBER 17, 2019
INSPECTION PHOTOS

Created 24JAN2020 mmw

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Photo #1 Outlet of Drain and Tile
Underdrain at Swan Creek Pliney Harris – 15"HDPE



Photo #2 Access Culvert at Rawsonville Woods Development
– 24" CMP



Photo #3 Hydrant Access Culvert – 24" RCP

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Photo #4 Rawsonville Woods Entrance - 36"
RCP (lower side)



Photo #5 Rawsonville Woods Entrance – 36" RCP (upper
side)



Photo #6 Driveway at 10755 Rawsonville - 36" HDPE

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Photo #7 Hydrant Access - 36" RCP



Photo #8 Tile Underdrain Inlet - 15" VCP



Photo #9 Farm Crossing - 36" CMP



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Photo #10 Driveway at 10641 Rawsonville -
36" CMP



Photo #11 Hydrant Access - 48" RCP



Photo #12 Driveway at 10595 Rawsonville - 36" CMP

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Photo #13 Farm Crossing - 36" RCP



Photo # 14 Hydrant Access - 36" RCP



Photo #15 Driveway at 10525 Rawsonville - 24" CMP



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Photo # 16 Driveway at 10517 Rawsonville -
36" CMP



Photo # 17 Driveway at 10481 Rawsonville - 48" CMP



Photo # 18 Driveway at 10471 Rawsonville - 36"
CMP

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Photo # 19 Hydrant Access - 48" CMP
connected to driveway with crane mats



Photo # 20 Driveway at 10451 & 10441 Rawsonville - 36"
CMP



Photo #21 Driveway at 10415 Rawsonville- 36" CMP

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Photo #22 Driveway at 10391 Rawsonville -
36" CMP



Photo #23 Rawsonville Road Crossing - 48" CMP



Photo #24 Driveway at 10250 Rawsonville - 36" CMP

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Photo # 25 Driveway at 10250 Rawsonville
(circle drive) - 36" CMP



Photo #26 Driveway at 10196 Rawsonville - 36" CMP



Photo #27 Driveway at 10106 Rawsonville - 36" CMP

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Photo #28 Driveway at 10078 Rawsonville -
48" CMP



Photo #29 Judd Road Crossing - 36" CMP



Photo #30 Drain Mid-Section Typical

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Photo #31 Driveway at 9746 Rawsonville -
24" CMP



Photo #32 Driveway at 9370 Rawsonville - 18" CMP



Photo #33 Driveway at 9338 Rawsonville - 12" CMP

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Photo #34 Driveway at 9318 Rawsonville -
12" CMP mostly buried



Photo #35 Driveway at 9310 Rawsonville - 12" CMP buried



Photo #36 Driveway at 9302 Rawsonville - 12" CMP buried

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Photo #37 Driveway at 9290/9280
Rawsonville - 12" CMP buried



Photo #38 Driveway at 9258 Rawsonville - 12" CMP



Photo #39 Driveway at 9238 Rawsonville - 12" CMP mostly
buried

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Photo #40 Driveway at 9202 Rawsonville -
12" CMP buried



Photo # 41 Driveway at 9180 Rawsonville - 12" CMP mostly
buried