From: stacy simpson
To: Pat Westlund
Cc: Elaine McCloskey
Subject: Re: Shelbourne
Date: Thursday, November 4, 2021 7:04:52 PM

Hi Mrs. Westlund,
I want to acknowledge receiving your note below. I've also reviewed a copy of the note you and your husband submitted to Elaine McCloskey on Wednesday, November 3rd @ 14:37 PM regarding public comment for the Addison Farms case. Thank you for both of these submissions.

Elaine,
For the record, Mrs. Westlund's address is 961 Executive Boulevard per the previous submission.

Best regards,
Stacy

Sent from my iPhone

> On Nov 4, 2021, at 18:19, Pat Westlund <mgb2go@gmail.com> wrote:
> My husband and I were at the meeting last night. We are senior citizens, and chose our home here on Executive Blvd. because of its serene back yard.
> We have been actively involved in learning about the Addison Project since July, attending city meetings, city council meetings, researching to learn more, signing petitions, and communicating with city officials. We are definitely a part of Delaware. Our residents have careers and jobs here, and pay our city of Delaware taxes. We own property, thus support the schools. When I retired from Dublin City Schools and moved here, I substituted in Delaware City Schools. We are friends with our neighbors, and we maintain our property, and make continuous improvements, inside and out. We are active in many of the special events in Delaware, and support many large and small businesses in Delaware. As far as location, our neighborhood is right beside the fairgrounds, which is a large part of Delaware. We also exit/enter our neighborhood from 23, a major travel route for Delaware residents.
> And, yes, we vote, and obviously care about what happens in our city/community. You reminded the citizens to be respectful in their comments last night. I ask that the same respect be shown by city officials to our Delaware citizens.
> Pat Westlund
>
> Sent from my iPhone

From: Susan McGrail
To: Elaine McCloskey
Subject: PUBLIC COMMENT FOR THE RECORD
Date: Monday, November 15, 2021 3:14:59 PM
Attachments: Document1.docx

The request by Addison Properties LLC to grant a planned multi use overlay (PMU) is inconsistent with and a violation of Delaware City code and zoning as well as the comprehensive City Plan.

The city plan and code indicates like housing and density is to blend with existing development or residential housing. For example, Oakhurst abuts 5.4 units per acre of high-density housing vs 1-2 units per acre.

There are no reasonable circumstances to justify a blanket zone change.

There is no evidence provided by the developer that the zone change will NOT AFFECT adjacent property values. If stub roads Kensington and Sylvan Dr. are opened to through traffic to route 23, housing values will plummet in Oakhurst subdivision. Most of Oakhurst has no sidewalks. Streets are walking paths and children stand in the street waiting for school buses. The streets can only be opened to emergency vehicles and properly gated or mounded.

There needs to be a written guarantee protecting home values. The city is to request a Bond from the developer for the full duration of development and construction. This Bond and guarantee should cover at least 10 years.

In addition, there are objections addressed by the City of Delaware staff that public services, particularly the police and fire departments are negatively financially affected by this development. There is evidence to support this in the 2 year 911 log from Seattle House apartments which has overwhelmed the police. 911 evidence was given to Mr Friedman and ignored.

Has the planning commission and city council factored in the 178 apartments approved for Coughlin Crossing in 2020.
Mr Efland is quoted in 2020 that the GATEWAY development (Coughlin Crossing) is a" handsome entrance into the city of Delaware along US 23”
It will take a lot of creativity to make this Delaware’s Gateway. Thoughtful planning should do better.

Where is the money coming from to finance all of the proposed and approved high density housing in the city of Delaware?
City staff indicates police resources are impacted negatively by the proposed high density housing in Addison Farm.

Only ONE of the aforementioned reasons is sufficient to reject a zoning change by Planning Commission and City Council..

It is obvious that this 273 acre development will set a course for the city of Delaware for the foreseeable future and determine it’s future.

The Delaware city staff report to the PLANNING COMMISSION for November, 3, 2021 and the public have raised many reasonable concerns including:

The TRAFFIC STUDY is still unfinished. Current traffic and travel Is reduced and constrained by COVID at the public and state level, rendering current counts and predictions grossly inaccurate.

TREE counts and removal of 90 to 100 acres of forest with predictable detrimental affects on

WATER ABATEMENT and the mandate for URBAN TREE CANOPY has not been resolved by the Delaware city staff. Reimbursement to the City of Delaware for tree loss could be bountiful and in the millions of dollars using Addison's tree counts.

ROADWAYS where they exit and terminate is a dilemma. Build it and they will come won't work here. Both potential exits for Merrick are problematic.
Building a railroad bridge won't work because NORTH travelers recross the railroad at Hills Miller road and SOUTH travelers hit a dead end at Central Avenue.
The same congestion exists for the Houck road intersections,
Merrick Pkwy intersects US Route 23 at a constriction and is not amenable to an interchange.
Merrick will be obsolete almost immediately. A better choice is to use existing TROY or HOUCK and HILLS MILLER road rightaways with a 23 exit north of Speedway which was proposed in 2015.

BIKEWAY, WALKWAY and PARKS are not fully vetted and resolved.

PUBLIC SERVICES are already impacted by the high density housing at Seattle House as evidenced by the 911 logs from the last two years.

Where is the introspection and imagination we expect from government and city officials?

A PMU fits nicely in certain circumstances such as the Short North, Grandview and the Bridge development in Dublin adjacent to River Road and Highway 161. A PMU does not fit the 273 acres at this level of discussion. There are too many unanswered questions as noted above.
Premature approval of the requested zoning change is not appropriate at this time.

A PMU for Addison Farms is not consistent with the city plan and city code drafted to prevent inappropriate development.

All of the questions proposed by the public and city staff have to be carefully addressed and answered before proceeding with a blanket zone approval requested by Addison Farms.

The future of Delaware City resides with your careful consideration.

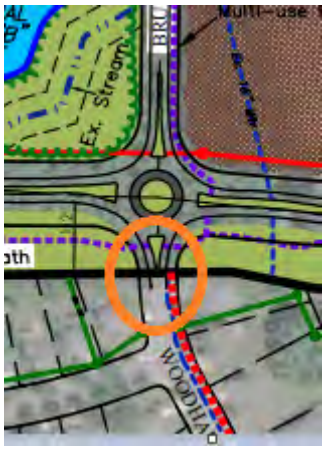
Thoughtfully submitted.

Dr. John W McGrail

16 November 2021

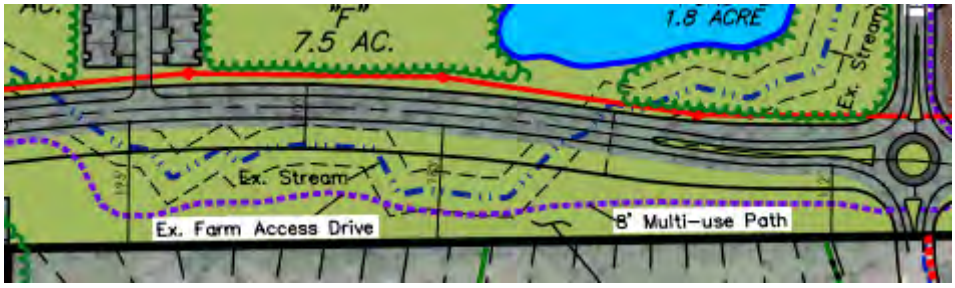
Dear Commissioners and City staff:
I wish to submit these questions into the record for consideration by the City regarding Addison Farms. In addition to these and other questions I have already submitted, I may have more going forward.

1. The southernmost point of the Woodhaul/Merrick roundabout has a truncated splitter island. How will that affect the functionality of the roundabout? If a longer splitter island is installed on Woodhaul, how will that affect the two closest existing properties' ability to access their driveways, which are also on that section of Woodhaul?



Roundabout splitter island as represented on the development map. Note that it's significantly shorter than others represented. (Also is this showing that the pavement coming into / out of Woodhaul narrows at this point from the width of the existing roadway?)

2. Why does the multi-use path not remain in the right-of-way south of Merrick Parkway?



Example of section where multi-use path deviates from location in right-of-way. Also it appears to show the allocated right-of-way in the stream buffer south of Merrick Parkway.

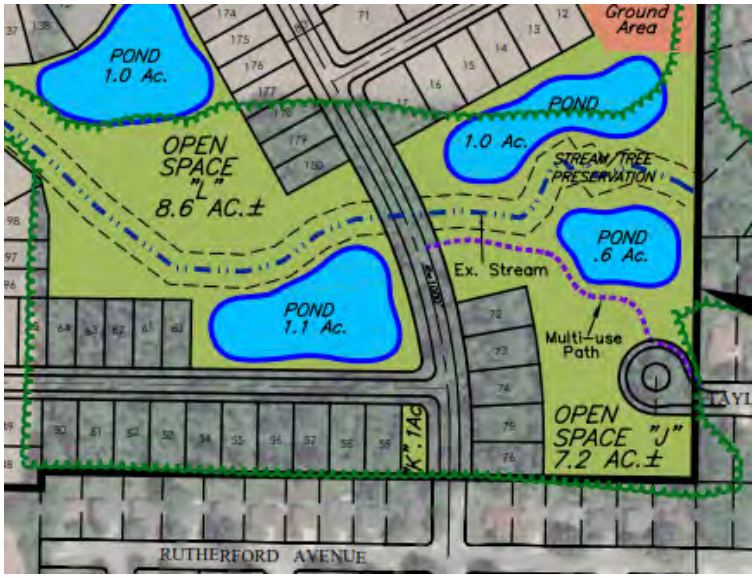
3. Is it permissible to have right-of-way in the stream corridor? (See south of Merrick Parkway, above.) Is there any risk to this protective buffer by having the right-of-way in that area, and the roadway so close?

4. As planned, can the roadways be installed without disrupting the vegetative buffer around the stream corridor?

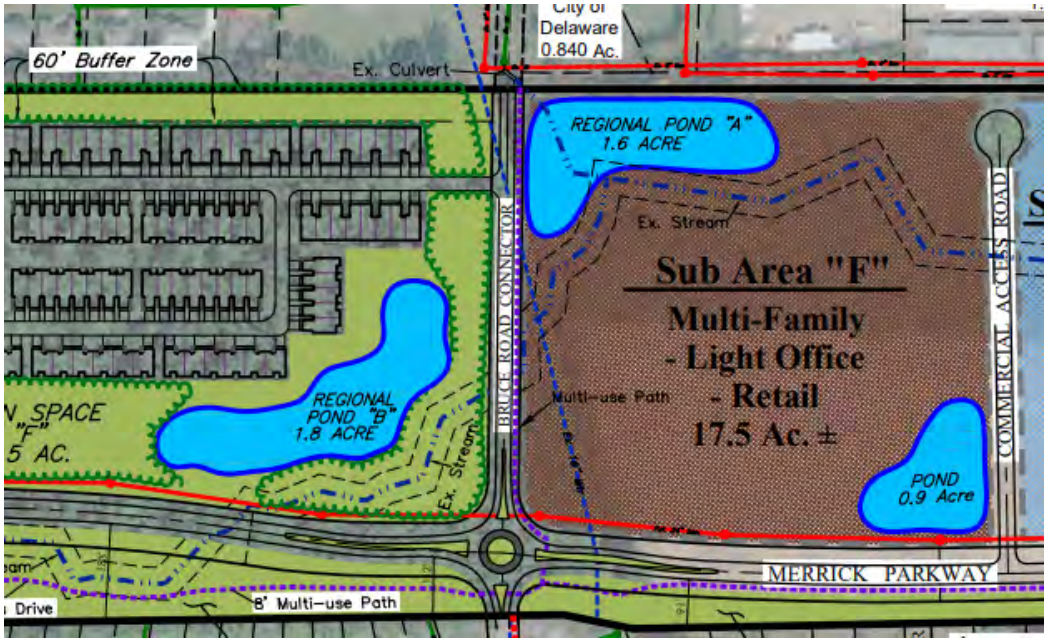
5. During what phase is a pedestrian crossing to Smith Park added? Is it going to be an over-, above-, or at-grade crossing?

6. How much tree canopy is preserved in the plan?

7. Why are the retention ponds in the treed areas (especially in sub areas C, D, E, and F)?



Example of ponds to be added to wooded area in sub areas C and D.



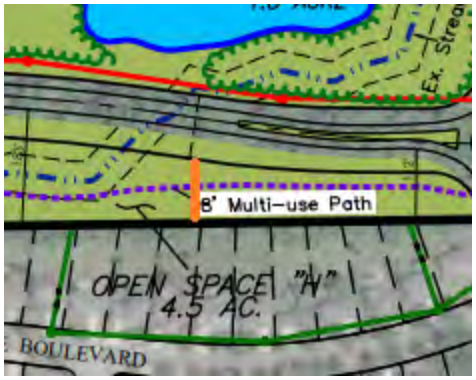
Examples of ponds to be added to wooded areas of sub area E and F (the 1.8 acre and 1.6 acre ponds are in tree-covered areas).

8. Once Merrick Parkway crosses the railroad tracks, it will function as an artery instead of a collector street. Relatedly:

    a. Will additional lanes be required at that time? How much more pavement will be added to the road to make this a functional artery? (How much of the right-of-way will be covered in pavement once the roadway is expanded?)

    b. What additional accommodations in terms of buffering and screening as well as protection of property value, quality of life, and safety is being provided to existing residents to manage the effects of having an arterial road placed close to their existing properties?

9. What is the distance as measured from the back of each existing property to the Merrick Parkway southern right-of-way boundary? Please provide measurements at the narrowest point. Please include all properties south of sub areas E, F, and G.



Example of measurement marker desired shown in orange: narrowest point from property boundary to right-of-way.

10. If Council wished to keep Merrick Parkway a collector street, as shown on the current *Thoroughfare Plan*, what additional measures should be taken in the design of the road that would prohibit its future use as an artery?

11. Can the city point to any existing arterial roads that have been installed after existing residences have been in place? Or does the installation of this arterial road behind homes that have been in place for decades set a new, undesirable precedent for our city?

12. If Merrick Parkway must be on this land, what measures can be taken to minimize its impact on surrounding residents? What minimum proximity of the road to existing homes should be considered acceptable given that it will function as an arterial road?

Thank you for your consideration of these matters.

Sincerely,

Stacy Chaney-Blankenship,

943 Executive Blvd, Delaware, Ohio 43015

Nora Hiland

799 Executive Blvd.
Delaware, OH 43015
614-581-1893
norahiland@gmail.com

November 19, 2021

Delaware City Planning Commission

Dear Members:

I am a retiree of Franklin Soil and Water Conservation District where I was an educator. Township trustees and road superintendents were some of my audiences regarding stormwater management.

The flood of May 2020 caused damage to businesses in downtown Delaware. It also moved a fallen ash that straddled my stream to one side of the stream. I had used that log as a bridge before the storm. Climate change is causing more severe storms. Stormwater rushes from sidewalks, streets and roof tops (all impermeable surfaces) to the storm drains which dump it into the tributaries. There is nothing to slow the water down causing additional stream bank erosion. This fast moving water enters the Olentangy River with the debris it carries from the neighborhoods. As Addison Farms develops, consideration should be made regarding the effects of stormwater runoff to downstream properties.

Please consider saving some of the beautiful, large native trees not only for a native corridor but also for stormwater management. As rain falls it is slowed down by the leaves on the large trees and hits the ground at a much slower velocity than without large trees, often soaking into the soil. Incorporating a natural play area in the native corridor would serve two purposes; stormwater management and allow for children to become familiar with nature.

Sincerely yours,

Nora Hiland

From: Jennifer Button
To: Elaine McCloskey
Subject: Green Space
Date: Monday, November 22, 2021 3:03:27 PM

Caution! This message was sent from outside your organization.

Hello, my name is Jennifer Button and I live on 552 Rutherford Ave. in Delaware. I am writing to voice my concerns for the new development that is being proposed for my neighborhood. We have lived here for 13 years and what brought us to our neighborhood was the trees! We love having a wooded backyard and especially love all of the trees/forest in our neighborhood. It brings beautiful birds and wildlife and we would be extremely sad to lose this! We want to save as much green space as possible in our neighborhood. Please speak up for us at the City Hall meeting on December 1st. The residents living here want to keep our beautiful trees. These developers need to be responsible and make sure that they are keeping greenspace accessible for all of us. I hope that you will share this letter at the meeting and make our voices heard. Please advocate to keep the trees!!!

Thank You,
Paul and Jennifer Button

From: stacy simpson
To: Stacy B. Chaney
Cc: Elaine McCloskey; Stephen Tackett
Subject: Re: Planning Commission - suggestion by Staff to table Addison Farms until 12/15
Date: Friday, November 26, 2021 9:06:54 AM
Attachments: image.png

Caution! This message was sent from outside your organization.

Mrs. Chaney-Blankenship,
Good morning and thank you for your note. I hope that you and your Family had a wonderful Thanksgiving.

Earlier this week I was informed by Planning Director Efland that more time was necessary for Staff to work through the information with the applicant and that a recommendation to table the cases would likely be forthcoming. As I expressed to Director Efland at the time, I fully support our Staff and the need for more time given the size and complexities of the subject site and the proposed development.

Regards,
Stacy

Sent from my iPhone

> On Nov 26, 2021, at 08:16, Stacy B. Chaney <sbchaney@gmail.com> wrote:
>
> Chairman Simpson,
>
> Thank you for your commitment to the Delaware community.
>
> In light of the recently released memo from City staff, contained in the 12/1/2021 Planning Commission agenda packet (p.17) and excerpted below, my neighbors and I anticipate that the Planning Commission will table the Addison Farms cases until 12/15/2021.

EST 1808
CITY OF
DELAWARE
OHIO

MEMORANDUM

TO: Planning Commission
FROM: David M. Efland, AICP Director of Planning & Community Development
DATE: 12/1/21
RE: Addison Farms Cases

Staff and the Applicant have been working over the past month as discussed at the last Planning Commission meeting. Both parties have agreed that a little more time is needed. Therefore, Staff and the Applicant would recommend removing the cases (2021-3843, 2021-3844, and 2021-3845) from the Planning Commission's table and then tabling them until the Planning Commission's special meeting of December 15, 2021.

Given that no updates have been released to the public, and no additional information for review is included in the agenda packet, I support the staff recommendation to table the Addison Farms cases.

Respectfully,
Stacy Chaney-Blankenship,
943 Executive Blvd, Delaware, OH 43015

From: Juliana Riggs
To: Elaine McCloskey
Subject: Shade tree commission meeting for November 30
Date: Tuesday, November 30, 2021 11:37:40 AM

Dear Planning Commission and Shade Tree Commission,
I am a long time resident of the Shelbourne Forest neighborhood in Delaware. My children grew up playing in the woods behind our home. Many family photos have been taken in these woods over the years.
We purchased our home knowing that development would come someday. However, we trusted that the codes and laws of the city would protect our property value and the integrity of our existing community. Why have programs to protect the tree canopy, codes that ensure like property built next to like property, or zoning regulations if there is a loop hole for developers to totally disregard them. This is my concern with the PMU that is planned for Addison Properties. What will be the effect on the tree canopy, wetlands and streams on this property? Will the single family homes in my neighborhood back up to businesses, apartments and busy streets causing dual frontage property? If there are no laws and ordinances from the city to protect the integrity of this property, I fear we are gambling with the future of the city. The developer will not look out for my concerns and the future of our city we call home. Will you? There is a responsible way to develop this beautiful land without ruining it's natural resources and potential.
Thanks for supporting us!
Juliana Riggs

Sent from my iPhone

From:	Sue Chaney
To:	Elaine McCloskey
Subject:	For the public record to Shade Tree Commission, Planning Commission, and City Council
Date:	Monday, November 29, 2021 4:18:55 PM

Caution! This message was sent from outside your organization.

Dear Commissioners and Council Members,

Thank you for your attention to the details when making decisions about development in Delaware. It is an awesome responsibility--the future of Delaware truly is in your hands.

I would like to see more tree canopy preserved in the city. The long-term benefits of preserving the tree canopy far outweighs the short-term benefit of allowing more hardscaping and gray infrastructure.

It is clear that trees benefit us all in a variety of ways. One of those ways is through managing water which is going to be a huge issue if the trees owned by Jason Friedman of Addison Properties are cleared. Addison Property, Delaware OH, is part of the Olentangy Watershed and the trees and vegetation are a necessary component to allow that precipitation to percolate in the ground before gently draining into the Olentangy. Do you remember what happened when the trees in the Shelbourne Forest, Pinecrest Drive area were cleared? There was a huge flood on US 23 and the road was closed.

What do you think is going to happen when Addison clears their trees? Remember this spring when the downtown businesses flooded? That problem is only going to become exacerbated by the runoff that will happen north of the Delaware Run--impeding its flow into the Olentangy River. Clearing acres of trees in the watershed=flooding.

The Greeks said, "all things in moderation." Addison Properties can be developed responsibly and acres of trees can remain to fulfill the city's code requiring green space. It can easily be a win/win for all.

Below is an excerpt from one of many studies done supporting the necessity of preserving and planning more green infrastructure. I hope you get the opportunity to read it in its entirety.

"Trees are considered “decentralized green infrastructure” and can be important tools for managing water, especially in an urban ecosystem (Berland et al., 2017). Water runoff is a serious issue in the city environment, as runoff can increase the exposure to pollution and cause property damage (Braden & Johnston, 2004). Trees can help reduce and intercept stormwater and improve the quality of runoff water (Berland et al., 2017; Bolund & Hunhammar, 1999; Brack, 2002; Livesley, McPherson, & Calfapietra, 2016; Scharenbroch, Morgenroth, & Maule, 2016). With less contact on impervious surfaces, stormwater is cooler and has fewer pollutants when it enters local waterways and water-related ecosystems (Schwab, 2009). Trees can also be

valuable in phytoremediation, where they can remove heavy metals and other contaminants from the environment (French, Dickinson, & Putwain, 2006)."

Sincerely,
Sue Chaney
883 Executive Blvd.
Delaware OH 43015

From: Debora Fuchs
To: Elaine McCloskey
Subject: Addison Farms
Date: Wednesday, December 1, 2021 2:22:25 PM

Caution! This message was sent from outside your organization.

Dear Planning Commission Members,

I live in Shelbourne Forest and have several concerns with the Addison Farms PMU requests. I have signed the petitions and attended City meetings. While I'm not opposed to development I feel the continued giving of PMUs to developers is unsustainable for our city.

The Addison Farms request is extremely unsettling. Destroying so much well established tree canopy, existing wetlands and habitat is not acceptable. The current placement of Merrick Parkway and opening up of and connecting roads is concerning and totally unwanted in some places. I'm not happy about increased, unchecked traffic, safety issues, decreased property values and increased flooding issues.

There is a stream that crosses Executive Blvd near the nature trail. This stream does not appear on the maps that have been provided thus far(at least not that I can see). We have had flooding issues in the past. While I'm one house away from this my neighbors have dealt with high water levels, fast currents, and tons of garbage coming from the north. What will happen here down stream with all the development and topographical changes the Addison plan makes? Especially since it's not even on the maps? Does the owner even know it exists? It can barely handle the storm water runoff now and has flooded in the past. What guarantees are there that this won't be exacerbated?

I believe the Addison Farms development can be done with Delaware's current zoning of the property, not a PMU. The developers will still make tons of money. Merrick Parkway can be reasonably moved to a more acceptable position that still satisfies the traffic need but doesn't compromise current residents property, (it's value, it's safety, it's wonderful mature tree canopy and wetlands, etc).
I encourage you and all involved City departments to please take the time to truly make this a development that Delaware can be proud of, not just another money maker for the developers at the expense of current and future residents. We have zoning codes, tree preservation codes, etc in place for a reason. Please do not throw them all away with more PMUs.

Thank you for your time and consideration and for your commitment to the City of Delaware.

Deb Fuchs
788 Executive Blvd

From:	Stacy B. Chaney
To:	Elaine McCloskey; Stephen Tackett
Subject:	Addison Farms cases (public comment - Planning Commission - 12/1/2021)
Date:	Wednesday, December 1, 2021 9:52:20 AM

Caution! This message was sent from outside your organization.

Dear Planning Commissioners:

Thank you for your important work for our city.

Your agenda for tonight includes the cases for Addison Farms, as well as a memo from City staff recommending that you table the cases until December 15. Given that no additional information about the Addison Farms cases has been provided to the public since the last hearing and the high level of complexity of the cases, the expectation of the residents would be that the Commission would table all of the Addison Farms cases. Based on the memo, it would appear the developer agrees to this and has the same expectation as well.

Over 80 families live adjacent to the proposed development, and will be directly impacted by it for as long as they live in their homes (source). The number of families impacted by the opening of the roads will be at least 200. The recommendations you make will impact us for a very long time, for as long as we live in our homes and raise our families here.

However, the public has not seen any updates to the PMU text nor the development plan since early October. Typically, development plans that have zone changes require advanced notice to the public. I understand that is not required at this point in this case, but leaving the public in the dark about changes to a major development is not in keeping with the spirit of those rules either.

Please provide us with the opportunity to participate in the conversation, and to provide *informed* input about how it will impact us. I ask you to **table all the Addison Farms cases** and **ask the applicant to provide updates to the public as soon as possible and in a reasonable amount of time prior to any additional discussion at City meetings**. While the City and the developer do have interests in the future of this property, so do those who will be directly impacted by living in proximity to these land uses. Thank you for your time and attention to this matter.

Respectfully,
Stacy Chaney-Blankenship,
943 Executive Blvd, Delaware, Ohio

Nora Hiland

799 Executive Blvd.
Delaware, OH 43015
614-581-1893
norahiland@gmail.com

December 6, 2021

Delaware City Planning Commission

Dear Members:

The Columbus Dispatch has a science article about climate change effects on precipitation in the Sunday, December 5, 2021 edition. The article is on A1 and is titled "Extremes in weather reveal shift in rainfall patterns". I highly recommend you read it before considering additional housing developments within the city.

A stream goes through the property where I have lived for 12 years. Because it is not spring fed it has been intermittent especially in the fall when there is normally a dry spell, but not this year. This is one indication that the weather pattern is changing. I have a concern regarding stormwater management and the effects on the streams with the development of Addison Farms. The developer's responsibility is to handle stormwater in a way that it will not cause damage downstream.

The article I recommended to you in the first paragraph refers to climate assessments, scientific papers, weather report and government documents. Reporters read through thousands of pages and interviewed more than 70 climate scientists, academic researchers, local and federal officials and residents for the article.

In summary, heat has changed how moisture moves across the country. The jet streams have been altered. Evaporation from land and water has increased. East of the Rockies, more rain is falling and coming in more intense bursts. Ohio is one of a dozen states that have had five of their 10 wettest years in history over the past two decades. Roads, bridges, sewer systems and communities face flood risks because climate change fuels the intensity of storms.

When talking about new development around the city it would be worth the effort to take into account recent rainfall increases and consider what the weather is going to look like in 30 or 40 years. How should the city adjust to this change?

Sincerely yours,

Nora Hiland

Columbus Dispatch | Page A01Sunday, 5 December 2021

SHARE

Extremes in weather reveal shift in rainfall patterns

Heat changes moisture movement across US

Dinah Voyles Pulver and Kevin Crowe

USA TODAY

Over eight days of wild weather in June, the realities of a changing climate grabbed the nation by its shoulders and shook.

In Michigan, a deluge dropped 7 inches of rain in Detroit, swamping highways and stranding cars.

At least 136 daily rainfall records were set during storms across fi ve states along the Mississippi River.

Tropical Storm Claudette soaked a swath of the South, fl ooding homes in Louisiana and in Alabama, where it dropped up to 8 inches of rain and claimed 14 lives.

Meanwhile, the drought-stricken West grappled with soaring temperatures that shattered century-old records, prompted heat warnings and ultimately killed more than 200 people.

Wildfi res exploded in Montana and

scorched the earth in California.

Such events do occur naturally, but rarely have so many struck at once or to such an extreme degree, making it hard to ignore their connection to each other and to a warming world.

Rising temperatures and rising oceans have for years been framed as the impending disasters on the crest of climate change. But this year, like few before it, changing rainfall patterns bullied their way into the collective consciousness.

USA TODAY reporters analyzed more than a century of precipitation records from the National Oceanic and Atmospheric Administration and a unique collection of snow and rain extremes computed by Alaska-based climate researcher Brian Brettschneider.

Reporters read thousands of pages of climate assessments, scientific papers, weather reports and government documents. They interviewed more than 70 people, including climate scientists, academic researchers,

local and federal officials, and residents forced from their homes by drought and flood.

Taken together, the reporting reveals a stunning shift in the way precipitation falls in America.

Heat has changed how moisture moves across the country. Scientists say it alters the flow of the jet stream, extends droughts, and increases evaporation from land and from bodies of water, including the Atlantic and Pacific oceans, the Great Lakes and the Gulf of Mexico.

East of the Rockies, more rain is falling and it's coming in more intense bursts. In the West, people are waiting longer to see any rain at all.

Readings from hundreds of rain gauges across the continental U.S. tracked for more than 100 years reveal a noticeable inflection point before the turn of the 21st century.

Of 285 weather stations, 44% get at least one more top rainfall event per year now than they did three decades ago, based on data compiled by Brettschneider. That means what used to count as the top three wettest rainfalls of the year now happen at least four times a year.

Nineteen places doubled their previous number of days of extreme precipitation – from three a year to six.

As deluges grow in frequency and severity, annual precipitation has increased for more than half the nation. At some point over the past three years, 27 states – all east of the Rocky Mountains – experienced their highest 30-year average since record keeping began in1895, according to a USA TODAY analysis of NOAA data.

A dozen states, including Iowa, Ohio and Rhode Island, saw five of their 10 wettest years in history over the past two decades.

At the opposite extreme, eight states – including five in the West – had at least three record-dry years in the same time period. That's double what would be expected based on historical patterns.

As states rack up records for rainfall, flooding, droughts and wildfire, it's becoming clear our country was built for the climate of the past.

Roads, bridges, sewer systems and entire communities that decades ago seemed safe from fire and flood now lie within one or both danger zones.

An October report by the nonprofit First Street Foundation warned that onefourth of the nation's "critical infrastructure," including roads, utilities, airports and emergency services, now faces flood risk from rainfall and sea level rise, as do 1 in 7 residential properties – about 12.4 million.

Heat, lack of humidity, and wind are combining more frequently to enhance the risk of wildfire. Climate Central, a nonprofit research organization, looked at 17 Western states and found parts of New Mexico now have at least 60 additional days when the fire risk is more extreme than 50 years ago.

Parts of 11 other states, including Arizona, California, Colorado, Oregon and Texas, saw more than a 100% increase in these "fire weather days."

These calamities displace families, claim lives and leave officials from coast to coast conflicted over which crisis to plan for next and how to pay for it all.

NOAA reported at least 133 "billiondollar disasters" in the decade ending in 2020, double the previous decade, at a cost of more than $867 billion. Meanwhile, the annual average number of flood claims paid by FEMA also doubled between 1997 and 2020, to 52,000.

Scientists say it's too late to stave off some of the climate change-driven precipitation extremes we're experiencing today. But the nation could take steps to reduce greenhouse gas emissions that amplify the weather extremes and take more aggressive measures to reduce flood risk.

Given the increasing frequency of weather disasters, "one would think the nation might be galvanized to action," said Rob Moore, a senior policy analyst with the Natural Resources Defense Council. "And yet we are not incorporating what we know about the future into our decisions about what we build, where we build and how we build as a nation."

What's causing it?

The earth has always produced erratic weather patterns. But now the heaviest downpours and droughts are growing more extreme. That trend started in the late 20th century, as the accumulation of greenhouse gases like carbon dioxide and methane reached critical levels in the atmosphere.

Climate scientists said these gases trap more of the energy radiating from the planet's surface, causing the earth to warm.

This warming doesn't just raise temperatures. It intensifies how water cycles between earth and sky.

Heat hastens evaporation. It draws more water into the air where it gathers into systems that can form wetter storms. For every 1.8 degrees Fahrenheit of warming, 7% more moisture is absorbed, said David Easterling, director of NOAA'S National Climate Assessment Technical Support Unit.

It's one of the reasons behind many of this summer's rainiest storms, including Hurricanes Henri and Ida, that flooded communities throughout the South and Northeast this August.

For these storms and others throughout the year, much of their moisture comes from the Gulf of Mexico, Great Lakes and Atlantic Ocean.

Gulf waters alone have warmed about 1.3 degrees over the past four decades.

A warmer Gulf contributes to more rainfall in hurricanes and tropical storms, but its moisture also helps form wetter storms as far north as Wisconsin, Easterling said.

At the same time, some scientists said rising temperatures have altered the summertime movement of the jet stream that transports moisture across the country. Weather systems that used to hustle along get stalled more often now, dumping more rain in one place.

Instead of flowing quickly across the north, the jet stream moves slower and gets bigger, wavy dips that trap high and low pressure systems in place, said Michael Mann, a climatologist at Penn State University and author of the book "The New Climate War."

The trapped highs and lows in the summertime affect the weather across the country, Mann said. For example, they can produce extreme heat, drought and wildfires in the West and drop huge amounts of rain to the east at the same time.

Scientists can't say for sure how much of the rain in each storm is directly attributed to the changing climate, Brettschneider said, but the shifts become apparent when comparing a sampling of current and older events.

More intense rains

Climate change also has been blamed for fueling the intensity of the storms that unleashed record rainfall and sparked deadly flooding across Tennessee in August.

The day that storm hit started like just another rainy morning in Humphreys County.

Weather forecasters had issued flash flood advisories, warning of 2-4 inches of rain, but no one had predicted four times that much or the catastrophe it would bring.

Typical summer thunderstorms sweep through at 50-60 mph. But on Aug. 21, a system got caught up with a stalled front and traveled through at only 10-15 mph. Meeting up with a pool of Gulf moisture overhead, it

forced storms to rain over the area again and again, dropping more than 12 inches of rain in seven hours in the small city of McEwen.

The total rainfall – 17 inches – broke the state's all-time record and triggered deadly flooding in Waverly.

Around 7 a.m., Joe Duncan looked outside and saw water rushing through his yard. He gathered his wife, daughter and two grandchildren and headed out through knee-high water to pick up his mother so they could evacuate. When they reached her house, Duncan turned around just in time to see his mobile home tilt sideways.

By this time, 9 inches of rain had fallen in six hours, sending Trace Creek out of its banks and raging toward Waverly in a muddy torrent.

Calls started lighting up the Humphreys County 911 Center.

The debris-filled Trace Creek hurtled toward a pair of bridges east of Waverly – one for U.S. 70 and one for the railroad. Mayor Buddy Frazier and others believe debris lodged at the bridges, creating a temporary dam until the water crashed through and sent a "tsunami" into Waverly.

Duncan's home slammed against a tree and split into three pieces. He said the nearby home built in the early 1900s also was destroyed.

Twenty people died in the disaster. They're among 144 flood-related deaths in the nation this year, the second-highest since 1985.

Rising temperatures also lengthen dry spells, creating wild swings between downpours and droughts.

The length of time between rain increased by three days on average across the West from 1976 to 2019, according to research published this year by scientists with the U.S. Department of Agriculture and the University of Arizona.

The researchers also found the longest interval between rains each year increased by 11 days in the West, to 32 days across the region. In the desert Southwest, it increased by 17 days to 48 days.

More dry days and drought

While increasingly intense rains fall east of the Rockies, the West experiences intense drought. Rising temperatures and lingering high pressure systems zap greater moisture from soils and plants.

"With precipitation you're only getting half of the picture," said Daniel Swain, a climate scientist at UCLA and the National Center for Atmospheric Research. "When it comes to drought, temperature is increasingly important, and temperatures are rising a lot."

Together, the intense heat and longer intervals between rains contribute to the conditions creating more record-breaking wildfires in the West.

All but two of California's 20 largest wildfires in history have happened since 2003.

Oregon had one of its most destructive wildfire seasons on record last year with roughly 2,200 fires that burned more than1.1 million acres and destroyed more than 4,000 homes.

One of those homes belonged to the Flores family, who lived in the Coleman Creek Estates mobile home park near Medford in the southern part of the state.

Seventeen years old at the time, Julio Bryan Flores woke up the morning of Sept. 8, 2020, looking forward to celebrating his mother's birthday when a neighbor's call alerted the family to danger, he said.

Soon ash fell from the sky. The entire neighborhood evacuated. Bryan's father, who had been away, returned home just in time to get the dog, but not his mechanics tools. "We could see fires literally starting everywhere," Bryan said. "We were surrounded by them." The family escaped, but the fire destroyed their home and possessions. When Bryan and his dad returned a week after the fire, "it was a nightmare."

"There were just the colors white and black everywhere, burned bicycles, destroyed cars, toys left on the street, just burned," Bryan said.

Once an intense wildfire burns through an area, it leaves the soil hardened and scarred and weakens its ability to absorb water. So when the rains come, they turn dry creek beds into raging rivers, like the one that swept up a Prius near Flagstaff, Arizona, in August and carried it down the street in a viral video.

The atmospheric river that swept across the West in late October dropped anywhere from 3 to 13 inches of rain across California, Oregon and Nevada.

Action needed now

Critical steps are needed – and soon – to try to keep downpours from growing ever more intense, correct past mistakes and adapt our surroundings to the new reality, experts said.

Many call for sweeping changes to curtail warming, upgrade stormwater and utility systems, and revamp federal guidelines and standards and stop building in vulnerable places.

"The future is still in our hands," said Mann.

Two things appear to be true for "pretty much everywhere that's populated and on land," Swain said. "Everyone is getting warmer and everyone is seeing, or should see shortly, more intense precipitation events." Part of the problem is the nation's woefully outdated federal precipitation estimates and inadequate flood zone mapping, said Moore of the Natural Resources Defense Council. Neither takes into account recent rainfall increases, much less future projections.

"We're still designing highways and stormwater systems and siting people's homes without any consideration of what the weather is going to look like in 30, 40 or 50 years," Moore said.

Changing rainfall amounts and rising sea levels mean the estimates, such as a 1-in-100 year flood or a 1-in-25 year rainfall, just aren't the same as they used to be. Neither set of estimates takes future projections into account.

The NOAA estimates guide governments, engineers and others when designing infrastructure. A new generation of estimates, called Atlas 14, began in 2002, but has never been completed for the entire country.

One study showed that for Michigan, Wisconsin, Iowa and Minnesota, the historic estimate of a 1-in-100-year storm is now a 1-in-40-year storm, said Daniel Wright, an assistant professor of civil and environmental engineering at University of Wisconsin-Madison. "These sorts of storms are happening 2 1/ 2 times as often as they should be."

Labeling storms as a once-in-a-generation occurrence gives people the impression they can't have another, said Peter Schultz, vice president of climate adaptation and resilience for ICF, an international climate change consulting firm. But that's not accurate.

"If you have dice and you roll a three, that doesn't mean the next time you roll the dice you can't get a three, you absolutely can," he said. "Nature is still rolling the dice, but it's not fair dice anymore, it's dice that are coming out toward those higher numbers."

"If you have dice and you roll a three, that doesn't mean the next time you roll the dice you can't get a three, you absolutely can. Nature is still rolling the dice, but it's not fair dice anymore, it's dice that are coming out toward those higher numbers."

Peter Schultz

Vice president of climate adaptation and resilience for ICF

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SHARE

From: mparker301@yahoo.com
To: Elaine McCloskey
Cc: Susanemcgrail
Subject: For public comment
Date: Friday, December 10, 2021 8:50:33 AM

Caution! This message was sent from outside your organization.

Ms. McCloskey,

I am concerned about the building project south of the Oakhurst neighborhood. I would like clarification as to whether the Heritage road will extend to Hills Miller road. If not where would it end? I strongly suggest, that if it will not be completed that it would end before reaching our development. If it ends just beyond our neighborhood to the north and our stub roads were opened, then they would deliberately be encouraging traffic through our streets to get to Hills Miller Rd. That is totally unacceptable. There are a lot of supposition's floating around, but I just want the facts.

Thank you so much,
Mary Ann Parker
343 Kensington Dr
Delaware

Sent from Yahoo Mail for iPad

From: jftello@aim.com
To: Elaine McCloskey; saradanderson@gmail.com; tbakare@ctconsultants.com; stroud_g@yahoo.com; stacy_simpson1976@yahoo.com; avolenik@gmail.com; cstaver@ymail.com; Carolyn Riggle; Stephen Tackett
Subject: Addison development proposal
Date: Friday, December 10, 2021 1:42:32 PM

Caution! This message was sent from outside your organization.

Dear City of Delaware Planning Commission Members,
I'm writing you to express my concerns regarding the Addison developer's proposal/ application. This is by no means that we are against development, but we expect and deserve nothing less than responsible development - responsible to current city residents and to the natural environment. I would also like to see the city and developers follow more of the Delaware Together Comprehensive Plan objectives, especially in terms of natural resources.
Regarding the placement of Merrick Parkway, Addison's claims are false and exaggerated. As drawn Merrick Parkway does not have "100 feet or more of preserved woods" between the road and existing homes on Executive and Pinecrest, as the application claims - it is far less in most places. The markings on the development map are insufficient, and we need to know the actual distance from the Merrick right-of-way to each adjacent property at the narrowest point. The actual numbers for this will be approximately 50-60' less than what is currently shown. Asking existing property owners to accommodate Merrick Parkway is inconsiderate and disrespectful, as I did NOT purchase land with a thoroughfare planned on it; accommodating Merrick Parkway is solely the responsibility of the developer. The quality of life and the home values for all of the 30 plus homes along this strip will be greatly lowered if Merrick Parkway and the roundabout are not built farther north of the current proposal.

My property is not only affected by the new Merrick Parkway but also it is affected for the **different proposals on the "Pod F"**. If you read the new PMU text, Addison is asking for 8 different possibilities on that zone: Office and Professional Services, Retail and Services, Automotive and Transportation (Gasoline Station), Outdoor Display Storage, Community Facilities (School, Day care, etc), Recreation and Entertainment, Restaurant and Apartments.
I don't understand how one small zone can be use on 8 different types. What is the reason to have zoning code at the Delaware city?
My property value is directly affected by any construction on that zone. My home is my unique investment. That is all we have.

I hope the planning commission put our city first and not profit interest of the Addison property.

Regards,
Javier Tello
210 Pinecrest Dr, Delaware, OH

From: James Sullivan
To: Elaine McCloskey
Cc: SFA, Shelbourne Forest Activists
Subject: Public Comment: Addison Property Proposal
Date: Saturday, December 11, 2021 3:57:33 PM

12/11/21

To Rep. McCloskey and to the Delaware City Council

RE: The current Addison property recommendations regarding HOA maintenance of public areas

Dear Members of the Council,

Throughout the City's agenda and recommendations are numerous suggestions regarding greenspaces, landscaping, playgrounds, walking paths, and other public-use spaces, with the suggestions that many of these spaces be kept and maintained either by Homeowners' Associations or other similar master organizations, even within the existing Shelbourne Forest and related developments.

Perhaps the City Council is unaware of this, but there are currently zero active Homeowners' Associations anywhere within the existing developments. The last active one, of which I myself was president, was abandoned by the homeowners nearly a decade ago. This HOA was established by Maronda Homes, but imposed only those properties it developed, being Pinecrest Drive, Pinecrest Court, Woodhaul Court, Saddletree Court, and a couple of houses each on Woodhaul Ave and Stratton Ave. During the operation of the HOA by Maronda and its appointed agents, the HOA demanded high membership fees from the homeowners, which it then spent to pay itself for managing the HOA, and to pay to lawyers for the purposes of extracting fines from homeowners for minor "violations" like altering mail boxes. The HOA was, in short, oppressive and petty, and largely resented by the homeowners themselves.

Moreover, when Maronda handed the HOA over to the homeowners, once all properties were completed and sold, our evaluation of their records confirmed that the fees were excessive, the management poor and nepotistic, and that the HOA, beyond exerting minute control over minor external matters, had zero common property or landscaping to maintain. I and the other HOA elected officers even met with the City at the time to confirm that Maronda had, in fact, established zero common areas or promised pathways, and had deeded over no land or responsibility to the HOA. In short, the HOA was extracting high membership fees while performing no duties.

Still further, this HOA had zero jurisdiction anywhere else beyond the Maronda-built homes. Property modifications like fencing, mailbox changes, house color changes, and similar matters could be restricted by the HOA on one house (with penalties ranging from fines to liens), but not on that house's neighbor. This was unfair.

As the majority of the owners under the HOA had no interest in any further enforcement one the HOA was handed over, in time the HOA was allowed to lapse and is now listed by the State of Ohio as defunct.

However, in the recommendations regarding the Addison development, the recommendations at numerous points speak of assigning responsibility for public-access spaces to HOAs. The playground located at the Hayloft Stub is one such example. To whom exactly would the City assign responsibility? A defunct HOA to be resurrected and imposed on resentful home owners? What about similar issues proposed for the extensions of Woodhaul and other stub roads? Does the City honestly think it can impose HOAs at those locations too?

The imposition of HOAs by developers, moreover, is widely recognized as a means by which cities fob off responsibilities for "public" properties onto unwilling private hands, and HOAs and other property management organizations have a well deserved reputation as sources of abuse levied at home owners. To demand an HOA to take care of landscaping is essentially a form of city strong-arming, "Sure, you can have your greenspace in this development you didn't want anyway, but YOU pay for it." In short, this is blackmail of existing property owners.

No HOA should be imposed back on unwilling property owners. The City should itself, if it is going to mandate public use spaces, then have the responsibility to pay for them. If the City wishes to benefit from the added tax base, then it should also bear the cost of the same.

Regards,

J. Patrick Sullivan
319 Pinecrest Court
Delaware, OH 43015

From: Larry Schneider
To: Elaine McCloskey
Cc: JAF@jafriedman.com; CMO; PlanningAndDevelopment; Stephen Tackett
Subject: Addison Project-supplement to record
Date: Saturday, December 11, 2021 2:12:49 PM

Caution! This message was sent from outside your organization.

PUBLIC COMMENT FOR THE RECORD

To: Elaine McCloskey

We need to supplement our November 3, 2021 e-mail objecting to the rezoning. For ease of review here is the Text of e-mail 11/3/21

> To: Elaine McCloskey
> My wife and I live on Kensington Dr. We are one of the homes that directly borders the proposed maceration of our entire neighborhood. We have supported every petition and Dr. John McGrail's detailed October 31st e-mail. Physical limitations limit our attending the hearing. Now, the Board needs to understand the direct impact of the proposal on us and others. At the back of our home is the large input for the storm sewer outlet on Kensington Dr. This sewer over flows. We even had to install our own drainage tile within the city easement but it has covered much of our back yard. When I was physically able I dug additional drainage in the woods to help with the water flow but the floods continued. Thankfully, the city has tried to clear the input but they do not go beyond the easement .
> Please understand the storm sewer is not addressed in the ludicrous "60 foot" set back. It needs to be over 120 feet to cover the area I dug years ago. We ask: Is the developer going to replace the sewer and back fill our yard when the tightly connected "rentals" drain in spite of "mounding"? I am familiar with "spot zoning"; this proposal will destroy our neighborhood.
> Sincerely,
> Larry Schneider and Cheryl Schneider, 165 Kensington Dr. 740-417-9238

Last night a large tree fell from the Addison property on to my neighbor and the relatively minor storm led to water that was close to flooding. We believe there are numerous trees that had fallen or are in bad shape. If the good trees are not left within around at least 300 feet or more there will be nothing stopping the flow of water leading to more flooding on Kensington Dr. and elsewhere.
Thanks for your time and making this part of the record for December 15, 2021.

Larry and Cheryl Schneider

P.S. I have numerous pictures but I am 80 and my Outlook is out of date. At least here is the tree:

Virus-free. www.avast.com

Elaine McCloskey

From: Sara Anderson <saradanderson@gmail.com>
Sent: Sunday, December 12, 2021 7:28 AM
To: David M. Efland; Elaine McCloskey
Subject: Fwd: Plea for Responsible Development (for Public Comment)

Caution! This message was sent from outside your organization.

FYI -- I didn't see either of you on this email or the next one I'm about to send.

Thanks and I'll see you both on Wednesday!

--sara

---------- Forwarded message ---------
From: **Diane Mungovan** <themungo5@me.com>
Date: Sat, Dec 11, 2021, 5:48 PM
Subject: Plea for Responsible Development (for Public Comment)
To: <saradanderson@gmail.com>, Tajudeen Bakare <tbakare@ctconsultants.com>, <criggle@delawareohio.net>, <stacy_simpson1976@yahoo.com>, <cstaver@ymail.com>, <stroud_g@yahoo.com>
Cc: CMO <CMO@delawareohio.net>

December 10, 2021

Dear Delaware City Leadership and Planning Commission Members,

"Do unto those downstream as you would have those upstream do unto you." - Wendell Berry

I've been told our city leaders feel inundated with emails regarding the proposed Addison Development and perceive many of the letters to be attacking development. This is not nor has it ever been my (or my neighbors) intention. We just long to be heard. To have our concerns for the Addison development and all future developments in the city to be taken seriously. We want to fully explain our thoughts and reasoning for many of the changes we wish to see occur. We want to know our concerns are being taken seriously and will be included in the conversations as you fully consider the Addison proposal.

Our requests are simple and straightforward - especially if addressed at the planning stage.

1. Move Merrick Parkway and the round-a-bout with Bruce Road further north of Shelbourne Forest. Preserve the wetlands, stream and tree canopy that lay between the homes on Executive Blvd. and Merrick. Make the area a conservation easement - which has tax benefits to the developer - or turn it into a park for all residents to benefit from.

2. As past developers have done successfully in Shelbourne Forest, **preserve the watershed and the tree canopy**. (Addison has done this to an extent in sub-area C & D). Build with nature. Take advantage of properties being adjacent to mature trees not only for increased property values, but for the sake of improved air and noise pollution control. Note the Shelbourne Forrest nature path as well as the land preserved between Rutherford and

Federal Circle. Look at the proposed Wickham Development that successfully integrated preserving the streams and trees while still building homes in sub-area E (as well as F & G)

Developments across the city need to fully consider future environmental impact. The days of clear cutting and forcing the land to do what developers wants versus working with the land should be behind us. We don't have 20-50 years for the tree canopy to mature. We need the old growth canopy now to help capture carbon emissions - especially as the city grows - adding more people and more cars. Do not allow the clear cutting that happened at Coughlin Crossing to happen at the Addison property.

3. In the area directly **south of Oakhurst place single family homes** and/or owner occupied free standing condo units - not high density or rental units. (sub-area E) Consider larger treed lots for single family homes (1/2 to 5 acres) - they go for a premium!

Move the 52 acres of rental units to be built by Redwood that Addison is proposing to go in that location to the 52 acres along the western portion of the property (subarea A & B)— away from existing homes and in an area that is primarily farm fields so no clear cutting of trees would be required. THIS WAS ALSO A STAFF RECOMMENDATION.

4. In the area next to Route 23 (sub-area G and F), instead of an unneeded gas station and retail, Addison can place offices and more high density housing. We understand the city has stated it would like higher density housing to be located closer to 23. Higher density here could be exchanged for more tree preservation in the form of conservation easements or natural parks that the high density units would be built around.

"May we speak in all human councils on behalf of the animals, plants, and landscapes of the earth." - John Seed

Please do not dismiss us or our concerns. We are doing our best to stay informed and to follow the process set in place by our city government. The Addison Development - if left as is (as of 12/1021) - would adversely impact so many of our lives and the lives of others in Delaware.

So in summary - please . . .
1. Move Merrick Parkway further north
2. Preserve the watershed corridors and the mature tree canopy. Build around and with the current landscape. Form conservancy easements or natural parks.
3. Place like housing next to existing housing
4. Place high density housing away from existing homes - place along route 23 (G) and the western portion of the development (A & B)

Thank you for reading this and taking my and my neighbors concerns seriously. We do appreciate all that you do for our city.

Sincerely,

Diane Mungovan
937 Executive Blvd.
Delaware, Ohio 43015

Elaine McCloskey

From: Sara Anderson <saradanderson@gmail.com>
Sent: Sunday, December 12, 2021 7:29 AM
To: David M. Efland; Elaine McCloskey
Subject: Fwd: Benefits of Preserving Trees in Addison Property and All of Delaware (for public comment)

Caution! This message was sent from outside your organization.

---------- Forwarded message ---------
From: **Diane Mungovan** <themungo5@mac.com>
Date: Sat, Dec 11, 2021, 5:53 PM
Subject: Benefits of Preserving Trees in Addison Property and All of Delaware (for public comment)
To: <saradanderson@gmail.com>, Tajudeen Bakare <tbakare@ctconsultants.com>, <criggle@delawareohio.net>, <stacy_simpson1976@yahoo.com>, <cstaver@ymail.com>, <stroud_g@yahoo.com>
Cc: CMO <CMO@delawareohio.net>

Dear Delaware City Leadership and Planning Commission Members,

"The wild places are where we began.
When they end, so do we." - David Brower

Trees make the world a more beautiful place. Mature trees provide shade, shelter, and serenity. Their benefits are endless yet below is a listing of some of the key benefits of trees. These reasons are **why we need to preserve the mature tree canopy in the Addison Development area, especially those among the wetlands and along the stream corridors - all part of the vital Olentangy watershed.**

Provide Oxygen
A single mature tree provides one day's worth of oxygen for a family of four.
In one year an acre of mature trees can provide enough oxygen for 18 people.

Combat Emissions
A mature tree can absorb 1 ton of carbon over its lifespan - this is like erasing 11,000 miles of car emissions.
In one year, an acre of mature trees absorbs the same amount of CO_2 produced when you drive your car 26,000 miles.

Clean the Air
One acre of trees has the ability to remove up to 5 tons of carbon dioxide and up to 13 tons of other particles and gases annually. A single tree might absorb up to 1 ton of carbon over a 40-year life span. Everyone benefits from cleaner air.

When trees are cut - much of the carbon stored within them is released into the air and all their benefits are lost.

Trees also absorb dust and wind and reduce glare

Save Money and Energy
Properly placed tree cover in urban areas can save cities millions of dollars annually in stormwater management, air purification, and energy conservation costs.

Carefully positioned trees can save 25 to 30 percent of energy consumption. Deciduous trees are the most beneficial for energy savings since they provide shade in the warmer months and let the sunlight shine through in the colder months.

Near homes they can reduce energy costs by up to 20%.

Trees can help cool cities by 10 degrees. They provide shade and break up "heat islands" created by roads, parking lots and buildings.

Natural Coolant
One mature tree has the same cooling power as 15 room-size air conditioners. Trees lower surface and air temperatures and through their leaves release water vapor into the air.

Filter Stormwater
One hundred mature trees can capture up to 100,000 gallons of rainfall per year. Mature trees filter water, reduce runoff (that pollutes and erodes soil) and naturally control flooding.

Forested watershed - like the area in question - in addition to absorbing rain and runoff, and filtering pollutants, also replenishes underground aquifers.

Increase property value
Homes with and bordering mature trees sell more quickly and for a high price.

Reduce Stress
According to Morton Arboretum, the sight of trees reduces blood pressure, exposure to trees makes children less stressed, and drivers who can see trees are less frustrated.

Aid Good Health
Trees reduce illnesses - studies show access to trees speeds up healing times. Other studies conclude being near and seeing trees slows heartbeats, lowers blood pressure, and relaxes brain wave patterns.

A well-placed tree can also block noise by up to 40 percent according to North Carolina State University. They help to muffle sounds from streets and roadways and provide privacy.

Lower Crime
Trees in the environment also reduce crime. University studies have shown a reduction in minor crimes as well as domestic aggression and violence in neighborhoods with more trees.

Benefit Wildlife
Trees provide vital habitat for a wide variety of birds, wildlife, insects, and other flora and fauna necessary for a healthy world.

Let's give trees the credit they deserve. Taking good care of Delaware's trees now will ensure that residents can enjoy their many benefits for years to come.

Natural areas are necessary for a healthy community.

Sincerely,

Diane and Michael Mungovan

937 Executive Blvd.
Delaware, Ohio 43015

Information gathered from -
brightview.com, and arborday.org and treepeople.org

More info also on canopy.org

Elaine McCloskey

From: stacy simpson <stacy_simpson1976@yahoo.com>
Sent: Sunday, December 12, 2021 3:06 PM
To: Elaine McCloskey
Cc: David M. Efland
Subject: Fwd: Addison Suggestions

Caution! This message was sent from outside your organization.

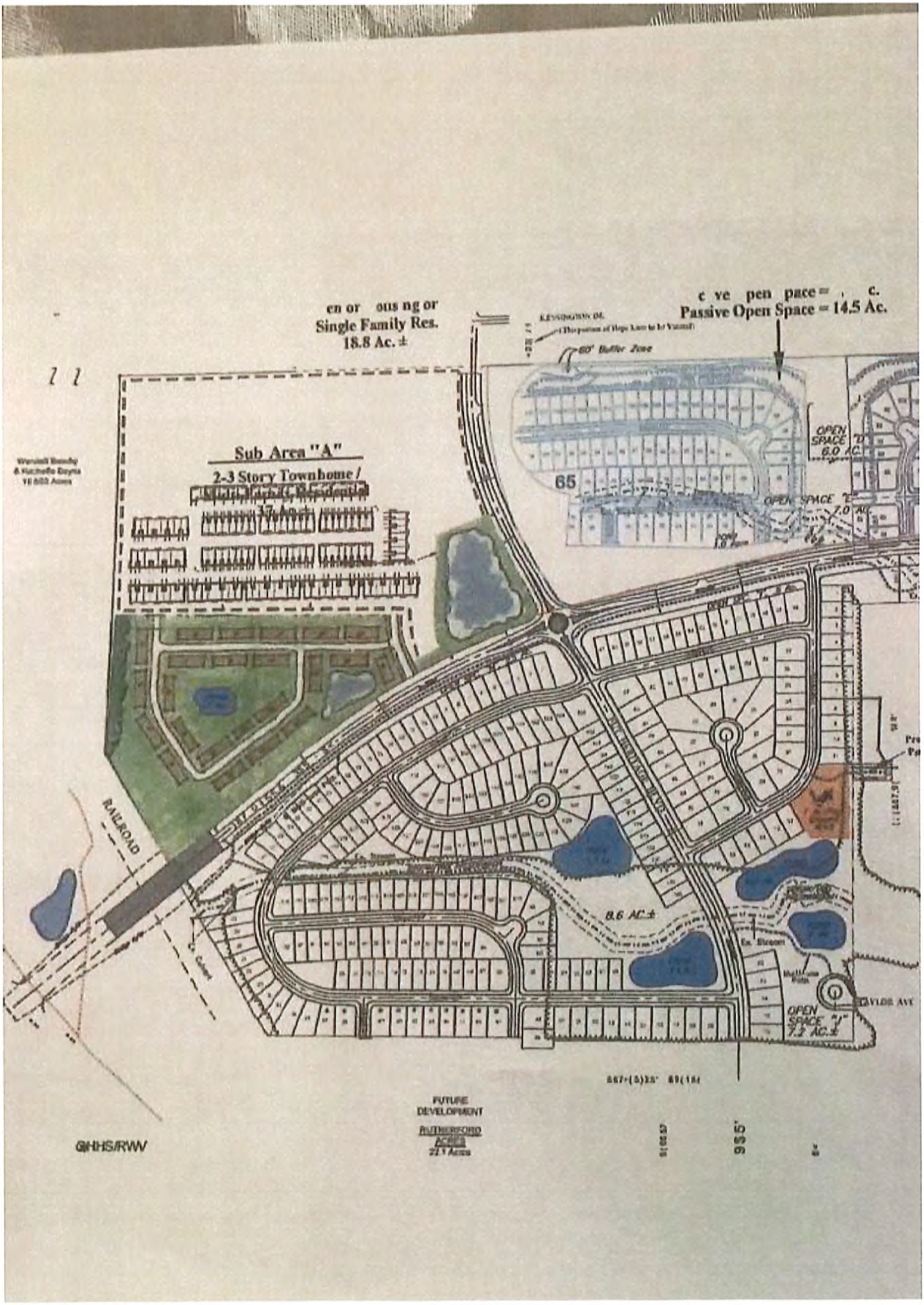
Hi Elaine,
Sharing this with you as you we're not copied. Please see below.

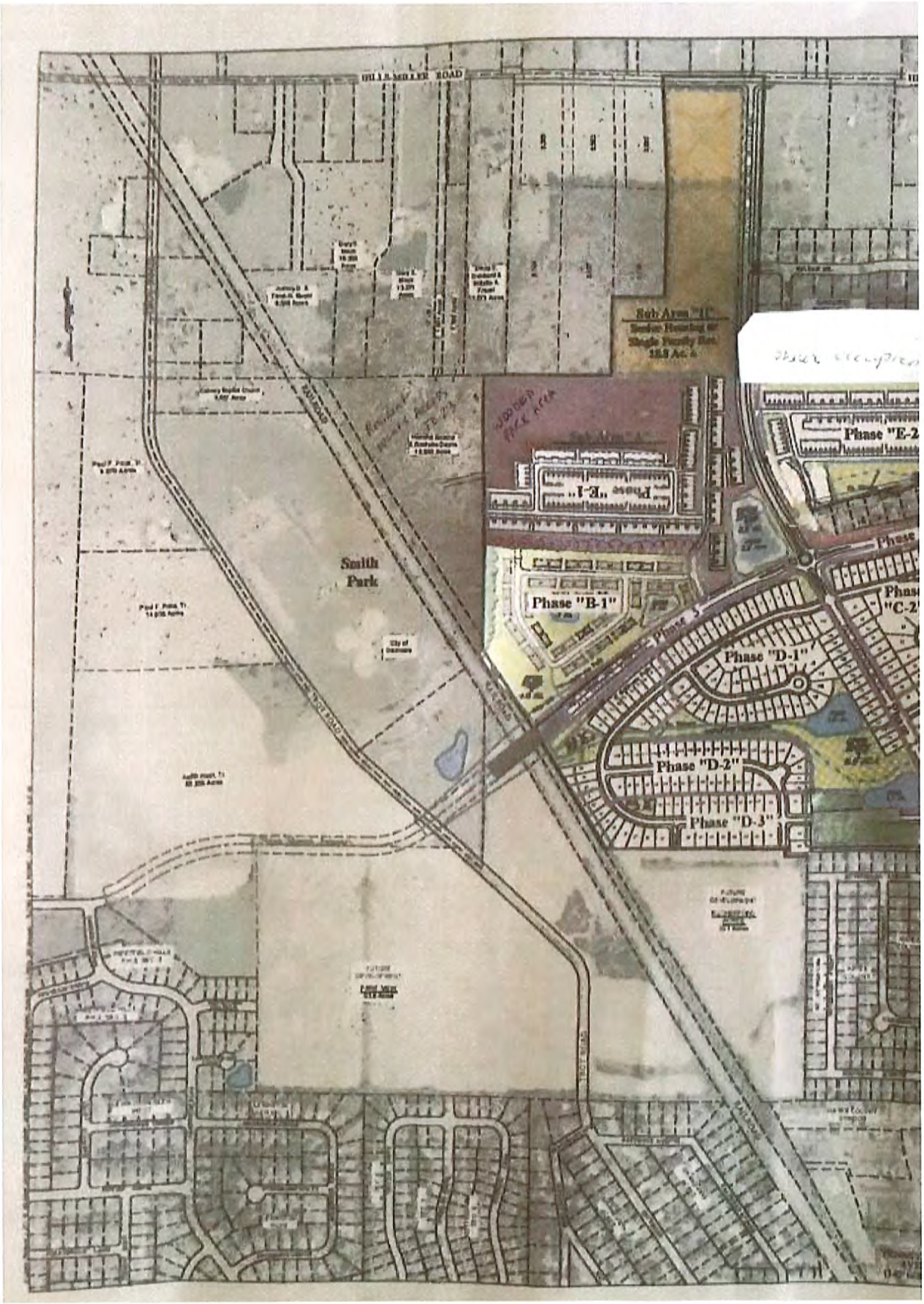
Sent from my iPhone

Begin forwarded message:

> **From:** Stephen Tackett <stackett@delawareohio.net>
> **Date:** December 12, 2021 at 12:22:33 EST
> **To:** stacy_simpson1976@yahoo.com, Sarah Fitzgerald <sfitzgerald@municipalcourt.org>
> **Subject: Fw: Addison Suggestions**
>
> Good afternoon planning members, I hope this email finds you well.
>
> I've been asked by residents of the first ward to forward this list of suggestions to you for your consideration.
>
> Thank you for your time.
>
> ---
>
> **From:** Stephen Tackett
> **Sent:** Sunday, December 5, 2021 7:36 AM
> **To:** jaf@addisonprops.com <jaf@addisonprops.com>
> **Cc:** Stacy B. Chaney <sbchaney@gmail.com>; jim masker <masker.james@gmail.com>; Jen Jenkins <jlphillips83@hotmail.com>; godnabr@edspot.us <godnabr@edspot.us>
> **Subject:** Addison Suggestions
>
> Good morning Mr. Friedman. Attached you will find suggestions from residents of Shelbourne and Oakhurst that I believe are reasonable and have merit.
>
> Some of the largest changes you'll see is moving apartments/townhomes into plots F and G, bringing them closer to the 23 corridor making that style of housing more uniform with what you would see anywhere else on 23.
>
> The redwood apartments have been moved into plot A, with single family residential housing replacing redwoods former pod bringing like housing to like housing.
>
> Merrick has been suggested to move another 165 feet, further easing the burden it has on current residents.

These suggestions emphasize natural resource preservation, consideration of current residents well being and thoughtful planning. Thank you for your time and consideration of these suggestions brought forward by the
residents.


en or ous ng or
Single Family Res.
18.8 Ac. ±
c ve pen pace = , c.
Passive Open Space = 14.5 Ac.
60' Buffer Zone
Sub Area "A"
2-3 Story Townhome /
OPEN SPACE 6.0 AC.
65
OPEN SPACE 7.0 AC.
RAILROAD
8.6 AC.±
OPEN SPACE 7.7 AC.±
FUTURE DEVELOPMENT
RUTHERFORD ACRES
22.1 Acres


Smith Park
Phase "B-1"
Phase "D-1"
Phase "D-2"
Phase "D-3"


Sub Area "H"
Senior Housing or
Single Family Res.
Smith
Park
Phase "B-1"
Phase "D-1"
Phase "D-2"
Phase "D-3"

From: Debbie Harris
To: Elaine McCloskey
Subject: Addison Property Development
Date: Monday, December 13, 2021 9:42:26 AM

Good morning,

My name is Debra Harris. My husband Warren and I live at 538 Rutherford Ave here in Delaware. I was born in Delaware and have enjoyed living my entire life practically, in this county as did my folks. As you know the Addison Development has been a big topic of discussion in my neighborhood. For good reason. We are very concerned about the development and what it will mean to our community. The loss of so many trees could be devastating. I have a Columbia Gas bill that says for the amount of natural gas my home alone uses, it would take 15 trees to counter the negative effects it creates. I've read and looked over the planning commissions agenda and would like to submit my thoughts for that meeting.

The green space being kept is a wonderful thing. However, the number of trees that are going to be destroyed is of major concern as is the PMU request. Delaware has had an awful lot of good people that have represented the people over the years. I'm grateful for those who devote their time, efforts and energy in trying to make this town a better place for all. The decisions made by the Planning Commission, Shade Tree Commission, City Council, and others over the years were made in the best interests of the people. The homes that will be effected directly by this development are our concern right now. Not only those individual homes, including ours, but the area around the development as well. There are so ways to keep the beauty of this property and still allow for the development of Addison to move forward. There are guidelines that have been put into place by zoning that should not be overlooked or not adhered to because of greed. The smaller lots and more households in a small area are not the answer. We truly don't want to see our property values diminish because of this development. The woods behind our home were definitely a deciding factor in the purchase of our home. Granted they don't belong to us, however, we kindly ask that as many of the trees as possible be saved. Please don't allow for decisions to be made simply to benefit financially. Our primary concerns about this development are:

1) Require PMU zones to have the same tree preservation requirements as all other development zones, not reduced accountability. Preferably no PMU at all.

2) Require developers to provide data on tree removal impacts, such as by leveraging tree canopy assessment tools.

3) Find a more comprehensive way to assess tree removal so that trees smaller than 6" diameter are also included.

4) Incorporate natural resource goals from the City's comprehensive plan into the development practice now and make implementation of the natural resource overlays a high priority item.

Now is the time to be responsible and think about everyone effected by this development. Your decisions will directly effect so many people now, and in the future. We can never get back the beauty and health affording benefits of the wooded areas in this property if they are destroyed. Your sincere attention to this is greatly appreciated. We know you will make the right decisions. Our homes, our beautiful trees are in your hands.

Thank you for your help,

Debra & Warren Harris
538 Rutherford Ave
Delaware, OH 43015
740-815-9592

December 14, 2021

Dear Planning Commissioners, City staff, and associates of Addison Properties:

Thank you for your continued work on the Addison Farms development, and your attention to community concerns. While the land may belong to Addison Properties LLC, the land uses impact not only those residents who will live and work there but the existing residents of Delaware. It is good to see improvements in the plan that move in a positive direction.

Notably, improvements to the tree preservation requirements include the removal of the timbering exception, protection of trees 36" diameter or larger, the per lot tree fee, and the 2 trees per a dwelling unit requirement. To that last point, I welcome the planting of 1800-2000 replacement trees in addition to street trees for the 900-1000 planned dwelling units, and recognize the potential this has to help mitigate the removal of an estimated 5,300 trees (approximately 53 acres of forests) from Addison Farms.[1] It will take awhile for those 1.75" diameter replacement trees to grow to the size of the on-average 11" diameter trees removed from our tree canopy in Addison Farms, with approximately 3,500 inches of trees planted and 41,610-58,300 inches of trees removed (resulting in replacement of only 5-8% of trees by inches). Therefore, I would encourage the applicant and the City to look for more opportunities for tree preservation and replacement in Addison Farms.

I also want to express appreciation for the following features included in the plan: the playground in Open Space J, preservation of the forested area at the end of Taylor Ave, and the walking paths created through the natural areas.

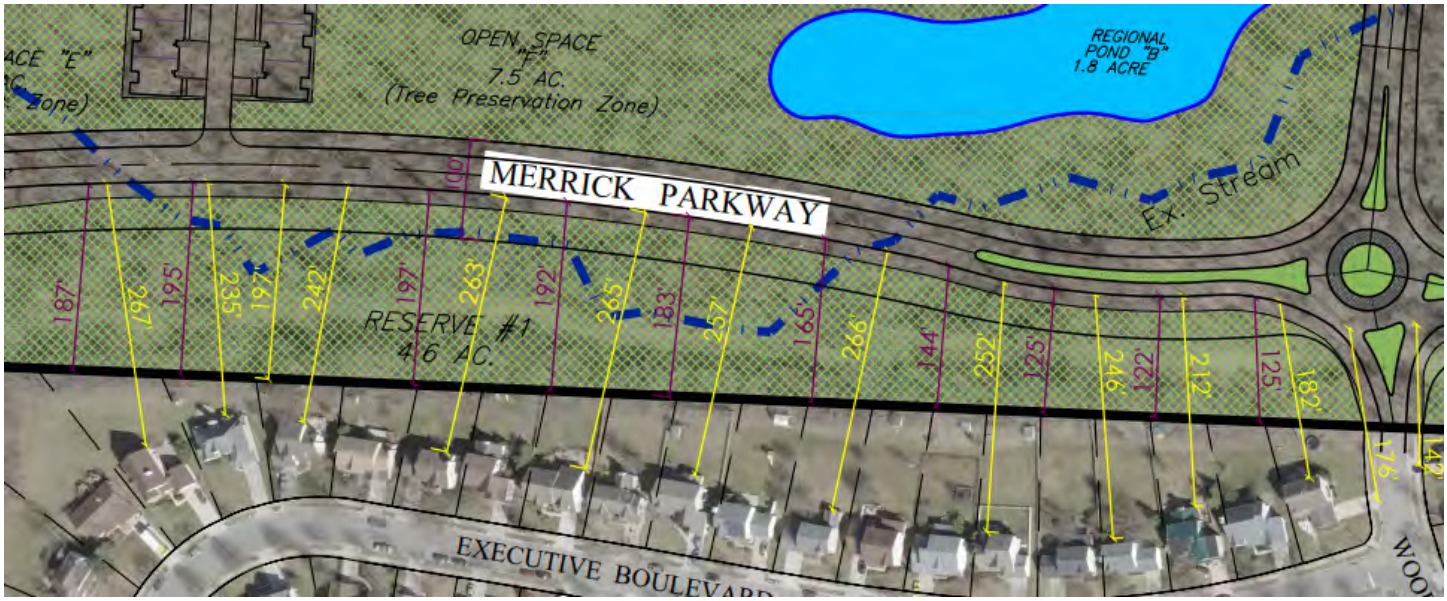
The City staff have included many important conditions to the approval of the Addison Farms case 2021-3845. In addition to support for many of them, I would like to express my strong support for: #3, 13, 14, second half of #18 (bike path along Merrick and evergreen planting in the farm lane), and #36.

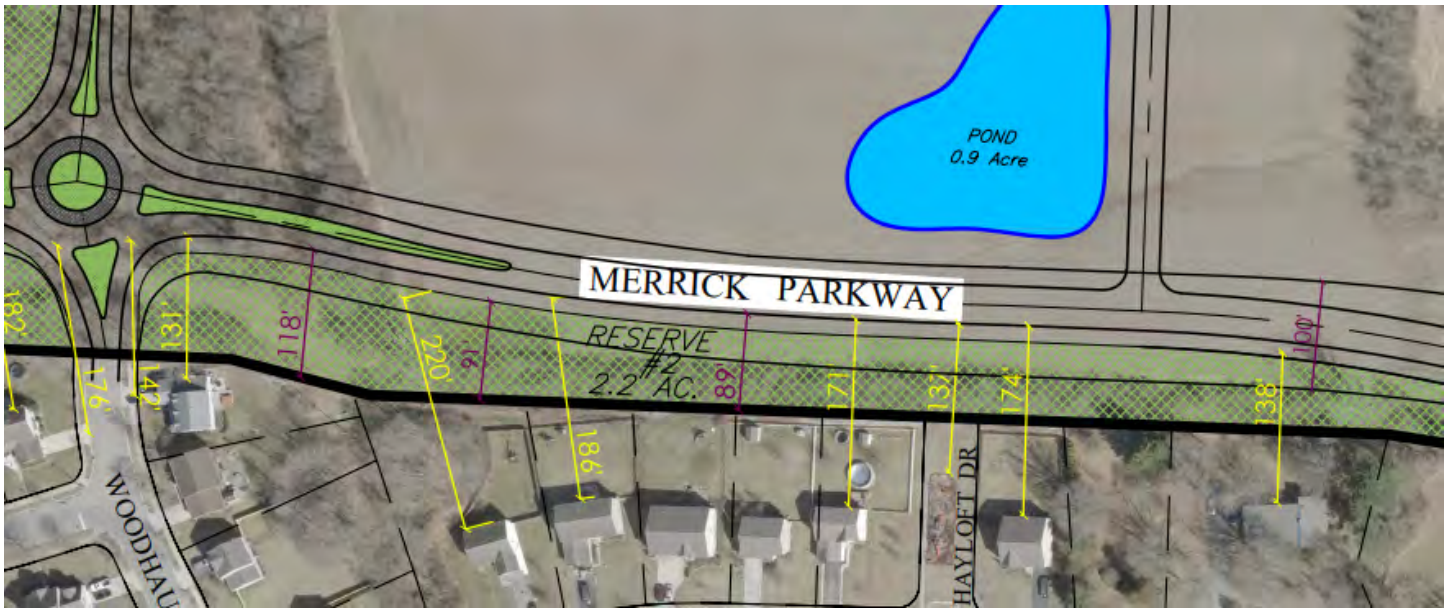
- #3: "Staff recommends as Sub Area planning proceeds that analysis should be done to consider moving the Merrick/Woodhaul/Bruce roundabout as far north as possible, while minimizing impacts on streams and trees, and that landscaping enhancements are incorporated in this roundabout area to provide the maximum buffering possible to the south while ensuring safety and site line visibility per the City Engineer."
- #13: "The five proposed single family lots located on the east side of Heritage Boulevard adjacent to the proposed park (Open Space J) shall be eliminated. The area of the lots represents 1 acre (bringing the park land to a total of 8.2 acres) and would result in a calculated total caliper inch preservation addition to the noted Tree Preservation of 1,066 inches."
- #14: "The proposed cul-de-sac at the end of Taylor Avenue shall be as small as possible to achieve compliance with City requirements."
- #18: … " bike path is placed along Merrick Parkway in this location [between Heritage and Woodhaul] (this would provide continuity with the rest of the path) additional evergreen planting shall be included in the farm lane to ensure year-round screening."
- #36: "Solar panels should not be restricted throughout the development."

[1] Tree removal calculations (all numbers from the tree survey and tree preservation / removal exhibit on p. 126-127 of the agenda packet): The tree replacement requirement of two trees per a lot for the 900-1000 proposed dwelling units will result in 1800-2000 trees replaced on site. In all Sub Areas, an estimated combined total of 3,677 trees will be removed. There is an estimated density of 99 trees per an acre. There will be an estimated 16.7 acres of trees removed for roads, sewer, and regional ponds, which equates to an additional 1,650 trees removed and not accounted for in the Sub Area calculations. Therefore the total number of trees removed is 3,677 +1,650= approximately 5,327 trees removed / 99 trees per an acre = approximately 53.8 acres of wooded area removed.

I have a few remaining areas of concern, and a few questions about the information provided on the development.

First, in considering the placement of Merrick Parkway, please note that the citizens have petitioned for this to be located away from existing properties at least the depth of the adjacent lot. Our petition submitted September 1, 2021, and containing 222 signatures listed this as our number one priority: “Move Merrick Parkway away from existing residences a significant distance, at least the depth of the adjacent lot.” As those of us who live here anticipated future development would entail a residential lot behind us before any roadways, as has been done throughout the city elsewhere, we feel this is a fair request. This distance is especially reasonable when you consider that Merrick Parkway has the potential to function as an arterial road for the city, making it larger and busier than a standard residential street. Keeping the road away from existing properties, and leaving trees as buffers for the sound and lights will be important to maintaining residents’ property values and quality of life. The residents and I have asked multiple times since Addison Farms was filed in October 2021 for the approximate measurement between back of property and right-of-way to Merrick Parkway at the narrowest point for each adjacent lot to be provided; this has not yet been done. Instead we have only been given measurements to the pavement (see below). Measurements to the right-of-way are important as the right-of-way contains the paths and sidewalks, and will include any future lanes for the road (with future lanes likely if Merrick Pkwy becomes the city’s designated northwest artery).

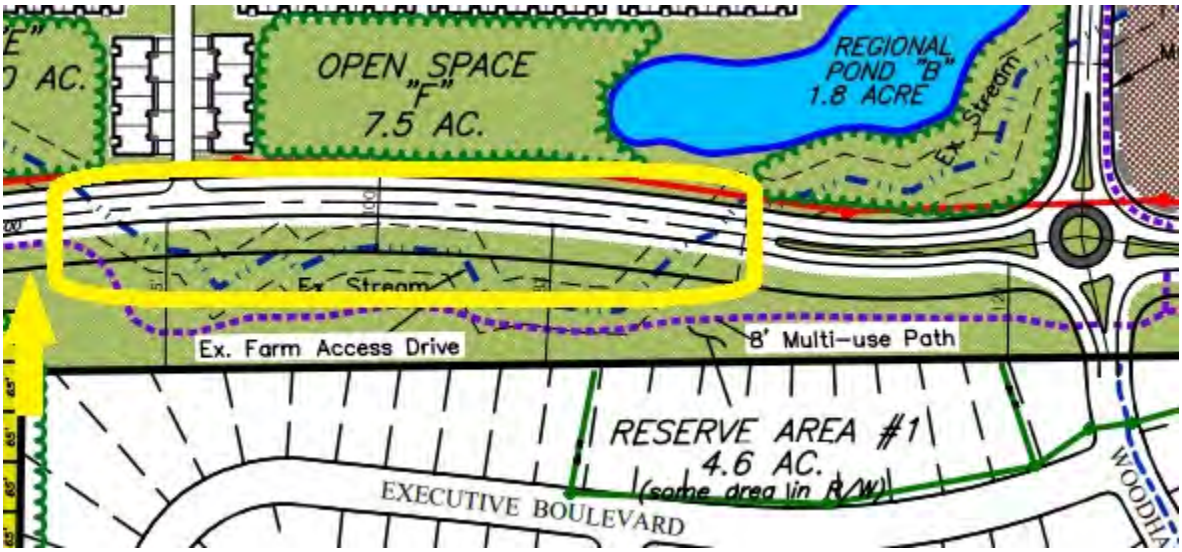




(Note on images above: The Merrick Parkway right-of-way is 100' and marked by the outer black lines; you can see one notation with a purple 100' mark that indicates the right-of way boundaries above.)

The pavement for Merrick Parkway is 36', which means the roadway sits 50-60' further north than the right-of-way boundary in these images. So it would appear that the distance to Merrick Parkway falls short of our reasonable request. For example, the easternmost marking for properties on Pinecrest Dr. has Merrick Parkway as 89' from the back of property to the pavement; subtract 50'-60' and the right-of-way for this road would be only 29'-39' away from the existing property line. Would the applicant please provide the distance between existing properties and the right-of-way for Merrick Parkway? This is important information to have in conversations going forward. And, more importantly, what can be done to meet the residents' reasonable request for distance and buffering that will maintain our property values, safety, and quality of life? Please move Merrick Parkway at least one lots' depth away from existing residents, approximately 165-200'. There are 999 linear feet between existing properties on the south and the northern boundary of Addison Farms; please respect existing residents and move Merrick Parkway further north.

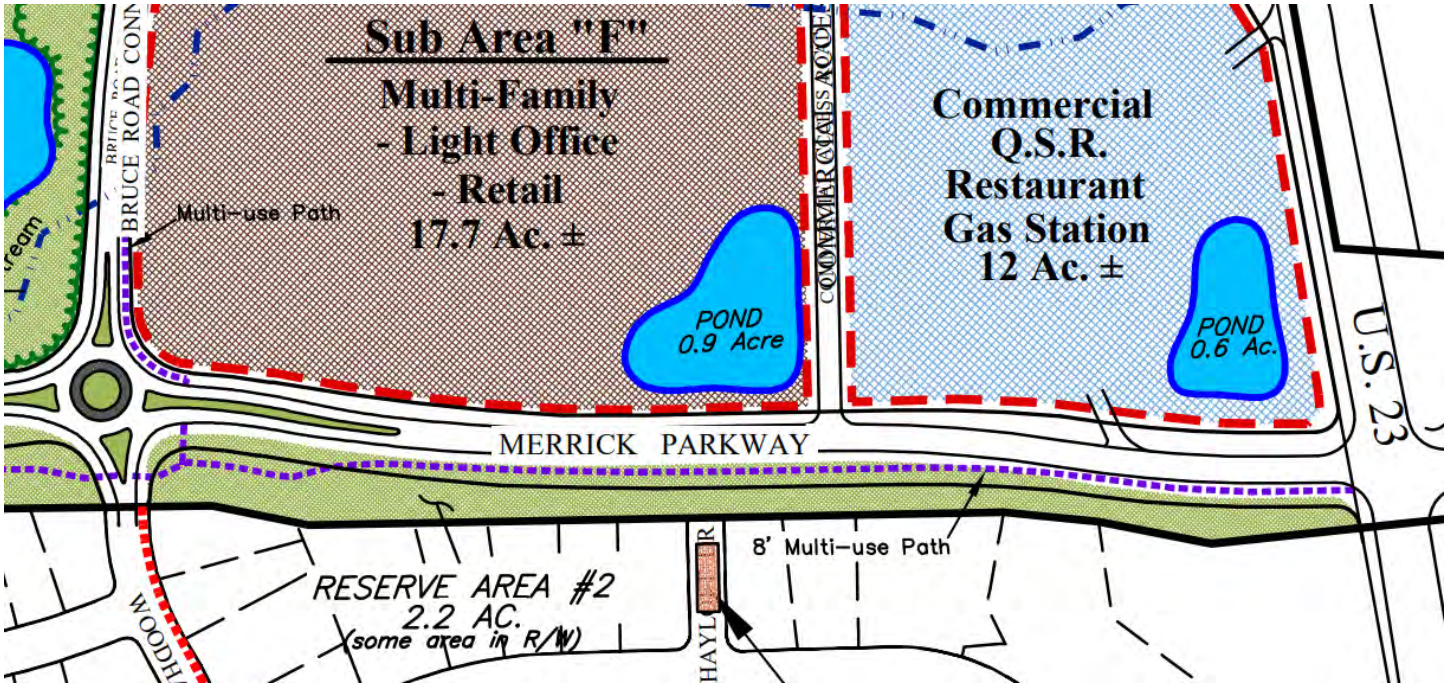
Moving Merrick Parkway further north would also help move it off the stream corridor. Between Heritage and Woodhual Dr., a significant portion of the Merrick Parkway right-of-way sits on top of the stream and its buffer zone, as shown in the following image (circled in yellow; the southern black line indicated with the yellow arrow marks the right-of-way boundary). This area of the stream corridor should be protected, as with all streams, but especially as it is a tributary to the Olentangy River.



The multi-use path on the southside of Merrick Parkway (as shown by the purple dashed line in the image above) should be put into the right-of-way for the entire length of Merrick Parkway, as well. Moving the multi-use path into the right-of-way will allow the tree reserve area south of Merrick Pkwy to provide the buffering and privacy it is intended to give. Otherwise, the multi-use path would be only 20' from existing property lines in the section shown in the image above. The multi-use path should move up into the right-of-way for Merrick Parkway and the existing farm access drive utilized for evergreen plantings to provide year-round buffering for existing residents.

Other neighbors have expressed concerns about the proximity of the Woodhaul/Bruce roundabout (shown on the right side of the image above). Although this moved marginally since the last plan, it does not appear to have moved enough to address safety concerns nor to provide adequate noise and light buffering from the cars and roundabout lighting posts. Please address these concerns, as well.

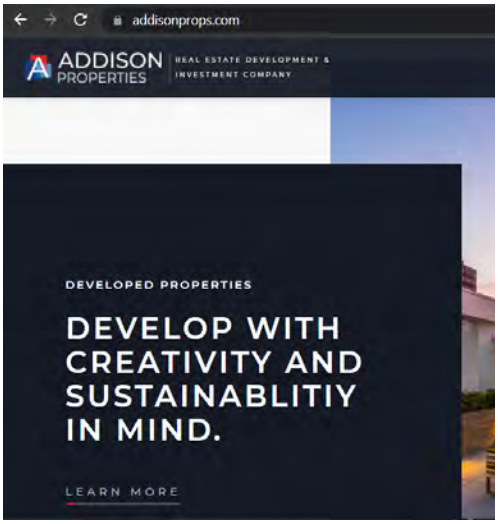
To the east of the roundabout, between Woodhaul Dr. and US23, Merrick Parkway comes even closer to existing property lines, as shown in the image below.



I would recommend that this move at least a lot's distance to the north (approximately 165-200 feet; lot depths can be found on the auditor's website). This section also currently has less trees due to an existing field; it would be appropriate that any area opened up that's not treed and not needed for mounds could be utilized for replacement tree planting. This would increase the number of trees on site, improve light and noise buffering, and greatly contribute to trees in Sub Area F. See image below for current tree plan; note the existing cleared area in the background for Sub Area F and G. A southern portion of Sub Area F and G should be utilized for tree planting when Merrick Parkway is moved more north. Most notably, Sub Area F is currently predicted to save 40% of the trees, a full 10% below the target. Creating a larger tree preservation zone to the south of Merrick Parkway could greatly improve the percentage of trees saved; it would also provide a tree bank site within the development. Also, the proposed commercial uses of Sub Area F and G would have large amounts of paved surfaces; more tree canopy can help counteract the heat island and microclimates caused by their parking lots.[2]

[2] "Paved surfaces, especially parking lots, occupy a significant proportion of the horizontal surface area in cities. The low albedo of many of these parking lots contribute to the urban heat island (UHI) and affect the local microclimate around them." From Sen, Sushobhan, Juan Pablo Ricardo Mendèz-Ruiz Fernandèz, and Jeffery Roesler. "Reflective Parking Lots for Microscale Urban Heat Island Mitigation." *Transportation Research Record* 2674, no. 8 (August 2020): 663–71. https://doi.org/10.1177/0361198120919401.

Another concern for Sub Area F and G would be the approval of a gas station for this development that would be in the Olentangy River watershed. Fueling stations create increased pollutants in rainwater runoff and can lead to petroleum contamination when underground tanks leak, degrading the water quality in our drinking water, rivers, and streams.[3] Addison Properties and Delaware should protect the Olentangy River and not put a gas station on this site. It's worth noting that the applicant has requested to expand the business district he purchased in order to find space to accommodate a gas station, so perhaps it's not inappropriate to ask the applicant to suggest other uses instead. Also, as stated on the Addison Properties website, we want solutions for land uses that can be developed "with creativity and sustainability in mind" (see image, right). Putting another gas station in the Olentangy River watershed is not sustainable.



In terms of sustainability, I would also ask the applicant to consider planting trees in the Smith Park extension that was recently dedicated to the City. This could help offset the tree canopy lost in the development site with the planting of trees in the immediate area. In the long-term, planting trees in the Smith Park extension will help improve the tree canopy in the First Ward, where Addison Farms is located.

I also think the public needs clarification on a few points.

(1) Is the easement reserve east of US 23 being counted towards the open space requirements for the development? (Should it be, due to lack of accessibility from the development?)
(2) What HOA would maintain the Hayloft Dr. pocket park, as suggested?
(3) It's stated that the school has projected 0.5 student per a dwelling unit; as currently zoned (R3 and A1), this would put their prediction at approximately 280 students for the Addison Farms area. The Community Impact Assessment for Addison Farms estimates it will create 420 students for Delaware City Schools. Can the schools handle the additional 140 students beyond what DCS would have projected?

Finally, I wish to ask the applicant to provide more lead time for public review of documents going forward. Receiving a 230+ page document on the Saturday afternoon before a Wednesday meeting does not give our Commissioners nor the general public the proper amount of time to read and review the material. This takes away from the intended effectiveness of our city's public review process, impacted even more so by the complexity of this development. Can we please establish a more considerate publication schedule going forward?

Thank you for your time and attention to these matters.

Sincerely,
Stacy Chaney-Blankenship,
943 Executive Blvd, Delaware, Ohio 43015

(revised and resubmitted 12/15/2021)

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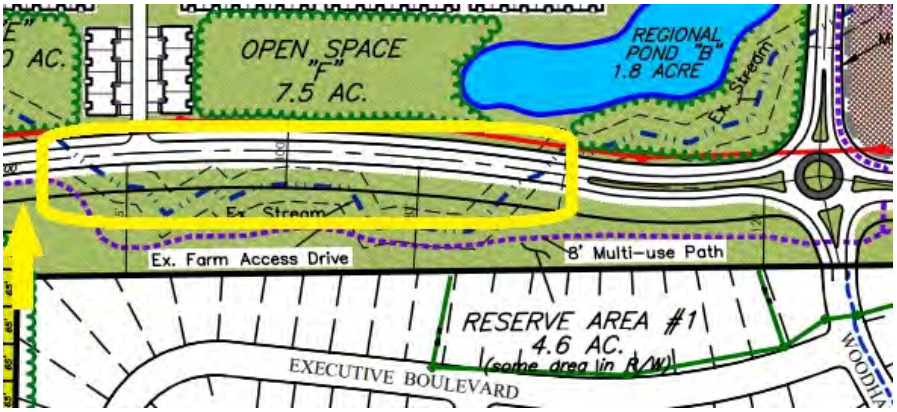
[3] "Fueling facilities generate stormwater runoff from precipitation such as rainstorms and snowfall. Runoff can transport solids, trace metals, hydrocarbons, road salts, trash and debris that may impair receiving water bodies." (EPA/600/R-20/214, September 2020) and "Of the estimated 450,000 brownfield sites in the U.S., approximately one-half are thought to be impacted by petroleum, much of it from leaking underground storage tanks (USTs) at old gas stations. These sites blight the surrounding neighborhoods and threaten human health and the environment. Petroleum can contaminate groundwater, the source of drinking water for nearly half of the U.S. population." from https://www.epa.gov/ust/petroleum-brownfields (last visited 13 Dec 2021).

From:	Stacy B. Chaney
To:	Elaine McCloskey; Sara Anderson; tbakare@ctconsultants.com; stroud_g@yahoo.com; stacy_simpson1976@yahoo.com; avolenik@gmail.com; Corey Staver; Carolyn Riggle
Subject:	Re: comments on Addison Farms for 12/15/21 Planning Commission
Date:	Wednesday, December 15, 2021 11:13:43 AM
Attachments:	image.png PDF 2021-12-14 public comment Planning Commission (updated).pdf

Caution! This message was sent from outside your organization.

Please see the edited version of my comments, attached.
The only changes are:

1) Corrected a typo and numbers in the third sentence of paragraph 2, which now reads: It will take awhile for those 1.75” diameter replacement trees to grow to the size of the on-average 11” diameter trees removed from our tree canopy in Addison Farms, with approximately 3,500 inches of trees planted and 41,610-58,300 inches of trees removed (resulting in replacement of only 5-8% of trees by inches).
2) Updated the graphic on p.3 using the development map that has the stream buffer zone marked:



3) Edited for clarity the paragraphs immediately before and after the image shown above.

Please let me know if you have any questions. It's a complex development, so I'm not sure that I'm not sure I've explained my concerns adequately. I would be more than happy to clarify anything.

Clerk: You may submit just the revised version into the record, as far as I am concerned, but I defer to your judgment.

Best,
Stacy

On Tue, Dec 14, 2021 at 12:43 PM Stacy B. Chaney <sbchaney@gmail.com> wrote:

> (Attached as PDF so the images render correctly.)
> Thanks,
> Stacy

From:	Jeff Easterday
To:	Elaine McCloskey
Cc:	Gloria Easterday
Subject:	Addison development public comment
Date:	Tuesday, December 14, 2021 2:58:06 PM

>From Jeff Easterday
319 Sylvan Drive

I have several concerns that I would like to address. I am a native of Delaware and, except for a few brief periods, a lifelong resident.

1). Keep Sylvan Drive closed (do not connect to the development). Oakhurst has long been a quiet retreat type of neighborhood. About half of the neighborhood does not have sidewalks. Increasing the traffic onto the Oakhurst area streets without sidewalks could impose safety hazards for adults and children. Many residents walk the neighborhood using the streets.

2). Move the extension of Rutherford further away from the Oakhurst neighborhood. The neighbors at the western end of Oakhurst would have a new street behind their homes with only a 30 foot buffer zone. While they may have expected similar low density residential use behind their homes someday, no one expected a new thoroughfare to be built so close behind their homes. Obviously they knew they may not be able to retain the quiet woods behind their homes, but they expected any change of use to be comprised of similar quality, low density homes.

3) do not build the apartment community directly south of Oakhurst. The area south of Oakhurst should be used for similar quality, low density homes and not multi family buildings. The new area should complement and blend in with the existing higher quality low density, large lot adjacent neighborhood in Oakhurst.

I strongly urge the City officials not to allow development not to proceed in a manner that is detrimental to the existing neighborhoods. I understand that development is inevitable but I encourage you to guide the process to ensure that the area quality and amenities are enhanced and not deteriorated.

Sent from my iPhone

From: Dave Grayum
To: Elaine McCloskey
Subject: Public comment for the record Addison development
Date: Wednesday, December 15, 2021 9:03:13 AM

Good morning,
I will keep this short as I have already emailed council members and zoning members individually.
I would like to voice my complete opposition to the Addison properties development plan. I feel that this development is completely wrong for our community. Briefly here are the reasons.
Far too many multi family units. These will further the overcrowding of our schools. Over time multi family has proven to turn into the problem areas for all of our first responders.
Over time this will effect community property values as well.
The Merrick extension is still far too close to existing homes.
The fact that Addison wants to utilize our tax dollars to fund portions of their development is absolutely absurd. In no way should our taxes fund a private development. If they want to make money they can front all of the costs.
The lot sizes of single family lots is too small and does not match existing lots in our community.
In all I feel that Addison will reap the dollars of our community while leaving us holding the bag in the future. We will be left dealing with overcrowded schools, blighted multi family housing and first responders who will be over worked.

Thank you for your time,
Dave Grayum
68 woodhaul ct
Delaware Ohio
43015

From: Meghan Hartranft
To: Elaine McCloskey
Subject: For public comment
Date: Wednesday, December 15, 2021 9:44:22 AM

Caution! This message was sent from outside your organization.

Good morning. I am writing today to express my concerns of the possible Addison development and Merrick Extension.

While I am not opposed to careful and thoughtfully controlled development, I am wholly against what Addison is proposing.

As it stands, Addison seems to care only about how much money they can make. This is understandable as they are not local, and as a business they are looking for maximum profit. This is evident by the high number of multi family housing proposed, the small lot sizes for the single family homes, and no regard for the existing tree canopy, wetlands and waterways.

Delaware is already bursting at the seams. This is evident by heavy rush hour traffic, overcrowded schools, and an infrastructure that doesn't keep up with current needs.

By adding hundreds upon hundreds of multi family units, our schools are not going to be able to keep up with demands, let alone bussing. Down the road, what was once a nice apartment complex will go down hill like most do, attracting crime. This will tax both police and fire resources. You don't even need to look to Columbus for examples; there are plenty here in Delaware that started off nice and are now molding dumps.

We then learned that Addison wants to use OUR tax dollars to help fund their project. This is unacceptable. If they want to set foot in this town then they can finance their entire project with their own money. While they are at it, they are more than welcome to build us a new elementary school and lease it to the city for the low cost of a dollar per year for 100 years.

Lastly, they want to develop in existing flood areas, demolish the tree canopy above Executive Blvd, and further pollute the waterways that make their way into the Olentangy River.

As I previously stated, I am not against careful and thoughtful development. I believe that if Addison is allowed to develop on the land, it should be mostly single family homes with large lots, to match those in Shelbourne Forest and the Oakhurst neighborhood to the north. If any multi-family is put in, it should be condo's and not 500+ unit apartment complexes.

My neighbors and I all pay a lot of money to live in this neighborhood for a reason. It is quiet, it is surrounded by mature trees, and the worst traffic we get is cars cutting through between Hayes Colony and 23.

Please do not approve the existing Addison plans. Please put your foot down and fight for YOUR community. Fight for schools that aren't overcrowded. Fight to keep home values stable and not brought down by this development.

Respectfully submitted,

Meghan Grayum
68 Woodhaul Ct
Delaware, OH 43015

From: Becky Wolff
To: Elaine McCloskey
Subject: Addison Properties
Date: Wednesday, December 15, 2021 12:30:09 PM

Caution! This message was sent from outside your organization.

Hi. My name is Becky Wolff and I live on Sylvan Drive in the Oakhurst neighborhood. Regarding the Addison development proposal, I remain deeply disappointed that the map still shows rental apartments (or possibly condos) running parallel to homes on Kensington Avenue. I thought the city required that "like" be built next to "like" buildings. Any type of rental in that location will almost certainly lead to devaluation of the $250,000+ homes along Kensington.

I'm not opposed to apartments. I just don't think they should be built next to existing homes. Instead, put them next some of the new homes that are too be built. That way, people will know what type of buildings are next to their home from the beginning. It will also help to retain the value of existing homes.

In addition, how are new city services going to be paid for? Road maintenance, schools, fire departments, etc? The schools are already over-crowded and building (and staffing) new ones is a major expenditure.

Thanks for listening to my concerns.

Regards,
Becky Wolff\
298 Sylvan Dr.

Elaine McCloskey

From: John McGrail <jmcgrail@mac.com>
Sent: Wednesday, December 15, 2021 1:10 PM
To: Elaine McCloskey
Subject: Public comment Dr John & Susan Mcgrail 268 Sylvan Drive Delaware Ohio City Plannng Meeting 12/15
Attachments: The request by Addison Properties LLC to grant a planned multi use overlay.docx

Caution! This message was sent from outside your organization.

https://www.epa.state.oh.us/Portals/35/nps/Approved%209-Element%20Plans/DelawareRun-OlentangyRiver_Ver1.0_6-29-2021.pdf

Also there are huge concerns over the impact on the Olentangy watershed & impact on the Delaware Run flooding. The Shroyer's mobile home park currently is at a flood stage that any additional water will be devastating.

Also the water run off from the storage facility on 23 north is like a river in a moderate rain storm crossing route 23. With just the pavement installed in this small facility a huge impact on water absorption & run off has occurred. With 271 acres of of development in the Olentangy Watershed without a preservation plan will be devastating in a multitude of areas.

It should also be noted that in a survey only 3 people in the Oakhurst Development were interested in the stub roads opening up @ Kensington & Sylvan and only to EMS, or if the apartments in Addison we not built for one resident. The majority (96 homes) are not in favor of opening Kensington & Sylvan.
The roads are 2 houses apart. Both do not need opened and the city had allowed Addison to take out several opening of roads in other neighborhoods yet no adjustment has been made for Oakhurst.

Our EMS & Fire response use route 23 N substation. Hook & ladder 303 uses 42 to 23 to service Oakhurst & hook & ladder 301 & 302 will use route 23 for quicker response as well.
The use of Heritage & Merrick will not be of any increased response time according to Lieutenant Wells to the Oakhurst Development.

The request by Addison Properties LLC to grant a planned multi use overlay (PMU) is inconsistent with and a violation of Delaware City code and zoning as well as the comprehensive City Plan.

The city plan and code indicates like housing and density is to blend with existing development or residential housing. For example, Oakhurst abuts 5.4 units per acre of high-density housing vs 1-2 units per acre.

There are no reasonable circumstances to justify a blanket zone change.

There is no evidence provided by the developer that the zone change will NOT AFFECT adjacent property values. If stub roads Kensington and Sylvan Dr. are opened to through traffic to route 23, housing values will plummet in Oakhurst subdivision. Most of Oakhurst has no sidewalks. Streets are walking paths and children stand in the street waiting for school buses. The streets can only be opened to emergency vehicles and properly gated or mounded.

There needs to be a written guarantee protecting home values. The city is to request a Bond from the developer for the full duration of development and construction. This Bond and guarantee should cover at least 10 years.

In addition, there are objections addressed by the City of Delaware staff that public services, particularly the police and fire departments are negatively financially affected by this development. There is evidence to support this in the 2 year 911 log from Seattle House apartments which has overwhelmed the police. 911 evidence was given to Mr Friedman and ignored.

Has the planning commission and city council factored in the 178 apartments approved for Coughlin Crossing in 2020.
Mr Efland is quoted in 2020 that the GATEWAY development (Coughlin Crossing) is a" handsome entrance into the city of Delaware along US 23"
It will take a lot of creativity to make this Delaware's Gateway. Thoughtful planning should do better.

Where is the money coming from to finance all of the proposed and approved high density housing in the city of Delaware?
City staff indicates police resources are impacted negatively by the proposed high density housing in Addison Farm.

Only ONE of the aforementioned reasons is sufficient to reject a zoning change by Planning Commission and City Council..

It is obvious that this 273 acre development will set a course for the city of Delaware for the foreseeable future and determine it's future.

The Delaware city staff report to the PLANNING COMMISSION for November, 3, 2021 and the public have raised many reasonable concerns including:

The TRAFFIC STUDY is still unfinished. Current traffic and travel Is reduced and constrained by COVID at the public and state level, rendering current counts and predictions grossly inaccurate.

TREE counts and removal of 90 to 100 acres of forest with predictable detrimental affects on

WATER ABATEMENT and the mandate for URBAN TREE CANOPY has not been resolved by the Delaware city staff. Reimbursement to the City of Delaware for tree loss could be bountiful and in the millions of dollars using Addison's tree counts.

ROADWAYS where they exit and terminate is a dilemma. Build it and they will come won't work here. Both potential exits for Merrick are problematic.
Building a railroad bridge won't work because NORTH travelers recross the railroad at Hills Miller road and SOUTH travelers hit a dead end at Central Avenue.
The same congestion exists for the Houck road intersections,
Merrick Pkwy intersects US Route 23 at a constriction and is not amenable to an interchange.
Merrick will be obsolete almost immediately. A better choice is to use existing TROY or HOUCK and HILLS MILLER road rightaways with a 23 exit north of Speedway which was proposed in 2015.

BIKEWAY, WALKWAY and PARKS are not fully vetted and resolved.

PUBLIC SERVICES are already impacted by the high density housing at Seattle House as evidenced by the 911 logs from the last two years.

Where is the introspection and imagination we expect from government and city officials?

A PMU fits nicely in certain circumstances such as the Short North, Grandview and the Bridge development in Dublin adjacent to River Road and Highway 161. A PMU does not fit the 273 acres at this level of discussion. There are too many unanswered questions as noted above.
Premature approval of the requested zoning change is not appropriate at this time.

A PMU for Addison Farms is not consistent with the city plan and city code drafted to prevent inappropriate development.

All of the questions proposed by the public and city staff have to be carefully addressed and answered before proceeding with a blanket zone approval requested by Addison Farms.

The future of Delaware City resides with your careful consideration.

Thoughtfully submitted.

Dr. John W McGrail

The request by Addison Properties LLC to grant a planned multi use overlay (PMU) is inconsistent with and a violation of Delaware City code and zoning as well as the comprehensive City Plan.

The city plan and code indicates like housing and density is to blend with existing development or residential housing. For example, Oakhurst abuts 5.4 units per acre of high-density housing vs 1-2 units per acre.

There are no reasonable circumstances to justify a blanket zone change.

There is no evidence provided by the developer that the zone change will NOT AFFECT adjacent property values. If stub roads Kensington and Sylvan Dr. are opened to through traffic to route 23, housing values will plummet in Oakhurst subdivision. Most of Oakhurst has no sidewalks. Streets are walking paths and children stand in the street waiting for school buses. The streets can only be opened to emergency vehicles and properly gated or mounded.

There needs to be a written guarantee protecting home values. The city is to request a Bond from the developer for the full duration of development and construction. This Bond and guarantee should cover at least 10 years.

In addition, there are objections addressed by the City of Delaware staff that public services, particularly the police and fire departments are negatively financially affected by this development. There is evidence to support this in the 2 year 911 log from Seattle House apartments which has overwhelmed the police. 911 evidence was given to Mr Friedman and ignored.

Has the planning commission and city council factored in the 178 apartments approved for Coughlin Crossing in 2020.
Mr Efland is quoted in 2020 that the GATEWAY development (Coughlin Crossing) is a" handsome entrance into the city of Delaware along US 23"
It will take a lot of creativity to make this Delaware's Gateway. Thoughtful planning should do better.

Where is the money coming from to finance all of the proposed and approved high density housing in the city of Delaware?
City staff indicates police resources are impacted negatively by the proposed high density housing in Addison Farm.

Only ONE of the aforementioned reasons is sufficient to reject a zoning change by Planning Commission and City Council..

It is obvious that this 273 acre development will set a course for the city of Delaware for the foreseeable future and determine it's future.

The Delaware city staff report to the PLANNING COMMISSION for November, 3, 2021 and the public have raised many reasonable concerns including:

The TRAFFIC STUDY is still unfinished. Current traffic and travel Is reduced and constrained by COVID at the public and state level, rendering current counts and predictions grossly inaccurate.

TREE counts and removal of 90 to 100 acres of forest with predictable detrimental affects on

WATER ABATEMENT and the mandate for URBAN TREE CANOPY has not been resolved by the Delaware city staff. Reimbursement to the City of Delaware for tree loss could be bountiful and in the millions of dollars using Addison's tree counts.

ROADWAYS where they exit and terminate is a dilemma. Build it and they will come won't work here. Both potential exits for Merrick are problematic.
Building a railroad bridge won't work because NORTH travelers recross the railroad at Hills Miller road and SOUTH travelers hit a dead end at Central Avenue.
The same congestion exists for the Houck road intersections,
Merrick Pkwy intersects US Route 23 at a constriction and is not amenable to an interchange.
Merrick will be obsolete almost immediately. A better choice is to use existing TROY or HOUCK and HILLS MILLER road rightaways with a 23 exit north of Speedway which was proposed in 2015.

BIKEWAY, WALKWAY and PARKS are not fully vetted and resolved.

PUBLIC SERVICES are already impacted by the high density housing at Seattle House as evidenced by the 911 logs from the last two years.

Where is the introspection and imagination we expect from government and city officials?

A PMU fits nicely in certain circumstances such as the Short North, Grandview and the Bridge development in Dublin adjacent to River Road and Highway 161. A PMU does not fit the 273 acres at this level of discussion. There are too many unanswered questions as noted above.
Premature approval of the requested zoning change is not appropriate at this time.

A PMU for Addison Farms is not consistent with the city plan and city code drafted to prevent inappropriate development.

All of the questions proposed by the public and city staff have to be carefully addressed and answered before proceeding with a blanket zone approval requested by Addison Farms.

The future of Delaware City resides with your careful consideration.

Thoughtfully submitted.

Dr. John W McGrail

Nine-Element Nonpoint Source Implementation Strategy (NPS-IS) for Delaware Run-Olentangy River HUC-12 (05060001 10 07)

Prepared for:

City of Delaware

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Version 1.0 Approved: June 29, 2021

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- John Krygier, Ohio Wesleyan University
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- Heather Doherty, Ohio Department of Natural Resources, Scenic Rivers
- Caroline Cicerchi, formerly of the City of Delaware

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Cover photo: Delaware Run at Ruth Melvin Preserve. Photo courtesy of Civil & Environmental Consultants, Inc.

Acronyms and Abbreviations

The acronyms and abbreviations below are commonly used by organizations working to restore Ohio's watersheds and are found throughout this NPS-IS document.

Numbers	
§319	Section 319 of the Clean Water Act
A	
ALU	Aquatic Life Use
B	
BMP	Best Management Practice
BOD_5	Biological Oxygen Demand- 5 day
C	
CRP	Conservation Reserve Program
CSO	Combined Sewer Overflow
D	
DO	Dissolved Oxygen
E	
E. coli	*Escherichia coli*
ECBP	Eastern Corn Belt Plains
ECHO	Environmental Compliance and History Online
EPT	*Ephemeroptera, Plecoptera and Trichoptera* – sensitive macroinvertebrate species
EQIP	Environmental Quality Incentives Program
EWH	Exceptional Warmwater Habitat
F	
FLOW	Friends of the Lower Olentangy
FLS	Federally Listed Species
FOTG	Field Office Technical Guide
FSA	Farm Services Agency
H	
HSTS	Home Sewage Treatment System
HTF	Hypoxia Task Force
HUC	Hydrologic Unit Code
I	
IBI	Index of Biotic Integrity
ICI	Invertebrate Community Index
M	
MARB	Mississippi/Atchafalaya River Basin
MHP	Mobile/Manufactured Home Park
MIwb	Modified Index of Well Being
MORPC	Mid-Ohio Regional Planning Commission

MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
MWH	Modified Warmwater Habitat

N

NH_3	Ammonia
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NPS-IS	Nonpoint Source-Implementation Strategy
NRCS	Natural Resources Conservation Service

O

ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
Ohio EPA	Ohio Environmental Protection Agency
OpTIS	Operational Tillage Information System
ORB	Ohio River Basin
ORBA	Ohio River Basin Alliance
OSU	Ohio State University
OWA	Olentangy Watershed Alliance

P

PAD-US	Protected Areas Database of the United States
PCR	Primary Recreational Contact
PSS	Project Summary Sheet

Q

QHEI	Qualitative Habitat Evaluation Index

R

RM	River Mile

S

SCR	Secondary Recreational Contact
SSO	Sanitary Sewer Overflow
SWCD	Soil and Water Conservation District

T

TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids

U

USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

V

VRT	Variable Rate Technology

W

WAP	Watershed Action Plan
WRP	Wetlands Reserve Program
WRRSP	Water Resource Restoration Sponsor Program
WQS	Water Quality Standards (Ohio Administrative Code 3745-1)
WTP	Water Treatment Plant
WWH	Warmwater Habitat
WWTP	Wastewater Treatment Plant

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CHAPTER 1: INTRODUCTION

The **Delaware Run-Olentangy River Hydrologic Unit Code (HUC)-12 (05060001 10 07)** is located in north central Delaware County and contains an area of 43.89 square miles (Figure 1). The **Delaware Run-Olentangy River HUC-12** contains a 6.6-mile segment of the Olentangy River, which flows from the Delaware Reservoir outlet (Delaware Dam) southerly through the watershed to eventually meet the Scioto River in the City of Columbus. The watershed is dominated by agricultural land use (68%), with a growing urban/residential area concentrated in the southern portion of the sub-watershed (~16%). The **Delaware Run-Olentangy River HUC-12** has been identified as an area of focus within the Ohio River Basin (ORB) due to the estimated loadings of total nitrogen that flows into the tributaries of the Ohio River, to the Mississippi River and its end-receiving waterbody, the Gulf of Mexico.

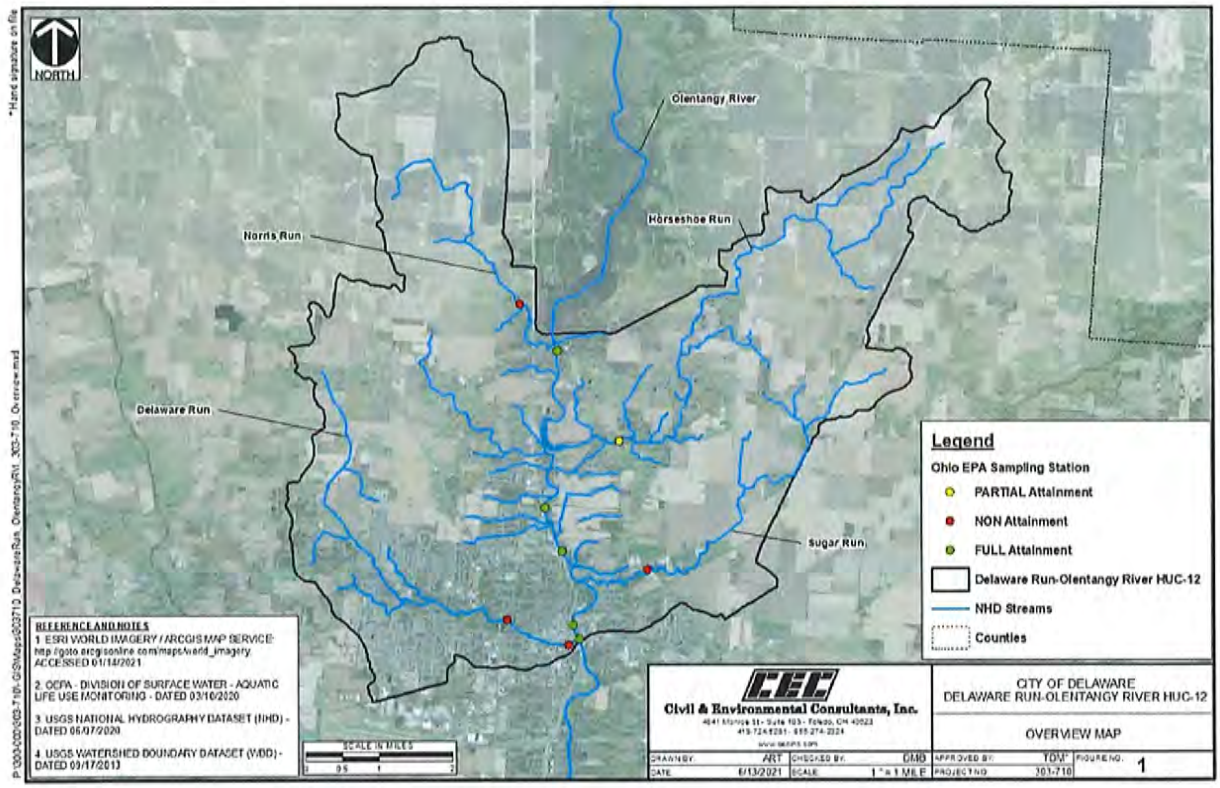

Figure 1: Delaware Run-Olentangy River HUC-12 Overview

1.1 Report Background

While watershed plans could be all-inclusive inventories, the US Environmental Protection Agency (USEPA) identified nine critical elements to include in strategic planning documents for impaired waters (Table 1). To ease implementation of projects addressing nonpoint source (NPS) management and habitat restoration, current federal and state NPS and habitat restoration funding opportunities require strategic watershed plans incorporate these nine key elements, concisely to HUC-12 watersheds. The Ohio Environmental Protection Agency (Ohio EPA) has historically supported watershed-based planning in many forms (Ohio EPA, 2016).

Table 1: Nine Elements for Watershed Plans and Implementation Projects

Element	Description
a	Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve load reductions
b	Load reductions expected from management measures described under element (c) below
c	Description of the NPS measures that need to be implemented to achieve load reductions estimated under element (b) above and an identification of the critical areas in which those measures will be needed to implement this plan
d	An estimate of the amounts of technical and financial assistance needed, associated costs and/or sources and authorities that will be relied upon to implement this plan
e	An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing and implementing the NPS management measures that will be implemented
f	A schedule for implementing the NPS measures identified in this plans that is reasonably expeditious
g	A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented
h	A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards
i	A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under element (h) above

(Source: USEPA, 2008)

In 1997, Ohio EPA issued guidance for the development of Watershed Action Plans (WAP), which typically covered larger watersheds (HUC-10 to HUC-8 size). The WAPs included an outline and checklist to ensure USEPA's nine elements were included within each plan. The USEPA issued new guidance in 2013 and concluded Ohio's interpretation for WAP development did not adequately address critical areas, nor did it include an approach that detailed the nine elements at the project level (Ohio EPA, 2016). In response, Ohio EPA developed a new template for watershed planning in the form of a Nonpoint Source-Implementation Strategy (NPS-IS), ensuring NPS pollution is addressed at a finer resolution and that individual projects listed within each plan include each of the nine elements. The first NPS-IS plans were approved in 2017. Over time, these plans have evolved to not only address in-stream (near-field) water quality impairment from NPS pollution, but they also address reductions in nutrient loadings to larger bodies of water (far-field).

Hypoxia Task Force

The State of Ohio is an active participant in the Mississippi River/Gulf of Mexico Hypoxia Task Force (HTF), a multi-state agency effort established in 1997 to understand the causes and effects of eutrophication in the Gulf of Mexico and coordinate activities throughout the Mississippi/Atchafalaya River Basin (MARB) to reduce the size, severity and duration and ameliorate the effects of hypoxia within the Gulf (USEPA, 2020). The HTF has outlined a goal to reduce nutrient loadings from major sources of nitrogen and phosphorus in the MARB by 20% by 2025. Ohio EPA's *Nutrient Mass Balance Study for Ohio's Major Rivers* (2020) has identified high nitrogen and phosphorus loads within the Ohio portion of the ORB, particularly from the Scioto River and Great Miami River watersheds, citing 82% and

83%, respectively, of the nitrogen load and 69% and 66%, respectively, of the phosphorus load in these two watersheds is from NPS contributions (Ohio EPA, 2020d).

Through the *State of Ohio's Domestic Action Plan*, state agencies modeled and estimated nutrient loads for NPS classifications (agricultural, home sewage treatment system (HSTS) and urban contributions) at the HUC-12 level within the northwestern portion of the state, underlining the state's commitment to nutrient reduction from all landscapes (OLEC, 2020). While this level of modeling has not yet occurred within the ORB, approximate loads from agricultural and urban landscapes, based upon nutrient loss literature and *Mass Balance* results, have been estimated for select HUC-12s within the ORB, including those in the Upper Scioto, Great Miami River, Little Miami River and Paint Creek watersheds as a beginning step in setting reduction targets to make progress towards HTF goals *(personal communication with Rick Wilson, Ohio EPA, November 12, 2020).*

Upper Olentangy Watershed Management and Action Plan

In 1999, the Olentangy Watershed Alliance (OWA) was formed through the collaborative efforts of private citizens, Ohio EPA, the Ohio Department of Natural Resources (ODNR) and The Ohio State University (OSU) Extension Office (OWA, 2006). Through a series of grants from state agencies, OWA was able to maintain a Watershed Coordinator and the group's efforts focused on planning a balanced approach for water and natural resources within the upper reaches of the Olentangy River watershed, an area burgeoning with growth and development. The plan provided a framework of strategies for stakeholders to adopt to ultimately achieve attainment of water quality goals and standards from all waterbodies contained within the Upper Olentangy watershed (OWA, 2006). This WAP was endorsed in 2006 and will be updated through the NPS-IS planning process, beginning with the **Delaware Run-Olentangy River HUC-12.**

Delaware Run-Olentangy River HUC-12 NPS-IS

The development of NPS-IS in watersheds contained within the ORB is critical to the efforts focused on implementing the HTF's goal to reduce nutrient loadings from major sources of nitrogen and phosphorus to the Gulf, as well as to meet state water quality standards and local goals. Development of NPS-IS within Ohio's portion of the ORB also aligns with goals established by the Ohio River Basin Alliance (ORBA) for abundant clean water and healthy and productive ecosystems in the Ohio River (USACE, 2020). The *Delaware Run-Olentangy River HUC-12 NPS-IS* will address NPS pollution by accounting for both near-field (within stream/watershed) and far-field (loadings to the Ohio River) effects. The *Delaware Run-Olentangy River HUC-12 NPS-IS* serves as an update to the *Upper Olentangy Watershed Management and Action Plan* and is sponsored and developed by the City of Delaware in collaboration with partners in the OWA, funded through a sub-grant from the Ohio EPA from the HTF.

Removal of NPS impairments, reduction in overall sediment and nutrient loss and restoration of streambanks, floodplains and wetlands within the **Delaware Run-Olentangy River HUC-12** is crucial to the attainment of aquatic life use (ALU) standards both within the Olentangy watershed and on a greater scale within the context of the Ohio River watershed, the Mississippi River and its end-receiving waterbody, the Gulf of Mexico. Within the **Delaware Run-Olentangy River HUC-12**, five biological

sample locations were established in the Olentangy River between sampling events conducted in 2011 and 2016. Assessments conducted during these years were undertaken to document water quality conditions after the removal of lowhead dam impoundments located at Panhandle Road (River Mile (RM) 28.2) in 2010, Central Avenue (RM 26.0) in 2008 and River Street (RM 25.8) in 2005 (Ohio EPA, 2020a). All five sites within the Olentangy River were found to be in *Full Attainment* of the Warmwater Habitat (WWH) designation. Tributaries within the **Delaware Run-Olentangy River HUC-12** were last sampled in 1999 (Delaware Run and Horseshoe Run) and 2003 (Norris Run and Sugar Run) to support Total Maximum Daily Load (TMDL) development. One sampling location was chosen in each of the aforementioned tributaries, except Delaware Run, which had two sampling locations. All tributary sites yielded *Non-Attainment* results for the WWH designation, except Horseshoe Run, which was found to be in *Partial Attainment*. This NPS-IS will be used to strategically identify and outline key projects that should be implemented within the **Delaware Run-Olentangy River HUC-12** to address management of NPS pollution to not only maintain or achieve attainment of Water Quality Standards (WQS) within the sub-watershed boundaries, but to also make progress towards far-field watershed goals on a larger scale within the greater ORB, MARB and Gulf of Mexico.

1.2 Watershed Profile & History

The land area contained within the **Delaware Run-Olentangy River HUC-12** is part of the larger Scioto watershed (0506). The Scioto watershed is located in the central to south-central region of Ohio and drains a total of 6,517 square miles (ODNR, 2001). The Scioto River is approximately 239 miles[1] in length, flowing from Hardin County in northwest Ohio, through Columbus, to empty into the Ohio River at Portsmouth. Along its course, the watershed is broken into three HUC-8 basins: the Upper Scioto (05060001), Lower Scioto (05060002) and Paint Creek (05060003). The Upper Scioto watershed is broken into 23 sub-basins at the HUC-10 level, including tributary watersheds for Big Darby Creek, Big Walnut Creek, Bokes Creek, Mill Creek, the Little Scioto River and the Olentangy River (Figure 2). The Olentangy River, the Scioto's largest tributary (93.8 miles[2]), flows from its headwaters located southeast of Galion in Morrow County to its confluence with the Scioto River in the City of Columbus in Franklin County.

The entire Olentangy River watershed is divided into four HUC-10s, but is commonly split into the Upper Olentangy (*Headwaters Olentangy River HUC-10, Whetstone Creek HUC-10* and *Grave Creek-Olentangy River HUC-10*) and the Lower Olentangy (*Rush Run-Olentangy River HUC-10*) for watershed management purposes (Figure 3). The *Grave Creek-Olentangy River HUC-10 (05060001 10)* is referred to as the Middle Olentangy sub-watershed in the *Upper Olentangy Watershed Management and Action Plan*; however, the portion of it located below the Delaware Dam (including the **Delaware Run-Olentangy River HUC-12**) is often included in planning and conservation efforts for the Lower Olentangy watershed due to the hydrologic significance of the impoundment (Ohio EPA, 2007).

[1] The *Ohio Gazetteer of Streams* (ODNR, 2001) lists the Scioto River as 230.8 miles in length; however, the *River Mile Index* (Ohio EPA, 2020e) shows the Scioto River with an approximate length of 238.9 miles. Biological sampling stations utilize the river mile locations in the *River Mile Index*.

[2] The *Ohio Gazetteer of Streams* (ODNR, 2001) lists the Olentangy River as 88.5 miles in length; however, the *River Mile Index* (Ohio EPA, 2020e) shows the Olentangy River with a length of ~93.8 miles. Biological sampling stations utilize the river mile locations in the *River Mile Index*.

The *Grave Creek-Olentangy River HUC-10* is divided into seven HUC-12 sub-watersheds, in which the **Delaware Run-Olentangy River HUC-12** is contained (Table 2). The HUC-10 has a total drainage area of ~181 square miles or 116,051 acres. Land use within the *Grave Creek-Olentangy River HUC-10* is mainly agricultural, with the largest concentration of urban land use surrounding the City of Delaware, a community of approximately 41,280 people, estimated to be up 18% from 2010 census polls (US Census Bureau, 2021).

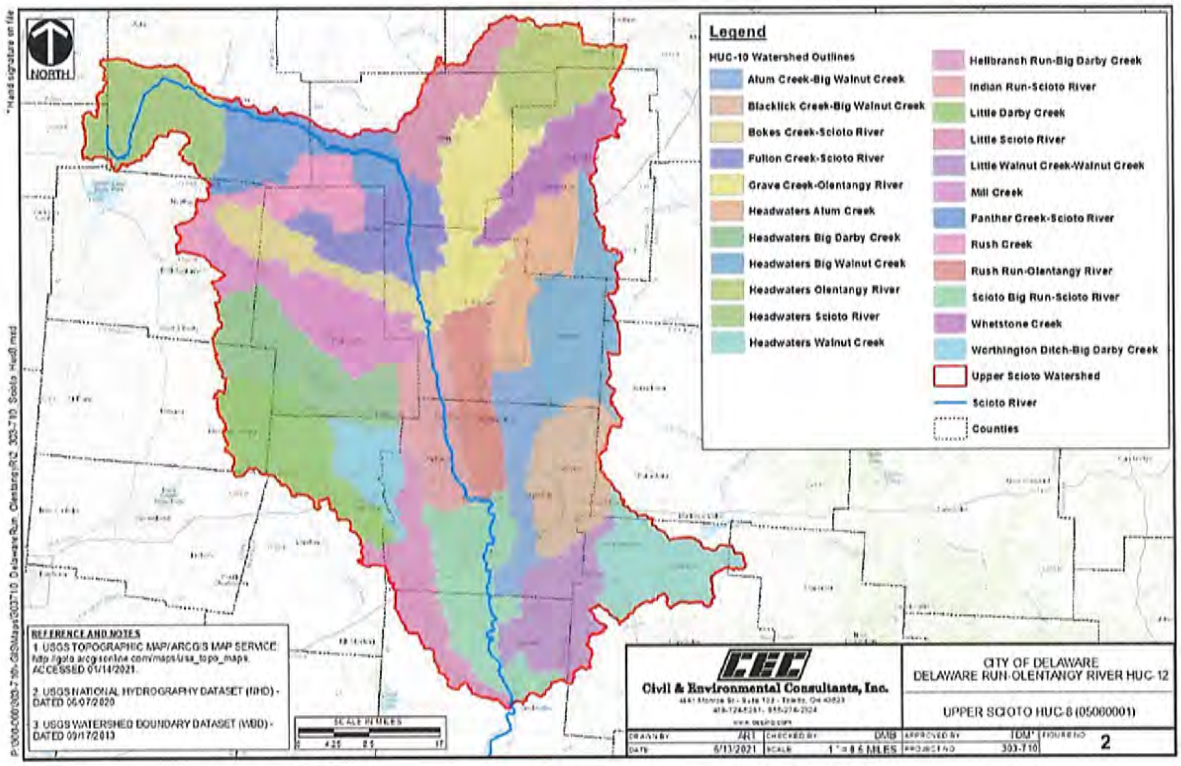

Figure 2: Upper Scioto River Watershed

Table 2: Sub-watersheds in the Grave Creek-Olentangy River HUC-10

Grave Creek-Olentangy River HUC-10 (05060001 10)		
HUC-12	**Area (Square miles)**	**Area (Acres)**
Otter Creek-Olentangy River (01)	22.86	14,631
Grave Creek (02)	28.83	18,451
Beaver Run-Olentangy River (03)	24.04	15,384
Qu Qua Creek (04)	16.91	10,824
Brandige Run-Olentangy River (05)	29.79	19,065
Indian Run-Olentangy River (06)	15.00	9,603
Delaware Run-Olentangy River (07)	43.89	28,093

(Source: Ohio EPA, 2020b)

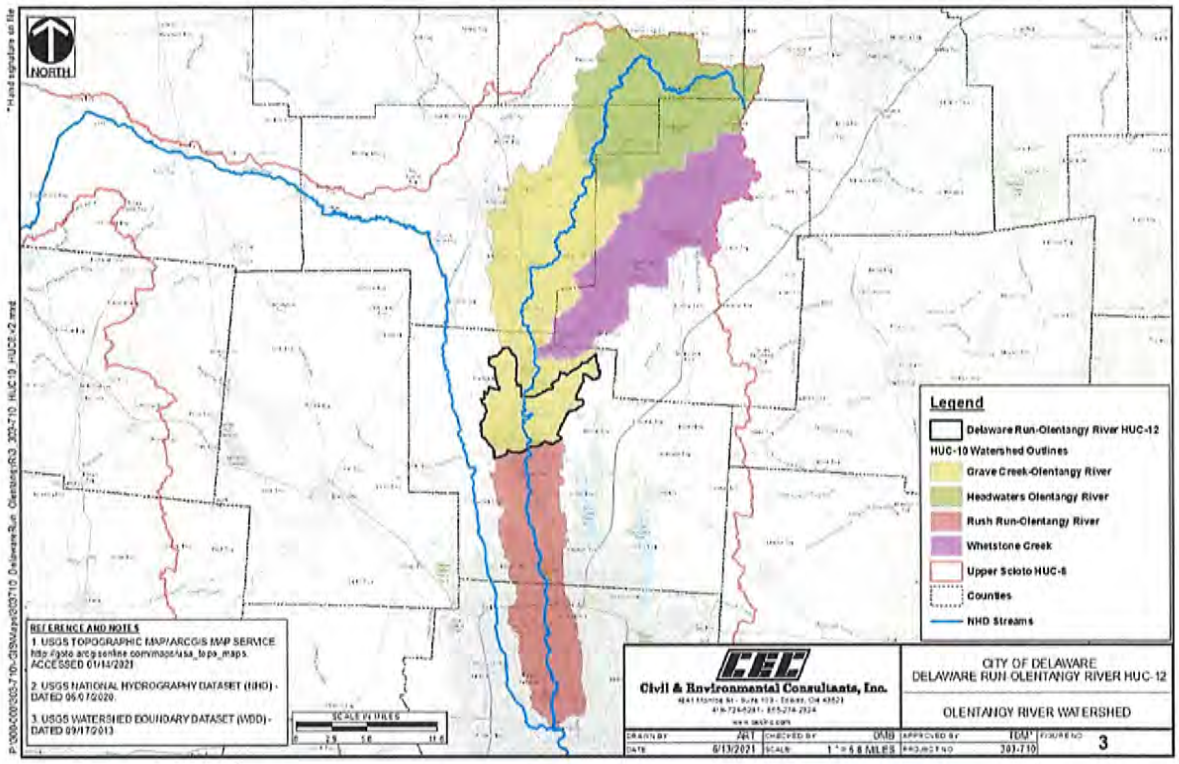

Figure 3: Location of the Delaware Run-Olentangy River HUC-12

The **Delaware Run-Olentangy River HUC-12** contains approximately 6.6 miles of the Olentangy River, from the outlet of the Delaware Reservoir at RM 32.4 to RM 25.8. The **Delaware Run-Olentangy River HUC-12** marks a transition zone for land use, where a rural landscape phases to a dense suburban setting along a southern trajectory leading to Columbus.

1.3 Public Participation and Involvement

Watershed planning is best accomplished by collaboration and input from a diverse group of entities, including governmental agencies, private businesses, academia, non-profit groups, neighborhood organizations and the public at large. A conglomerate of municipal agencies and stakeholders, led by the City of Delaware, spearhead watershed efforts in the **Delaware Run-Olentangy River HUC-12** through activities hosted by the OWA. The City of Delaware Public Utilities employs a Watershed and Sustainability Coordinator who focuses efforts on the improvement and protection of water quality within the Olentangy River watershed. The Watershed and Sustainability Coordinator facilitates the meetings of the OWA, and through this organization, contributes to watershed-wide activities, including: the implementation of the Delaware Run Storm Net Project, the establishment of an *Escherichia coli (E. coli)* monitoring program within Delaware Run, the removal of low head dams within the Olentangy River mainstem, invasive species removal, seedling plantings along local waterways and the establishment of a public-private partnership with Ohio Wesleyan University that engages students in hands-on, water quality monitoring projects while accomplishing annual stormwater goals tied to the City's Municipal Separate Storm Sewer System (MS4) Program. Since 2015, OWA has hosted the

Northern Olentangy Watershed Festival, an annual event that is designed to engage and educate the community on the Olentangy River and the importance of protecting natural resources.

OWA garners participation from many organizational stakeholders, including:

- Preservation Parks of Delaware County, an organization dedicated to preserving natural and historic features in Delaware County;
- Del-Co, a private public drinking water company serving seven counties within central Ohio;
- Delaware Soil and Water Conservation District (SWCD), an agency focused on managing the natural resources and environmental challenges in Delaware County;
- Ohio Wesleyan University, a private liberal arts university with an active Environment and Sustainability Department;
- Friends of the Lower Olentangy River (FLOW), a watershed organization tasked with maintaining clean and safe water within the Olentangy River and its tributaries; and,
- the ODNR Scenic Rivers Program, of which the Olentangy River has been designated.

These stakeholders provided watershed background knowledge and helped guide and formulate critical areas and potential projects within the **Delaware Run-Olentangy River HUC-12**.

Chapters 1, 2 and 3 were primarily prepared using the *2020 Ohio Integrated Report* (Ohio EPA, 2020b), *2016 and 2017 Biological and Habitat Studies of the Rivers and Streams in 33 Section 319(h) and SWIF/GLRI Project Areas in Ohio* (Ohio EPA, 2020a), *Biological and Water Quality Study of the Olentangy River, Whetstone Creek and Select Tributaries, 2003-2004* (Ohio EPA, 2005), *Total Maximum Daily Loads for the Olentangy River Watershed* (Ohio EPA, 2007), *Biological and Water Quality Study of the Olentangy River and Selected Tributaries 1999* (Ohio EPA, 2001) and the *Upper Olentangy Watershed Management and Action Plan* (OWA, 2006). Project information for Chapter 4 was compiled by collaborative outreach with organizational stakeholders, community partners and local landowners, when possible. The *Delaware Run-Olentangy River HUC-12 NPS-IS* was developed during the Coronavirus Disease-2019 (COVID-19) pandemic occurring in 2020-2021, limiting in-person meetings and gatherings. Organizational stakeholder input was solicited and received through interpersonal electronic communications, virtual meetings and phone calls.

Potential restoration sites were visited on January 5, 2021 by the City of Delaware and consultants. In addition, landowners within the sub-watershed were invited to complete surveys regarding watershed issues in order to identify areas of concern and potential locations for projects on private property. The surveys were developed to query both agricultural and urban residents and were made available on the City of Delaware's website, http://www.delawareohio.net/about-the-public-utilities-department/olentangy-river-watershed/, and distributed through channels of OWA partners.

Site visit conducted in 2021

CHAPTER 2: HUC-12 WATERSHED CHARACTERIZATION AND ASSESSMENT SUMMARY

2.1 Summary of HUC-12 Watershed Characterization

2.1.1 Physical and Natural Features

The *Grave Creek-Olentangy River HUC-10* is comprised of seven HUC-12 watersheds; this document focuses on the #07 hydrologic unit—the **Delaware Run-Olentangy River HUC-12**. The largest waterbody within this sub-watershed is the Olentangy River, a 93.8 mile-long stream that rises southeast of Galion in Morrow County. It flows west, then south through agricultural lands to enter Delaware Lake. The Olentangy River outlets at the southern end of the lake through the Delaware Dam and flows due south through suburban and urban landscapes to discharge in the Scioto River at RM 132.33 in the City of Columbus in Franklin County. In total, the Olentangy River drains a watershed of 543 square miles (347,520 acres) over the duration of its length.

The **Delaware Run-Olentangy River HUC-12** contains a 6.6 mile-long segment of the Olentangy River, from its outlet at the Delaware Reservoir at RM 32.4 to RM 25.8, where the Olentangy River exits the HUC-12 and continues flowing south through the *Deep Run-Olentangy River HUC-12*. The segment starting at the Delaware Dam flowing through the sub-watershed to Old Wilson Bridge in Worthington was designated as a State Scenic River in 1973. The **Delaware Run-Olentangy River HUC-12** contains 43.89 square miles (28,092.70 acres) (refer to Figure 1, p.1). Four tributaries essentially split the sub-watershed into quadrants, with Norris Run and Delaware Run flowing from the west and Horseshoe Run and Sugar Run flowing from the east (Table 3). In total, 68.74 miles of stream segments flow in the sub-watershed.

Table 3: Tributary Characteristics in the Delaware Run-Olentangy River HUC-12

Stream	Entry Point to the Olentangy	Length (Miles)	Drainage Area (Square Miles)
Norris Run	RM 32.18	5.3	7.21
Horseshoe Run	RM 29.74	9.1	11.3
Sugar Run	RM 26.97	6.8	5.96
Delaware Run	RM 25.71	7.0	10.1

(Source: Ohio EPA, 2020e; USGS, 2021)

The Olentangy River is located in the Eastern Corn Belt Plains (ECBP) ecoregion (Ohio EPA, 2007). The ECBP consists of a rolling till plain with local end moraines (USEPA, 2013). Wisconsinan glacial deposits are extensive across the ecoregion and supported beech forests prior to settlement. The ecoregion today mostly supports corn, soybean and livestock production, which has negatively impacted stream chemistry and turbidity. Underlying bedrock in the area consists of the Olentangy and Ohio Shales, and the Delaware Limestone in the area of the Delaware Dam (ODNR, 2021a). Soils in the Olentangy River watershed are primarily clay-rich, high in lime and derived from glacial material that sits atop these bedrock layers (Ohio EPA, 2007). The dominant soil association in the **Delaware Run-Olentangy River**

HUC-12 includes the Blount-Pewamo, which are predominantly finer-grained particles with slow permeability and slow to moderate infiltration capacity (Figure 4). In the **Delaware Run-Olentangy River HUC-12**, the Pewamo silty clay loam and Blount silt loams cover over 60% of the sub-watershed (NRCS, 2019). These soils are typically not suitable for septic system use, and generally require surface and subsurface drainage systems for agricultural production (Ohio EPA, 2007).

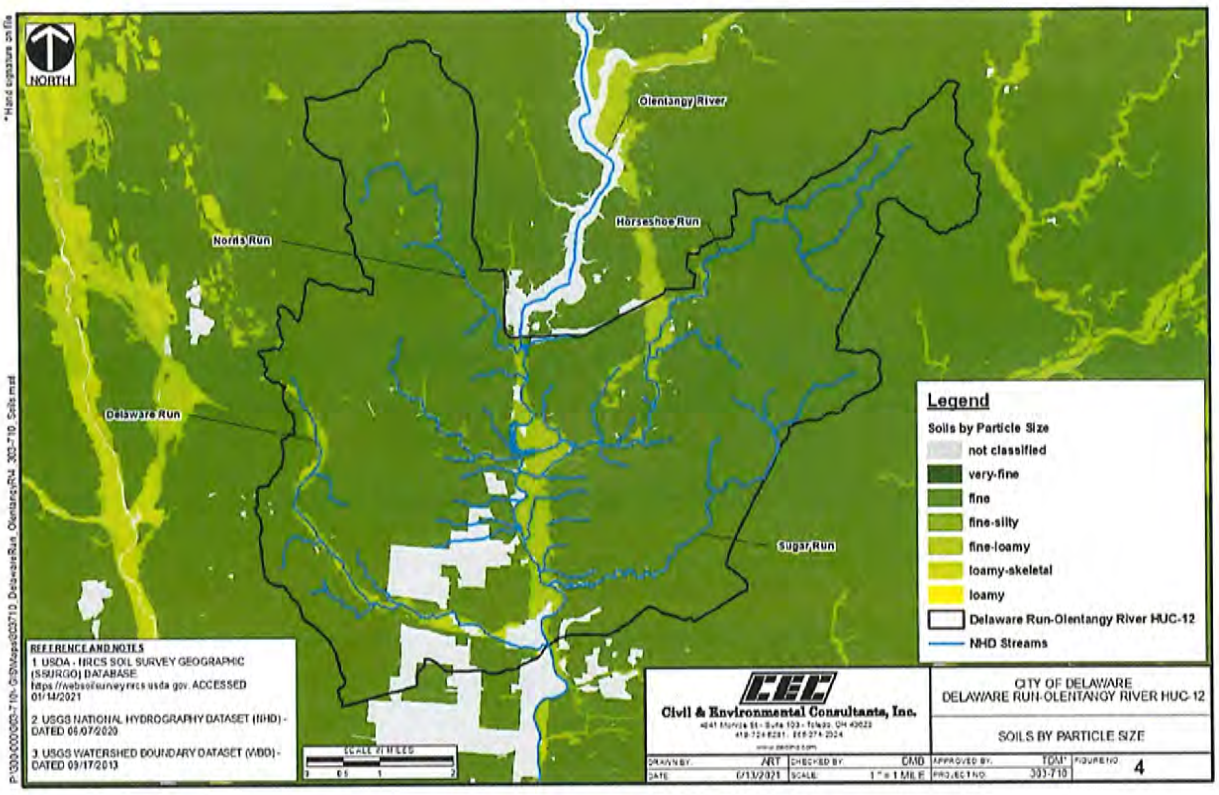

Figure 4: Soils Classified by Particle Size

Currently, eight National Pollutant Discharge Elimination System (NPDES)-permitted facilities are located within the **Delaware Run-Olentangy River HUC-12** (Table 4; Figure 5). Of these facilities, one is a municipal water treatment plant (WTP), one is a wastewater plant, three are package plants from manufactured home parks (MHPs), two are package plants from school/governmental facilities and one is an industrial facility (petroleum). The USEPA documents NPDES permit compliance through the Enforcement and Compliance History Online (ECHO) database (USEPA, 2021). Results discussed here cover the three year (12 quarters) compliance history from October 1, 2017 through September 30, 2020. Several facilities have remained in compliance with their NPDES permits over the last three years including Shroyers Home MHP, Delaware MHP, the United States Department of Agriculture (USDA) Forest Service and Berachah Church Waste Water Plant.

Table 4: NPDES-Permitted Facilities in the Delaware Run-Olentangy River HUC-12

Facility Name	Permit Number	Receiving Waterbody
McWherter Petroleum Services	4IN00168*ED	Olentangy River
Delaware WTP 2	4IZ00054*CD	Olentangy River
USDA Forest Service	4PN0001*GD	Olentangy River
Buckeye Valley Middle & High Schools	4PT00107*ED	Unnamed tributary to the Olentangy River
Crystal Lake MHP	4PV00010*FD	Unnamed tributary to Horseshoe Run
Shroyers Homes MHP	4PV00095*FD	Olentangy River
Delaware MHP	4PV00106*ED	Olentangy River
Berachah Church Waste Water Plant	4PX00001*ED	Olentangy River

(Source: Individual NPDES Permits Interactive Map (Ohio EPA, 2021))

NOTES
WWTP Wastewater Treatment Plant
WTP Water Treatment Plant
MHP Manufactured Home Park

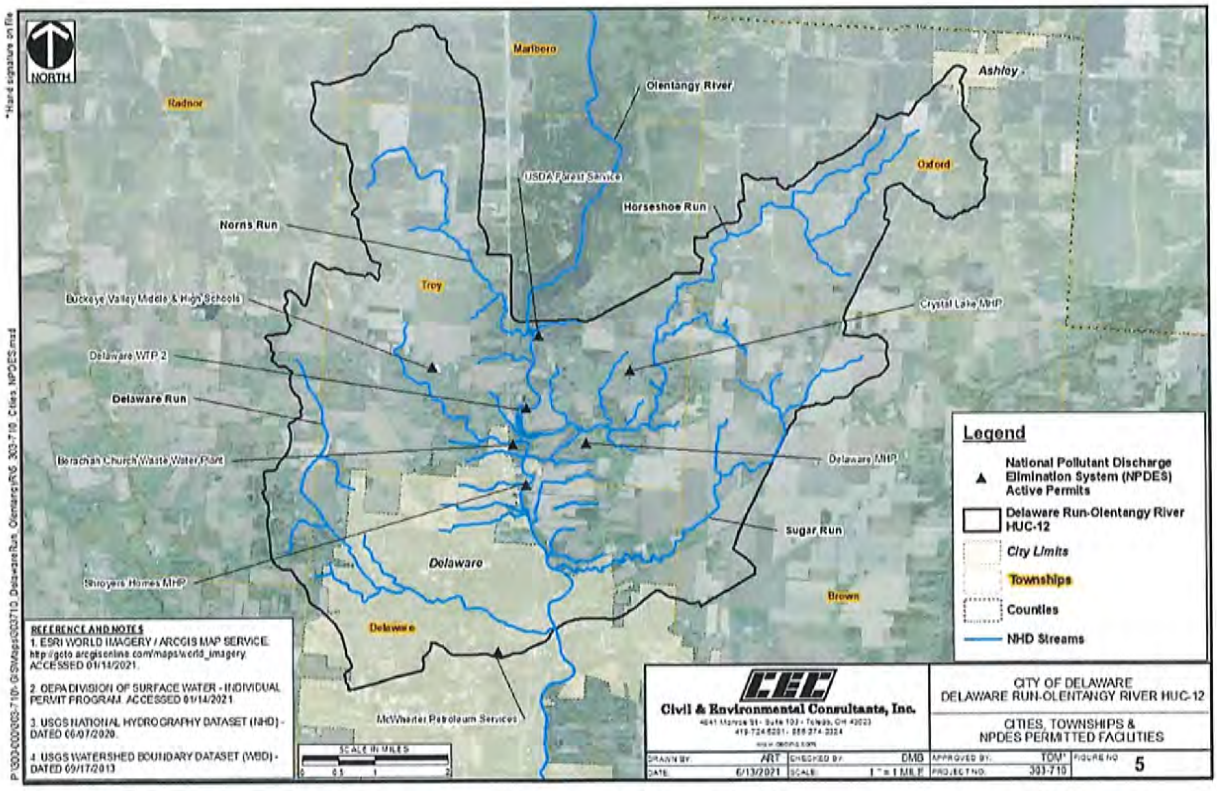

Figure 5: Urban Areas and National Pollutant Discharge Elimination Systems (NPDES) Facilities

Buckeye Valley Middle & High Schools has recorded violations of its permit in two of the last 12 quarters for exceedances in nitrogen as ammonia (NH_3) and total suspended solids (TSS). Exceedances in TSS and total recoverable strontium, as well as toxicity to the aquatic species *Ceriodaphnia dubia* (water flea) have been recorded in four of the last 12 quarters at the Delaware WTP. The Crystal Lake MHP and McWherter Petroleum Services have received numerous violations during the previous three years, earning past or current Significant Noncompliance (SNC) status. The Crystal Lake MHP recorded exceedances in Biological Oxygen Demand-5 day (BOD_5), NH_3, TSS and dissolved oxygen (DO) in eight of the last 12 quarters, with two of those in 2018 in SNC. McWherter Petroleum Services is currently listed in SNC for failure to report effluent results. Only one quarter of the last 12 has been clear of a violation or SNC status.

The City of Delaware is the major population center within the **Delaware Run-Olentangy River HUC-12** and serves as the county seat for Delaware County. Delaware covers an area of approximately 19.9 square miles (12,736 acres), of which approximately 39% lies within the **Delaware Run-Olentangy River HUC-12**. Population estimates cite over 41,280 people living within the City of Delaware in 2019, an 18.7% increase from the last census conducted in 2010 (US Census Bureau, 2021). Both the City of Delaware and Delaware County as a whole are known to be areas of intense development—the County has one of the fastest growing housing markets across the country, growing at about 2.2% (Hendrix, 2020). While the majority of the City of Delaware has storm and sanitary sewers, approximately 18.8 acres utilizes a Phase II MS4 permit, allowing stormwater to be directly discharged to local waterways (City of Delaware, 2007). Because these stormwater systems do not connect with water treatment systems, oil, grease, pesticides, herbicides, dirt and grit have a high potential to negatively impact water quality. The City utilizes a Stormwater Management Plan to minimize storm drain pollution.

The City of Delaware operates its own WWTP, and the City's wastewater system includes 175 miles of sewer line (City of Delaware, 2021a). Though rare, sanitary sewer overflows (SSOs) have been found to occur during heavy precipitation events, as documented in the May 2020 storm. These SSOs occurred at three locations along Delaware Run within the lower mile of the stream (*personal communication with Caroline Cicerchi, City of Delaware, January 13, 2021)*. Outside of the city limits, the remainder of the sub-watershed extends across six townships: Troy, Brown, Oxford, Delaware, Marlboro and Radnor. These townships have limited development and are predominantly rural. In these areas, homes and businesses rely upon HSTS for treatment of household wastewater (DCRSD, 2015). Housing densities in these areas are relatively low and are unlikely to drive connection to sanitary sewer infrastructure due to distance from current treatment plants and the need for extensive improvements to the collection systems. The Delaware County Public Health District maintains records of HSTS in the county. The Health District's database includes records of HSTS permits and inspections, and contains 717 records within the **Delaware Run-Olentangy River HUC-12**[3]. Studies conducted by the Ohio Department of Health (ODH) across Ohio have shown an average HSTS failure rate of 31% (ODH, 2013). Though the amount of NPS pollution from HSTS in the **Delaware Run-Olentangy River HUC-12** is estimated to be small, repair

[3] Database entries prior to 2013 may include addresses that have no previous HSTS records associated with the property, and properties connected to sanitary sewers may have not been removed from the list provided by the Delaware County Public Health District. HSTS locations were linked to parcel data in GIS but were not field verified.

or replacement of failing HSTS or connection to sanitary sewer lines reduces the potential for NPS pollution from this source.

Specific landmarks and features within this watershed include:

- a number of parks (see Section 2.1.2)
- Flying Acres Airport and Obi One Airport
- Buckeye Valley Middle School and High School
- Greenwood Lake
- Delaware County Transfer Station
- Whitesands Campgrounds
- Roy Rike Field
- Delaware Dam
- Selby Stadium
- Lone Oak Farm-Hunting Preserve
- Gleasoncamp Pond
- Marlboro Cemetery and Martin Cemetery
- Ohio Wesleyan University
- Veterans Park Splash Pad

2.1.2 Land Use and Protection

Land use within the **Delaware Run-Olentangy River HUC-12** is primarily agricultural, supporting mainly row crop production (~68%) with small amounts of pasture lands interspersed (Figure 6). Urban lands are found concentrated in the southern portion of the sub-watershed (~16%), while forested stands are concentrated in the northern and central portion of the sub-watershed (~12%) (Table 5).

Table 5: Land Use Classifications in the Delaware Run-Olentangy River HUC-12

Land Use	Delaware Run-Olentangy River HUC-12 (05060001 10 07)		
	Area (mi^2)	Area (acres)	% Watershed Area
Bare/Mines	0.61	45.38	0.13%
Commercial/Industrial/Transportation	0.45	329.79	1.15%
Crop	29.46	18,988.34	66.47%
Deciduous Forest	4.65	3,024.72	10.65%
Evergreen Forest	0.06	53.23	1.77%
Open Water	0.01	14.89	0.03%
Pasture	1.63	1,084.99	3.84%
Residential	6.65	4,299.22	15.19%
Urban/Recreational Grasses	0.37	252.14	0.77%
Total	**43.89**	**28,092.70**	**100.00%**

(Source: Homer et al., 2020)

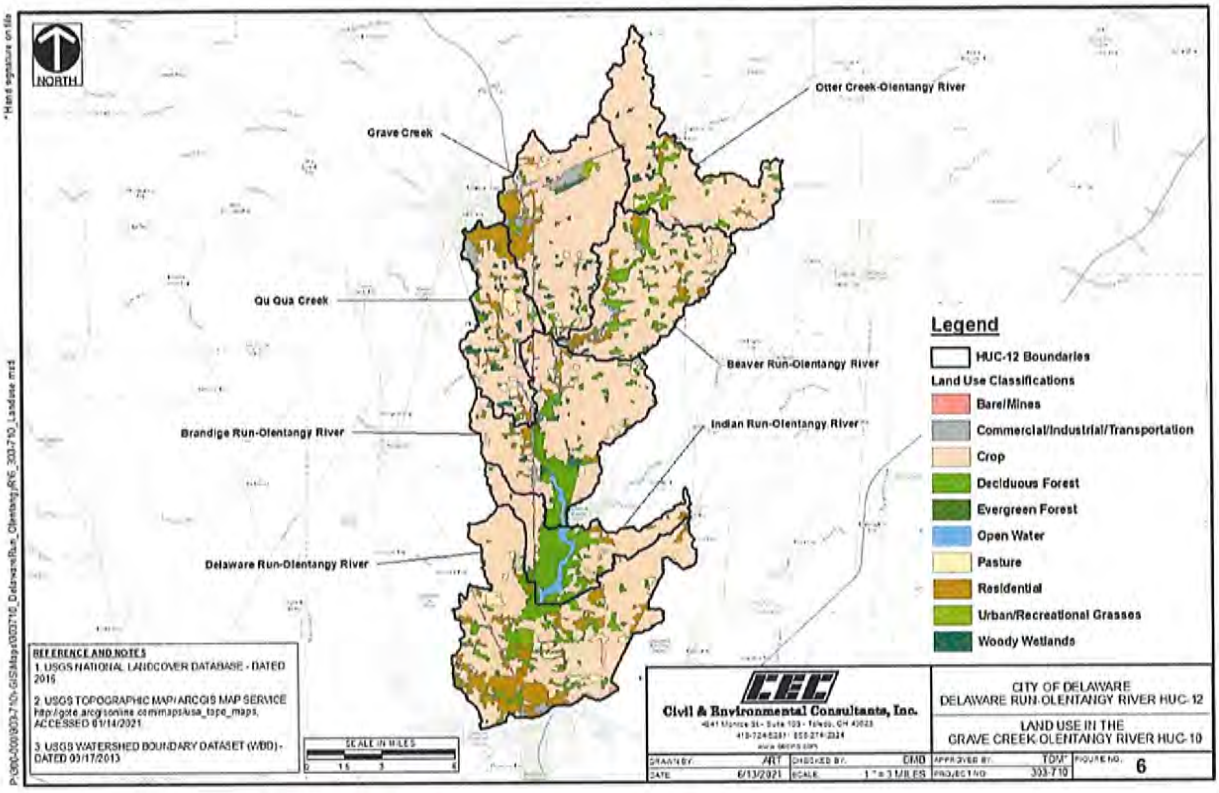

Figure 6: Land Use in the Grave Creek-Olentangy River HUC-10

Land protection at the local, state and federal level is prevalent throughout the **Delaware Run-Olentangy River HUC-12** (Figure 7). Listings within the United States Geological Survey's (USGS) Protected Areas Database of the United States (PAD-US) indicate 829 acres within the sub-watershed are held under management as park or protected land (Table 6). These protected lands may serve as habitat for the six threatened or endangered species listed in Delaware County by the United States Fish and Wildlife Service (USFWS) (Table 7). The Olentangy River is listed as a Group 2 Stream in the *Ohio Mussel Survey Protocol* (ODNR, 2020), indicating that it is a small to mid-sized stream where the presence of Federally Listed Species (FLS) is expected. Delaware Run is also listed within the *Ohio Survey Mussel Protocol*; however, it is classified as a Group 1 Stream, meaning FLS are not expected to be found. All other tributaries within the **Delaware Run-Olentangy River HUC-12** are unlisted, and though their drainage areas are >5 square miles, FLS are not expected to be found.

Table 6: Parks and Protected Lands in the Delaware Run-Olentangy River HUC-12

Name	Acreage	Description
Bicentennial Park	3	City of Delaware park
Blue Limestone Park	16	City of Delaware park providing picnic shelters, playground equipment, pickleball courts and a public fishing pier
Carson Farms Park*	6	City of Delaware park
Delaware County Fairgrounds	101	County fairgrounds and shelters
Delaware Recreation Area	151[a]	Reservoir created in 1951 by the US Army Corps of Engineers; State Park area providing boating, fishing, swimming and nature-based recreation opportunities

Name	Acreage	Description
Gallant Farm Park	19	Interpretive Depression-era farm owned by Preservation Parks of Delaware County
Gallant Woods Park	231	Old-growth woods and restored prairie and wetlands owned by Preservation Parks of Delaware County
Hidden Valley Golf Course	85	Golf course operated by the City of Delaware
Lexington Glen Park	8	City of Delaware park
Lincoln Sports Field	2	City of Delaware park
Locust Curve Park	3	City of Delaware park
Marvin Lane Park	2	City of Delaware park
Mingo Park	50	City of Delaware park offering picnic shelters, rental facilities, pool and a 1.1 mile trail
Nottingham Park	4	City of Delaware park
Oakhaven Golf Club	136	Private golf course
Oakhurst Park	11	City of Delaware park
Region 09 National Forest	181	Experimental forest area managed by the US Forest Service
River Run Park*	14	Kayak access and acreage along the Olentangy River owned by Preservation Parks of Delaware County
Riverview Park	25	City of Delaware park
Ross Street Park*	2	City of Delaware park
Shelbourne Forest Park	5	City of Delaware park
Smith Park	50	City of Delaware park providing picnic shelters, tennis and basketball courts, field space and playground equipment
Sunnyview PPG Park	5	City of Delaware park
Veterans Park*	15	City of Delaware park with 1.2 mile trail

(Source: USGS, 2019; City of Delaware, 2021b; Preservation Parks, 2021)

NOTES

a Total acreage is 9,191 acres, but most is located north of the Delaware Run-Olentangy River HUC-12

** Parks not listed in the PAD-US.*

Table 7: Threatened and Endangered Species in Delaware County

Species	Status	Habitat Characteristics
Indiana bat *(Myotis sodalis)*	Endangered	Hibernates in caves and mines and forages in small stream corridors with well-developed riparian woods, as well as upland forests
Northern long-eared bat *(Myotis septentrionalis)*	Threatened	Hibernates in caves and mines and swarms in surrounding wooded areas in autumn; roosts and forages in upland forests during late spring and summer
Rabbitsfoot *(Quadrula cylindrical cylindrica)*	Threatened	No information available
Rayed bean *(Villosa fabalis)*	Endangered	Mainly headwater creeks, but sometimes larger rivers
Snuffbox *(Epioblasma triquetra)*	Endangered	Small to mid-sized creeks and larger rivers in swift current areas
Running buffalo clover *(Trifolium stoloniferum)*	Endangered	Disturbed bottomland meadows and disturbed sites that are partially shaded

(Source: USFWS, 2018)

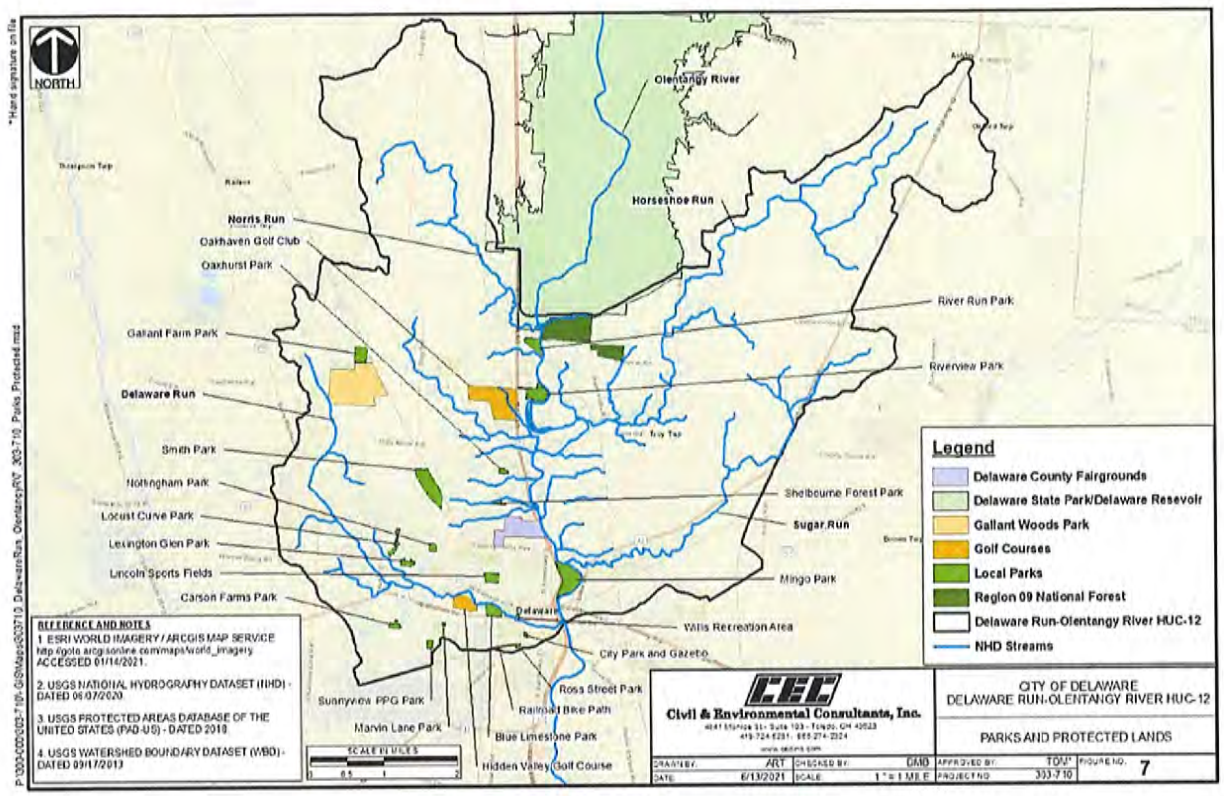

Figure 7: Parks and Protected Lands

Land protection is an important component of regional initiatives in the greater Olentangy watershed. The *Lower Olentangy Watershed Greenspace Plan* was a study spearheaded by FLOW in 2020 and identifies priority areas for greenspace protection to ensure the preservation of high quality natural areas and ample space for recreation (FLOW, 2020). Twenty-two (22) ecological and land restoration variables were assessed to generate a greenspace score. Scores were classified into five tiers. Tier 1 signified areas with the highest amount of overlapping variables, offering the most need for greenspace protection, with Tier 5 values indicating little overlap in variables and thus, lower priority areas for greenspace protection. The *Lower Olentangy Watershed Greenspace Plan* identified approximately 3,400 acres of Tier 1 and Tier 2 priority lands for potential greenspace protection in the **Delaware Run-Olentangy River HUC-12**.

Impoundments within the sub-watershed were once numerous along the length of the Olentangy River. Beginning in 2005 and ending in 2010, lowhead dams were removed from RM 25.8 (River Street), RM 26.0 (Central Avenue) and RM 28.2 (Panhandle Road), creating opportunities for fish passage and improving biological diversity throughout this reach of the river. An impoundment along Sugar Run that created Greenwood Lake breached after heavy rains in June 2020, causing a sinkhole in the overlying US 42. Greenwood Lake has since

New spillway and culvert along Sugar Run

been drained and a new spillway and culvert created in this area by the Ohio Department of Transportation (ODOT) (ODOT, 2020).

Flooding within the **Delaware Run-Olentangy River HUC-12** is of great concern. The same heavy rain event in May 2020 caused massive flash flooding that inundated streets, businesses and homes in the City of Delaware and caused the closure of Delaware State Park. Larger rain events, coupled with growing development and increasing impervious surface can contribute to the risk of more frequent and intense flooding events. Existing wetlands within the sub-watershed may present opportunities for water retention and filtration benefits (Figure 8), and opportunities to further restore or expand wetland complexes and/or retention basins, particularly in the headwaters sections of the sub-watersheds may help provide capacity for future flood level events.

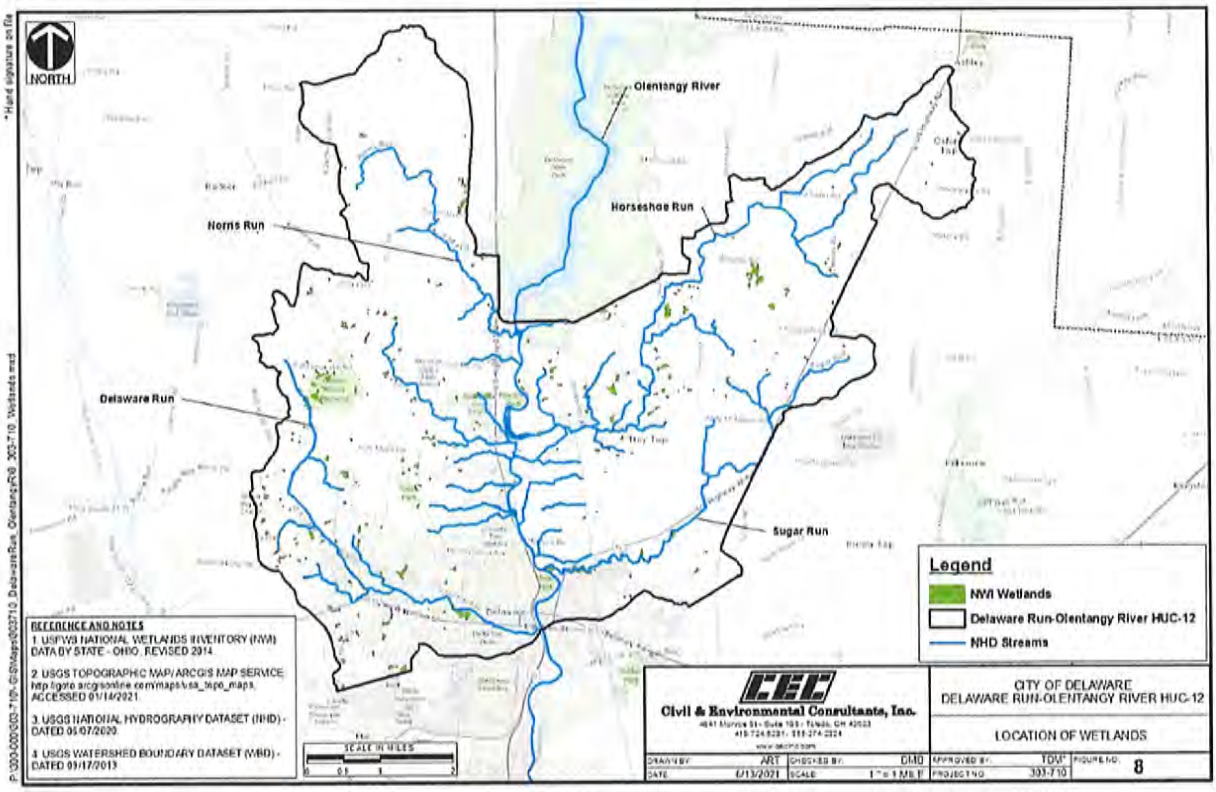

Figure 8: Wetlands within the Delaware Run-Olentangy River HUC-12

Most land within the **Delaware Run-Olentangy River HUC-12** is privately owned; therefore, knowledge of land use and conservation practices may be limited. The City of Delaware and partners from OWA deployed surveys to elicit information from local landowners and producers. Responses were garnered from more than 60 landowners, mainly from urban areas (62/64 responses). Approximately 65% lived within the sub-watershed boundaries. Urban development, followed by impervious surfaces, were cited as the most pressing issues within the sub-watershed. In the urban setting, the majority of landowners implemented some type of urban best management practice (BMP) (Table 8). Sixty percent (60%) and 55% of respondents have an interest in implementing rain gardens and rain barrels, respectively, which

may indicate potential actions to be taken in the sub-watershed to further the retention, detention and filtration of urban stormwater.

Table 8: Urban Best Management Practice Implementation Survey Results

Practice	Implementation (% of Respondents)
Leave leaves/grass clipping on lawn, mulch leaves	85%
Clear storm drains of debris	77%
Minimize salt application	73%
Organic lawncare	63%
Pick up pet waste	63%
Mow at 3-4" height, utilize no-mow areas	61%
Composting	56%
Rain barrels	31%
Rain gardens	11%

(Source: City of Delaware survey, 2021)

Within the agricultural portion of the sub-watershed, farms are generally of smaller size, averaging between 50-179 acres (USDA, 2019). Soybeans are the largest harvested crop in Delaware County, accounting for >45% of crop acres, while corn accounts for 25-34% of crops (USDA, 2019). Generally, livestock operations are not abundant and are smaller in size (Table 9).

Table 9: Estimated Animal Counts in the Delaware Run-Olentangy River HUC-12

Livestock Type	Animal Units
Beef	132
Dairy	42
Swine	1,623
Sheep	72
Horse	134
Chicken	143
Turkey	9
Duck	11

(Source: USDA Census of Agriculture, 2012, as presented in the STEPL Input Data Server (Tetra Tech, 2017))

Within agricultural areas, some conservation practices, such as the use of conservation tillage, can be estimated from remote sensing techniques used within the Operational Tillage Information System (OpTIS). From 2014-2018, OpTIS estimated an average of 34.1% of crop fields in the Upper Scioto watershed were under no-till conditions, 53.6% were under some form of reduced tillage and 12.3% were under traditional tillage regimes (Dagan, 2019). OpTIS also estimated cover crop usage across the Upper Scioto watershed to average 3.0% of fields utilized a winter commodity crop, while 2.1% utilized a winter cover crop over the same five-year period. County-wide estimations for till and reduced-till fields were well below the HUC-8 average (Table 10). According to summary data provided by Ohio EPA regarding the use of the Environmental Quality Incentives Program (EQIP) within the **Delaware Run-Olentangy River HUC-12**, one Nutrient Management Plan and 3.2 acres of Conservation Cover were certified between March 30, 2017 and mid-2019 within the sub-watershed *(personal communication*

with Rick Wilson, June 13, 2019). Additional data provided by the Farm Service Agency (FSA) on current contracts within Delaware County are found in Table 11.

Table 10: OpTIS Countywide Conservation Practice Averages for 2014-2018 for Delaware County

	Upper Scioto HUC-8	Delaware
Practice	% Usage	% Usage
No-till conditions	34.1	24.7
Reduced till conditions	53.6	14.5
Conventional till	12.3	49.6
Winter commodity cover crop	3.0	2.5
Winter cover crop	2.1	3.0

(Source: Dagan, 2019; provided by The Nature Conservancy in 2021)

Table 11: Conservation Reserve Program (CRP) Contract Acreage by County

	Delaware
Practice	Acres*
Establishment of Permanent Native Grasses	176.33
Filter Strips	352.99
Riparian Buffer	15.69
Wetland Restoration	22.47
Wetland Restoration, Non-Floodplain	30.19
Rare and Declining Habitat	21.99
Marginal Pastureland and Wildlife Buffer	4.02
Upland Habitat Buffers	134.74
Permanent Wildlife Habitat for Pheasants	14.55
Hardwood Tree Planting	21.40
Pollinator Habitat	105.20
Field Windbreak Establishment, Noneasement	3.90
Grass Waterways, Noneasement	104.74
Shallow Water Areas for Wildlife	8.66

(Source: USDA-NRCS, 2018)

NOTES
**Acres reported at the county level and may not necessarily fall within the Delaware Run-Olentangy River HUC-12 boundaries.*

2.2 Summary of HUC-12 Biological Trends

Ohio EPA last sampled the Olentangy River in the **Delaware Run-Olentangy River HUC-12** in 2011 and 2016 to document water quality conditions after removal of lowhead dam impoundments. Four tributaries in the sub-watershed were last sampled in 1999 and 2003 to support TMDL development. A summary of these sample locations and results are provided in Table 12. For reference, WQS for the ECBP ecoregion are presented in Table 13.

Table 12: Biological Indices Scores for Sites in Delaware Run-Olentangy River HUC-12

Delaware Run-Olentangy River HUC-12 (05060001 10 07)							
River Mile	Drainage Area (mi^2)	IBI	MIwb[a]	ICI[b]	QHEI	Attainment Status	Location
Olentangy River (WWH)							
[c]32.10[W]	393.0	46	10.8	38	80.5	Full	USGS Gage, Dst. Delaware Reservoir
[d]28.20[W]	409.0	50	10.3	38	82.3	Full	Panhandle Road
[c]27.50[W]	411.0	43	9.4	46	81.0	Full	Adj. Hudson Road, at Bend
[d]26.00[W]	421.0	48	11.0	46	83.0	Full	Central Avenue
[d]25.80[W]	421.1	48	9.6	48	77.5	Full	Williams Street
Norris Run (WWH)							
[e]1.3[H]	5.8	23*	N/A	LF*	62.0	Non	Penry Road
Horseshoe Run (WWH)							
[f]0.3[H]	11.3	38[ns]	N/A	F*	63.5	Partial	Panhandle Road
Sugar Run (WWH)							
[e]1.3[H]	3.5	29*	N/A	LF*	69.0	Non	Salt Storage Road
Delaware Run (WWH)							
[f]1.2[H]	9.5	34*	N/A	P*	61.0	Non	Limestone Park
[f]0.2[H]	10.1	30*	N/A	P*	40.0	Non	Henry Street

(Source: Ohio EPA, 2001; Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES

IBI *Index of Biotic Integrity*

a *The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).*

ICI *Invertebrate Community Index*

b *Narrative evaluation used in lieu of ICI (G=Good; MG=Marginally Good; H Fair =High Fair; F=Fair; L Fair=Low Fair; P=Poor; VP=Very Poor).*

QHEI *Qualitative Habitat Evaluation Index*

W *Wading site*

H *Headwater site*

ns *Nonsignificant departure from ecoregion biocriteria (≤4 IBI or ICI units, ≤5 MIwb units).*

*** *Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*

N/A *Not applicable*

WWH *Warmwater Habitat*

c *2011 sample*

d *2016 sample*

e *2003 sample*

f *1999 sample*

Table 13: Water Quality Standards for the Eastern Corn Belt Plains (ECBP) Ecoregion

ECBP Ecoregion	EWH WQS			WWH WQS			MWH WQS		
	Wading	Headwater	Boat	Wading	Headwater	Boat	Headwater	Wading	Boat
IBI	50	50	48	40	40	40	24	24	24
MIwb	9.4	N/A	9.6	8.3	N/A	8.5	N/A	6.2	5.8
ICI	46	46	46	36	36	36	22	22	22
QHEI[a]	75	75	75	60	55	60	43.5	43.5	43.5

(Source: Ohio EPA, 2001)

NOTES

EWH Exceptional Warmwater Habitat

WWH Warmwater Habitat

MWH Modified Warmwater Habitat

WQS Water Quality Standards

a QHEI is not criteria included in Ohio WQS; however, it has been shown to be highly correlated with the health of aquatic communities. In general, sites scoring 60 or above (or above 55 for headwater sites) support healthy aquatic assemblages indicative of WWH (Ohio EPA, 2013). Sites scoring 75 or above support EWH assemblages (Ohio EPA, 1999).

N/A MIwb not applicable to headwater sampling locations with drainage areas ≤ 20 mi^2.

Fishes (Modified Index of Well-Being (MIwb) & Index of Biotic Integrity [IBI])

Fish communities within the Olentangy River in the **Delaware Run-Olentangy River HUC-12** were in *Full Attainment* in 1999. Communities at Panhandle Road (RM 28.1) showed signs of distress in 2003, with low MIwb scores resulting in a status change to *Partial Attainment* (Ohio EPA, 2005). Impoundment and siltation from the Panhandle Dam were listed as the primary causes for the decline in water quality. Sampling accomplished in 2005 indicated long-term effects of impoundment were detrimental to the aquatic communities in the Olentangy, as fish performance at RM 28.2, RM 26.0 and RM 25.8 had fallen to a Fair to Marginally Good range (IBI=30-38), necessitating the award of grant funding to remove the three impoundments found throughout this reach (Ohio EPA, 2020a). Notable gains in community performance were observed during sampling post-dam removal. Fish performance after dam removal ranged from 43-50, shifting to Very Good to Exceptional scores. Scores for MIwb at all sites met the threshold for Exceptional Warmwater Habitat (EWH) streams.

Of the four tributaries, only those within Horseshoe Run reached WQS for the WWH designation, though even at this site, communities marginally achieved the threshold, falling within the nonsignificant departure range. Fish communities within Norris Run scored poorly, mainly as a result of habitat alterations and siltation from riparian removal and urbanization. Communities within Delaware Run and Sugar Run performed at a Fair level, influenced by urban runoff and development.

Macroinvertebrates (Invertebrate Community Index [ICI])

Macroinvertebrate species within the Olentangy River in the **Delaware Run-Olentangy River HUC-12** followed a similar trend in performance as fish communities. In 1999, macroinvertebrate communities performed to meet WQS, but signs of stress first arose in 2003 at RM 28.1 at the Panhandle Dam. Samples obtained in 2005 indicated the macroinvertebrate communities had severely declined at this

location due to impoundment and continued siltation, with scores dropping to the Fair to Marginally Good range (ICI= 14-34) (Ohio EPA, 2020a). Post-dam removal, macroinvertebrate communities recovered with scores reaching Good to Exceptional levels (ICI=36-60).

Macroinvertebrate communities in tributary locations did not perform well. In Norris Run, Horseshoe Run and Sugar Run, scores fell in the Low Fair to Fair range (IBI= 14-30), while the macroinvertebrate communities in Delaware Run at both locations scored poorly, triggering the *Non-Attainment* status at both sites. The tributary locations lacked diversity in sensitive taxa and supported only tolerant populations (Ohio EPA, 2005).

Habitat (via Qualitative Habitat Evaluation Index [QHEI])

Ohio EPA sampling crews documented various water quality and habitat attributes during the QHEI assessments conducted in 1999, 2003, 2011 and 2016 (Table 14). Habitat in the Olentangy River was generally of high quality, with scores ranging from 77.5 to 83.0; however, the most downstream locations within the river exhibited lasting effects from siltation caused by impoundment. Habitat scores in the tributaries were high, with the exception of Delaware Run at RM 0.2 (Henry Street). Despite higher scores, the tributaries exhibited a notable number of negative habitat attributes, mostly related to low current, high embeddedness and low sinuosity. Generally, streams that have QHEI scores of at least 60 are capable of supporting WWH assemblages. Strong correlations exist between habitat attributes and a stream's ability to support healthy aquatic assemblages (Ohio EPA, 1999). The presence of certain attributes are shown to have a larger negative impact on fish and macroinvertebrate communities. Streams designated as WWH should exhibit no more than four total Modified Warmwater Habitat (MWH) attributes; additionally, no more than one of those four should be of high-influence (Ohio EPA, 2013). Habitat lends itself to being able to support WWH communities throughout this sub-watershed; however, channelization and removal of the riparian corridor is limiting in the tributaries.

Delaware Run at Limestone Park

Table 14: QHEI Matrix with WWH and MWH Attribute Totals for Sites in the Delaware Run-Olentangy River HUC-12

Delaware Run-Olentangy River HUC-12 (05060001 10 07)																																
Key QHEI Components			WWH Attributes											MWH Attributes																		
														High Influence						Moderate Influence												
River Mile	QHEI Score	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrate	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth >40 cm	Low/No Riffle/Run Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40 cm	High-Influence MWH Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrate (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1 or 2 Cover Types	Intermediate/Poor Pools	No Fast Current	High/Moderate Embeddedness	High/Moderate Riffle Embeddedness	No Riffle	Moderate-Influence MWH Attributes
Olentangy River (WWH)																																
32.10[W]	80.5	3.82	•	•			•	•	•	•	•	•	9						0		•			•	•			•	•		5
28.20[W]	83.0	6.58	•	•		•	•	•	•	•	•	•	9						0						•						1
27.50[W]	81.0	5.68	•	•		•		•	•		•		6			•			1		•				•				•	•		4
26.00[W]	77.5	6.58	•	•		•	•	•	•	•	•	•	9						0	•	•				•				•			4
25.80[W]	69.0	9.43	•	•		•	•	•	•	•	•	•	9						0	•	•				•				•			4
Norris Run (WWH)																																
1.3[H]	62.0	17.2	•	•			•	•	•		•		6	•					1		•			•			•		•	•	•	6
Horseshoe Run (WWH)																																
0.3[H]	63.5	23.7	•	•			•	•		•	•		6						0						•				•		•	3
Sugar Run (WWH)																																
1.3[H]	69.0	30.3	•	•		•	•	•	•	•	•	•	9						0		•						•		•		•	4
Delaware Run(WWH)																																
1.2[H]	61.0	13.3	•	•				•			•		4			•	•		2					•	•			•	•	•		5
0.2[H]	40.0	3.70		•									1	•		•	•	•	4					•	•	•		•	•	•		6

(Source: Ohio EPA, 2001; Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES
QHEI Qualitative Habitat Evaluation Index
WWH Warmwater Habitat
MWH Modified Warmwater Habitat

2.3 Summary of HUC-12 Pollution Causes and Associated Sources

Sampling conducted in 2011 and 2016 has demonstrated that the five sampling locations in the Olentangy River contained within the **Delaware Run-Olentangy River HUC-12** are meeting WQS for the WWH designation. In 1999 and 2003, no tributary sampling locations were meeting WQS. Near-field impairment in the tributaries is primarily driven by land use influences and habitat alterations (Table 15). These alterations leave streambanks vulnerable to excessive erosion through hydrologic shear

stress or reduction in the landscape's capacity to buffer sediment and nutrient-laden runoff from surface flow into waterways.

Table 15: Causes and Sources of Impairments for Sampling Locations in the Delaware Run-Olentangy River HUC-12

Delaware Run-Olentangy River HUC-12 (05060001 10 07)				
River Mile	**Primary Cause(s)**	**Primary Source(s)**	**Attainment Status**	**Location**
Olentangy River (WWH)				
32.10[W]	--	--	Full	USGS Gage, Dst. Delaware Reservoir
28.20[W]	--	--	Full	Panhandle Road
27.50[W]	--	--	Full	Adj. Hudson Road, at Bend
26.00[W]	--	--	Full	Central Avenue
25.80[W]	--	--	Full	Williams Street
Norris Run (WWH)				
1.3[H]	Habitat alteration, nutrient enrichment, siltation	Riparian removal, urbanization	Non	Penry Road
Horseshoe Run (WWH)				
0.3[H]	Low flow conditions	Natural sources	Partial	Panhandle Road
Sugar Run (WWH)				
1.3[H]	Siltation, nutrient enrichment	Urban influences	Non	Salt Storage Road
Delaware Run (WWH)				
1.2[H]	Flow hydrology, habitat alterations, sewage	Development, urban runoff, CSO/SSO	Non	Limestone Park
0.2[H]	Flow hydrology, habitat alterations, sewage	Development, urban runoff, CSO/SSO	Non	Henry Street

(Source: Ohio EPA, 2001; Ohio EPA, 2005; Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES
WWH Warmwater Habitat
CSO Combined Sewer Overflow
SSO Sanitary Sewer Overflow

In addition to the near-field impairments that exist in this sub-watershed, the presence and persistence of the hypoxic zone within the Gulf of Mexico has shown the need for reduced NPS pollution, particularly in regards to nitrogen, and to a lesser extent phosphorus, throughout the entire MARB, of which the Ohio River is a main tributary. Nitrogen loss within the **Delaware Run-Olentangy River HUC-12** contributes to this far-field impairment. Ohio EPA has estimated nitrogen loadings from individual sub-watersheds in targeted areas of the ORB. These estimates include a breakdown of estimated loads from contributing sources of NPS pollutants, including agricultural lands/activities and developed/urban lands (Table 16). Efforts to reduce nutrients from each of these contributing sources will focus on reaching the 20% reduction goal by 2025, as outlined by the HTF in 2014.

Table 16: Estimated Total Nitrogen Loadings from Contributing NPS Sources in the Delaware Run-Olentangy River HUC-12

	Agricultural Load (lbs/yr)	Developed/Urban Load (lbs/yr)
Current Estimates*	490,000	32,000
Target Loadings	392,000	25,500

(Source: personal communication with Rick Wilson, Ohio EPA, November 12, 2020)

NOTES
**Estimated using two significant figures*

2.4 Additional Information for Determining Critical Areas and Developing Implementation Strategies

Del-Co routinely conducts water quality sampling throughout the **Delaware Run-Olentangy River HUC-12**. Select results from 2016-2018 are shown in Table 17. While the State of Ohio does not have WQS for nutrients, target concentrations are recommended for biocriteria attainment. For headwaters streams, target values are 1.0 mg/L for nitrate+nitrite and 0.08 for total phosphorus (Ohio EPA, 1999). Average nutrient values in every tributary exceed these recommended concentrations for both nitrate+nitrite and total phosphorus, with the exception of Delaware Run. Average nitrate+nitrite concentrations are just under the threshold in Delaware Run.

Norris Run, Sugar Run and Delaware Run have the Primary Contact Recreation (PCR) use designation. Water samples obtained for *E.coli* should not exceed 126 Colony Forming Units (CFU)/100 mL[4]. For streams that have been given the Secondary Contact Recreation (SCR) use designation, like Horseshoe Run, WQS are set at 1,030 CFU/mL. The average values presented in Table 17 are not necessarily equivalent to the geometric mean of the dataset, but they do indicate elevated levels of *E.coli* in the tributaries. The *Upper Olentangy Watershed Management and Action Plan* indicates the majority of fecal contamination within the watershed is from failing HSTS (OWA, 2006).

Table 17: Select Water Quality Sampling Results in Tributary Locations, 2016-2018

Delaware Run-Olentangy River HUC-12 (05060001 10 07)				
Chemical Parameter	**Average Concentration (mg/L)**	**Minimum Concentration (mg/L)**	**Maximum Concentration (mg/L)**	**Count**
Norris Run (WWH)				
Total nitrogen	4.75	0.84	21.81	20
Nitrate	3.03	0.05	12.2	26
Total phosphorus	0.25	0.01	1.35	21
*Escherichia coli**	587.8	0.05	2,420.0	19
Horseshoe Run (WWH)				
Total nitrogen	5.01	0.65	14.94	11
Nitrate	3.54	0.06	13.90	23
Total phosphorus	0.18	0.04	0.44	21
*Escherichia coli**	686.9	54.0	2,420.0	20

[4] One Colony Forming Unit is equivalent to one Most Probable Number (MPN) unit.

Delaware Run-Olentangy River HUC-12 (05060001 10 07)				
Chemical Parameter	Average Concentration (mg/L)	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Count
Greenwood Lake (Sugar Run) (WWH)				
Total nitrogen	5.03	1.36	27.96	20
Nitrate	3.76	0.05	14.90	24
Total phosphorus	0.18	0.04	0.51	21
*Escherichia coli**	156.7	10.0	961.0	22
Delaware Run (WWH)				
Total nitrogen	2.25	0.92	7.87	19
Nitrate	0.99	0.36	4.06	26
Total phosphorus	0.25	0.05	0.86	21
*Escherichia coli**	6,103.0	163.0	53,934.0	16

(Source: personal communication with Jeff Kaufmann, Del-Co and Caroline Cicerchi, City of Delaware)

NOTES

* *Escherichia coli is measured in Most Probable Number (MPN)/100 mL*

Assessment data from the 1999 TMDL sampling event, the 2003 TMDL sampling event and the 2011 and 2016 post-dam removal studies referenced in the *2020 Ohio Integrated Report*, *2016 and 2017 Biological and Habitat Studies of the Rivers and Streams in 33 Section 319(h) and SWIF/GLRI Project Areas in Ohio*, *Biological and Water Quality Study of the Olentangy River, Whetstone Creek and Select Tributaries, 2003-2004*, *Total Maximum Daily Loads for the Olentangy River Watershed*, *Biological and Water Quality Study of the Olentangy River and Selected Tributaries 1999* and the *Upper Olentangy Watershed Management and Action Plan* were used in the development of this NPS-IS (Ohio EPA, 2020b; Ohio EPA, 2020a; Ohio EPA, 2005; Ohio EPA, 2007; Ohio EPA, 2001; OWA, 2006). Any additional documents and/or studies created by outside organizations that were used as supplemental information to develop this NPS-IS are referenced in Chapter 5 (Works Cited), as appropriate.

CHAPTER 3: CRITICAL AREA CONDITIONS AND RESTORATION STRATEGIES

3.1 Overview of Critical Areas

Overall, ten sampling sites are located in the **Delaware Run-Olentangy River HUC-12**: five are within the Olentangy River mainstem and five are located in tributaries, including Norris Run (one site), Horseshoe Run (one site), Sugar Run (one site) and Delaware Run (two sites). The Olentangy River sites are all in *Full Attainment* of the WWH designation, while the tributary locations are not. Sites within Norris Run, Sugar Run and Delaware Run are in *Non-Attainment* of the WWH designation, and Horseshoe Run is in *Partial Attainment* of the WWH designation. Impairment within Horseshoe Run is attributed to natural sources (low flow conditions), while impairment within the other three tributaries results from urban runoff, urbanization and riparian area removal.

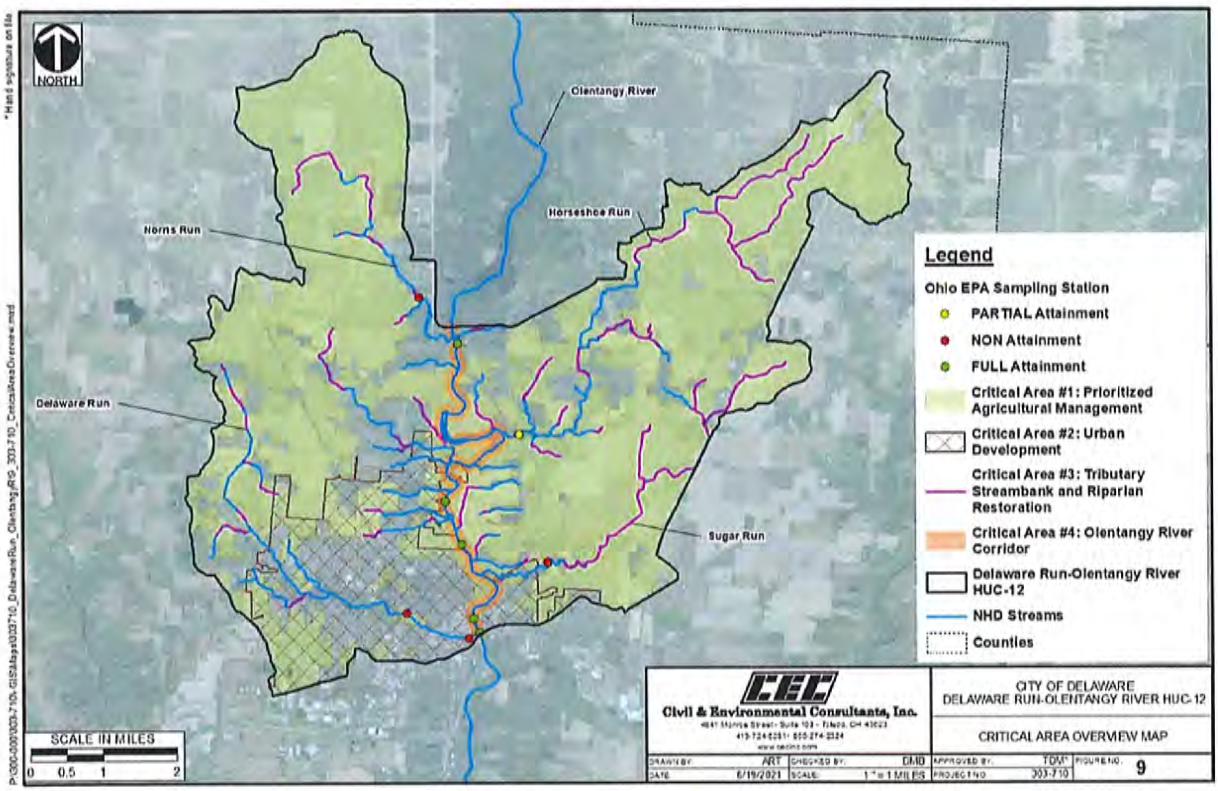

Figure 9: Delaware Run-Olentangy River HUC-12 Critical Area Overview[5]

Four critical areas have been identified within the **Delaware Run-Olentangy River HUC-12** (Figure 9). Several critical areas will address far-field effects of nutrients and sediments flowing to the Ohio River, Mississippi River and Gulf of Mexico, the end receiving waterbody of drainage from the **Delaware Run-Olentangy River HUC-12**. However, many BMP implementation activities nested within this sub-watershed also simultaneously benefit near-field effects in the tributaries and provide protection for the high quality waters of the Olentangy. Because many of these BMPs offer dual benefits of nutrient and

[5] Critical area maps developed with the most recently available digital geographic data and may not reflect current land use or existing conditions that have changed since digital publication.

sediment reduction and both agricultural and urban land prioritization is not substantially different for nutrient and sediment reduction within this sub-watershed, critical areas for each of these land use categories address both near-field and far-field impacts (Table 18). Additional critical areas may be developed in subsequent versions of this NPS-IS.

Table 18: Delaware Run-Olentangy River HUC-12 Critical Area Descriptions

Critical Area Number	Critical Area Description	NPS Pollutant Addressed	Focus Area
1	Prioritized Agricultural Lands	Sediment and nutrients	Far-field (with near-field effects)
2	Prioritized Urban Lands	Sediment and nutrients	Far-field (with near-field effects)
3	Streambank and Riparian Restoration	Sediment and nutrients	Near-field
4	Olentangy River Corridor	High Quality Waters Protection	Near-field

3.2 Critical Area #1: Conditions, Goals & Objectives for Prioritized Agricultural Lands

3.2.1 Detailed Characterization

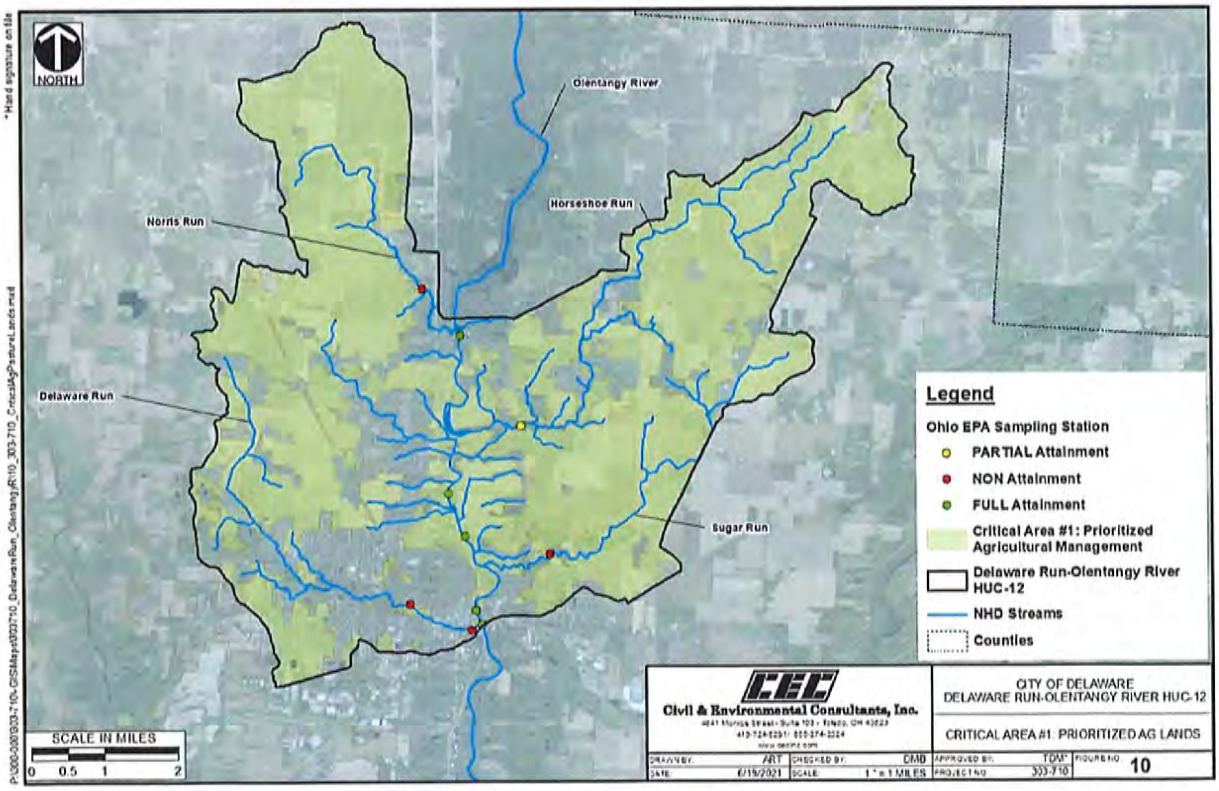

Figure 10: Delaware Run-Olentangy River HUC-12 Critical Area #1

Ohio's *Nutrient Mass Balance Study* (Ohio EPA, 2020c) estimated 82% of the nitrogen nutrient loading to the Ohio River via the Scioto River was primarily from nonpoint sources, related to land use activities,

with only small contributions from failing HSTS and NPDES-permitted facilities. Given the dominance of agricultural land use throughout the greater Scioto River watershed, the use of BMPs are recommended for agricultural operations to minimize nutrient and associated sediment loss to local waterways and drainage ditches through surface and tile flow. While BMPs are encouraged on all agricultural lands, certain lands are more prone to nutrient loss than others and are prioritized for BMP implementation. Lands that are proximal to streams and ditches or do not currently implement specific BMPs are most vulnerable to excessive nutrient and sediment loss, and these lands are prioritized as critical within this watershed. *Critical Area #1* contains prioritized agricultural lands throughout the **Delaware Run-Olentangy River HUC-12** (Figure 10). Of the 20,073 agricultural acres in the **Delaware Run-Olentangy River HUC-12**, prioritized lands are operations that meet one or more of the following criteria:

- Lands directly adjacent to streams or drainage waterways;
- Lands with recurrent gully erosion;
- Lands in need of surface water management;
- Lands with uncontrolled or unfiltered subsurface drainage water;
- Lands without a current (<3 years) nutrient management plan or soil test.

3.2.2 Detailed Biological Conditions

Fish community data for the ten sampling locations within the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 19). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by Ohio EPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. Within the Olentangy River, fish communities performed well, with all sites exceeding biocriteria for WWH streams and reaching EWH thresholds, attributed to the removal of three lowhead dams along the mainstem (Ohio EPA, 2020a). In the tributaries, community diversity declined, with no site exceeding 17 species. Habitat scores met expected thresholds for WWH streams; however, fish communities generally fell within the Poor to Fair range, with the exception of Horseshoe Run, indicating stress from land use characteristics, particularly in the upstream reaches of each tributary.

Table 19: Critical Area #1 – Fish Community and Habitat Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)							
RM	**Drainage Area (mi^2)**	**Total Species**	**QHEI**	**IBI**	**MIwb[a]**	**Predominant Species (Percent of Catch)**	**Narrative Evaluation**
Olentangy River (WWH)							
[b]32.10[W]	393.0	34	80.5	46	10.8	Bluegill sunfish (15%), green sunfish (9%), black crappie (9%)	Very Good – Exceptional
[c]28.20[W]	409.0	29	82.3	50	10.3	Central stoneroller (38%), banded darter (13%), spotfin shiner (8%)	Exceptional
[b]27.50[W]	411.0	33	81.0	43	9.4	Bluntnose minnow (21%), bluegill sunfish (17%), spotfin shiner (11%)	Good – Exceptional
[c]26.00[W]	421.0	30	83.0	48	11.0	Smallmouth bass (14%), central stoneroller (14%), northern hog sucker (11%)	Very Good – Exceptional

[c]25.80[W]	421.1	23	77.5	48	9.6	Central stoneroller (23%), sand shiner (22%), northern hog sucker (13%)	Very Good – Exceptional
Norris Run (WWH)							
[d]1.3[H]	5.8	17	62.0	23*	N/A	Bluntnose minnow (70%), white sucker (8%), creek chub (7%)	Poor
Horseshoe Run (WWH)							
[e]0.3[H]	11.3	13	63.5	38[ns]	N/A	Central stoneroller (43%), creek chub (32%), rainbow darter (6%)	Marginally Good
Sugar Run (WWH)							
[d]1.3[H]	3.5	8	69.0	29*	N/A	Orangethroat darter (54%), green sunfish (27%), white sucker (8%)	Fair
Delaware Run (WWH)							
[e]1.2[H]	9.5	10	61.0	34*	N/A	Johnny darter (36%), fantail darter (22%), creek chub (11%)	Fair
[e]0.2[H]	10.1	8	40.0	30*	N/A	Johnny darter (24%), central stoneroller (22%), bluntnose minnow (15%)	Fair

(Source: Ohio EPA, 2001; Ohio EPA, 2005; Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES

QHEI *Qualitative Habitat Evaluation Index*

IBI *Index of Biotic Integrity*

a *The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi²).*

W *Wading site*

H *Headwater site*

* *Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*

N/A *Not applicable*

WWH *Warmwater Habitat*

b *2011 sample*

c *2016 sample*

d *2003 sample*

e *1999 sample*

Characteristics of the aquatic macroinvertebrate community for the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 20). Analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates found by Ohio EPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. The macroinvertebrate communities within the Olentangy River mainstem performed well, despite persistence of MWH attributes that could affect them (i.e., heavy silt cover, high embeddedness, etc.). Improvement in many of these locations is a direct result of the removal of three lowhead dams within the sub-watershed. No macroinvertebrate community within the four tributaries met WWH thresholds, with scores falling in the Poor to Fair range. Tributary communities were consistently populated with intolerant taxa and counts of sensitive and *Ephemeroptera, Plecoptera* and *Trichoptera* (EPT) species were relatively low.

Table 20: Critical Area #1 – Macroinvertebrate Community Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)			
RM	**ICI Score-Narrative[a]**	**Notes (Density of Ql./Qt.)**	**Predominant Species**
Olentangy River (WWH)			
[b]32.10[W]	38 – Good 14 sensitive taxa	--	*Rheotanytarsus* sp (F), *Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F)
[c]28.20[W]	38 – Good 23 sensitive taxa	--	*Polypedilum (Uresipedilum) flavum* (F), *Baetis intercalaris* (F), *Cheumatopsyche sp* (F)
[b]27.50[W]	46 – Exceptional 36 sensitive taxa	--	*Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F), *Maccaffertium pulchellum* (MI)
[c]26.00[W]	46 – Exceptional 29 sensitive taxa	--	*Baetis intercalaris* (F), *Cheumatopsyche sp* (F), *Maccaffertium pulchellum* (MI)
[c]25.80[W]	48 – Exceptional 31 sensitive taxa	--	*Baetis intercalaris* (F), *Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F)
Norris Run (WWH)			
[d]1.3[H]	N/A – Low Fair* 5 sensitive taxa	Moderate	Blackflies (F)
Horseshoe Run (WWH)			
[e]0.3[H]	N/A – Fair* 4 sensitive taxa	--	Alder flies, midges
Sugar Run (WWH)			
[d]1.3[H]	N/A – Low Fair* 9 sensitive taxa	Moderate	Blackflies (F), sow bugs (F)
Delaware Run (WWH)			
[e]1.2[H]	N/A – Poor* 1 sensitive taxa	--	River snails
[e]0.2[H]	N/A – Poor* 2 sensitive taxa	--	River snails

(Source: Ohio EPA, 2001; Ohio EPA, 2005; Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES

a Narrative evaluation used in lieu of ICI

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

b 2011 sample

c 2016 sample

d 2003 sample

e 1999 sample

H Headwater site

W Wading site

WWH Warmwater Habitat

3.2.3 Detailed Causes and Associated Sources

Five sampling sites in the Olentangy River mainstem in the **Delaware Run-Olentangy River HUC-12** are currently in *Full Attainment* of the WWH designation. One sampling site within Norris Run is in *Non-*

Attainment of the WWH designation due to habitat alteration, nutrient enrichment and siltation from riparian removal and urbanization. One sampling location in Horseshoe Run is in *Partial Attainment* of the WWH designation due to naturally occurring low flow conditions, and one sampling location within Sugar Run is in *Non-Attainment* of the WWH designation due to siltation and nutrient enrichment from urban influences. Two sampling locations within Delaware Run are in *Non-Attainment* of the WWH designation due to flow hydrology, habitat alterations and sewage from development, urban runoff and CSO/SSO impacts. The headwaters of these tributaries are agricultural in nature, and land use activities upstream are also contributing to impairment in downstream reaches and beyond. Despite the high performing communities in the Olentangy River mainstem, residual negative habitat attributes persist. The data summarized previously in Table 14 (p.22) reveal a direct link between the presence of attributes in the watershed that have influence on the aquatic communities throughout the streams in *Critical Area #1*. These contributing attributes in *Critical Area #1* include:

- Heavy/Moderate Silt Cover (Olentangy River, Norris Run, Sugar Run)
- Low Sinuosity (Olentangy River, Horseshoe Run, Delaware Run)
- High/Moderate Embeddedness (all streams)
- High/Moderate Riffle Embeddedness (Olentangy River, Norris Run, Delaware Run)
- Lack of Riffle (Norris Run, Horseshoe Run, Sugar Run)

Many of the habitat attributes found during the QHEI sampling event (i.e., low sinuosity, substrate embeddedness, etc.) are likely a result of land use activities, which include impacts from agricultural operations within the headwaters portions of the watershed. From a far-field perspective, agricultural land use activities contribute to excessive nutrient loadings to the Ohio River, eventually reaching the Mississippi and then the Gulf of Mexico, contributing to its extensive hypoxic zone. The use of a variety of BMPs on private agricultural lands, at both in-field and edge-of-field locations can help reduce the amount and concentration of nutrient-laden surface runoff and tile drainage. Many BMPs can not only address reduction of nutrients in surface and drainage water, but they can also simultaneously address the loss of sediment from agricultural lands, which contributes to sediment-covered substrates in local waterways. In addition, a reduction of sediment loss to local waterways can also reduce nutrient loss to near-field and far-field waterbodies, as nutrients will also adsorb to sediment particles, potentially becoming dissolved at a later time. The implementation of BMPs on agricultural lands that are prone to sediment and nutrient loss serves as a benefit for both near-field and far-field waterbodies.

3.2.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores in order to remove a waterbody's impairment status or protect quality areas to maintain attainment status. Agricultural land use activities in *Critical Area #1* contribute to not only near-field impairment and stressed aquatic communities in the four tributaries, but also far-field impairment through excessive nutrient loss to local waterways that flow to the Ohio River. The Ohio EPA has estimated nutrient loadings associated with various land uses and sources within targeted HUC-12s in the ORB, and has set nitrogen reduction goals for agricultural and urban sources. To achieve the desired nitrogen reduction from agricultural land use in the **Delaware Run-Olentangy River HUC-12**, the following goal has been established:

Goal 1. Reduce nitrogen loading contributions in the **Delaware Run-Olentangy River HUC-12** to a level at or below 392,000 lbs/year (20% reduction).
NOT ACHIEVED: Current estimated load contribution is 490,000 lbs/year.

Simultaneous goals relate to the improvement of in-stream conditions within the Olentangy River, Norris Run, Horseshoe Run, Sugar Run and Delaware Run in order to improve and/or maintain the health of aquatic communities. Implementation of BMP objectives geared towards nutrient reduction efforts will generally also help make incremental progress towards the following goals:

Goal 2. Maintain IBI score at or above 40 at a USGS gage downstream of the Delaware Reservoir in Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 46.

Goal 3. Maintain MIwb score at or above 8.3 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 10.8.

Goal 4. Maintain ICI score at or above 36 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 38.

Goal 5. Maintain QHEI score at or above 60 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 80.5.

Goal 6. Maintain IBI score at or above 40 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 50.

Goal 7. Maintain MIwb score at or above 8.3 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 10.3.

Goal 8. Maintain ICI score at or above 36 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 38.

Goal 9. Maintain QHEI score at or above 60 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 82.3.

Goal 10. Maintain IBI score at or above 40 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 43.

Goal 11. Maintain MIwb score at or above 8.3 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 9.4.

Goal 12. Maintain ICI score at or above 36 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 46.

Goal 13. Maintain QHEI score at or above 60 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 81.

Goal 14. Maintain IBI score at or above 40 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 48.

Goal 15. Maintain MIwb score at or above 8.3 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 11.

Goal 16. Maintain ICI score at or above 36 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 46.

Goal 17. Maintain QHEI score at or above 60 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 83.

Goal 18. Maintain IBI score at or above 40 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 48.

Goal 19. Maintain MIwb score at or above 8.3 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 9.6.

Goal 20. Maintain ICI score at or above 36 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 48.

Goal 21. Maintain QHEI score at or above 60 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 77.5.

Goal 22. Achieve IBI score at or above 40 at Penry Road in Norris Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of 23.

Goal 23. Achieve ICI score at or above 36 (Good) at Penry Road in Norris Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of Low Fair (~28).

Goal 24. Maintain QHEI score at or above 60 at Penry Road in Norris Run (RM 1.3).
✓ ACHIEVED: Site currently has a score of 62.

Goal 25. Achieve IBI score at or above 40 at Panhandle Road in Horseshoe Run (RM 0.3).
NOT ACHIEVED: Site currently has a score of 38.

Goal 26. Achieve ICI score at or above 36 (Good) at Panhandle Road in Horseshoe Run (RM 0.3).
NOT ACHIEVED: Site currently has a score of Fair (~32).

Goal 27. Maintain QHEI score at or above 60 at Panhandle Road in Horseshoe Run (RM 0.3).
✓ ACHIEVED: Site currently has a score of 63.5.

Goal 28. Achieve IBI score at or above 40 at Salt Storage Road in Sugar Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of 29.

Goal 29. Achieve ICI score at or above 36 (Good) at Salt Storage Road in Sugar Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of Low Fair (~28).

Goal 30. Maintain QHEI score at or above 60 at Salt Storage Road in Sugar Run (RM 1.3).
✓ ACHIEVED: Site currently has a score of 69.

Goal 31. Achieve IBI score at or above 40 at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of 34.

Goal 32. Achieve ICI score at or above 36 (Good) at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 33. Maintain QHEI score at or above 60 at Limestone Park in Delaware Run (RM 1.2).
✓ ACHIEVED: Site currently has a score of 61.

Goal 34. Achieve IBI score at or above 40 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 30.

Goal 35. Achieve ICI score at or above 36 (Good) at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 36. Achieve QHEI score at or above 60 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 40.

Objectives

In order to make substantive progress toward the achievement of the nitrogen load reduction goal of 98,000 lbs for the **Delaware Run-Olentangy River HUC-12**, efforts must commence on more widespread implementation, according to the following objectives within *Critical Area #1*. Additionally, actions taken to address nutrient reduction will also help reduce stressors on aquatic communities within the Olentangy River and its tributaries, Norris Run, Horseshoe Run, Sugar Run and Delaware Run.

Objective 1: Implement nutrient management (planning and implementation through soil testing and Variable Rate Technology (VRT)) on at least at least 5,700 additional acres.

Objective 2: Plant cover crops on at least 3,800 additional acres annually.[6]

[6] Cover crop usage is estimated to occur on approximately 570 acres, based upon OpTIS data (Dagan, 2019). Cover crop plantings may be implemented in the absence of grant funding.

Objective 3: Implement conservation tillage (30-50% residue) on at least 3,800 additional acres[7].

Objective 4: Reduce nutrient loss from subsurface tile drainage through the installation of drainage water management structures that drain at least 500 acres.

Objective 5: Reduce erosion and nutrient loss through the installation or rehabilitation of grassed waterways (as a standalone practice or coupled with erosion control structures/other drainage management practices) that receive/treat surface water from at least 1,000 acres.

Objective 6: Reduce erosion and nutrient loss through the installation of filter strips/buffers (of at least a 50 ft setback) that receive/treat surface water from at least 1,300 acres.

Objective 7: Reduce erosion and nutrient loss through the installation of forested riparian buffers (of at least a 100 ft setback) that receive/treat surface water from at least 80 acres.

Objective 8: Install nitrogen bioreactors to treat subsurface drainage water from 50 acres.

Objective 9: Create, enhance and/or restore at least 50 acres of wetlands and/or water retention basins for treatment of agricultural runoff and/or nutrient reduction purposes from 1,250 total agricultural acres.

Objective 10: Reduce erosion from agricultural streambanks and drainage conveyances through natural channel design or two-stage ditch design stabilization techniques to at least 9,300 linear feet (1.75 miles).

Objective 11: Increase the retirement of marginal and highly vulnerable lands by enrolling at least 50 acres into programs such as the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP).

These objectives will be directed towards implementation on prioritized agricultural lands and are estimated to reach the nitrogen reduction goal (Table 21). Additional conservation activities within the **Delaware Run-Olentangy River HUC-12**, both on priority and secondary lands, may also make incremental progress towards nitrogen reduction goals. The implementation of BMPs included in these objectives, as well as BMPs implemented through federal and state programs and other voluntary efforts may be tracked to monitor progress towards nitrogen reduction goals within the watershed.

[7] Current estimates indicate reduced tillage occurs on approximately 7,400 acres, based upon OpTis data (Dagan, 2019).

Table 21: Estimated Annual Nutrient Load Reductions from Each Objective

Objective Number	Best Management Practice	Total Acreage Treated	Estimated Annual Nitrogen Load Reduction (lbs)
1	Nutrient Management (Planning and Implementation through Soil Testing and VRT)[a]	5,700	20,340
2	Cover Crops	3,800	17,710
3	Conservation Tillage (30-50% Residue)	3,800	15,050
4	Drainage Water Management Structures	500	4,500
5	Grassed Waterways[b]	1,000	7,730
6	Filter Strips/Buffers (of at least 35 ft)[c]	1,300	11,020
7	Forested Buffers (of at least 100 ft)	80	940
8	Bioreactor	50	530
9	Wetlands[d] and/or Water Retention Basins	1,250[e]	8,070
10	Stream Stabilization and/or Two-Stage Ditch	650[f]	11,120
11	Land Retirement	50	1,110
	TOTAL	**18,180**	**98,120**

(Source Model: Spreadsheet Tool for Estimating Pollutant Loads (STEPL), Version 4.4, (USEPA, 2018))

NOTES

a Nutrient Management consists of "managing the amount (rate), source, placement (method of application) and timing of plant nutrients and soil amendments to budget, supply and conserve nutrients for plant production; to minimize agricultural nonpoint source pollution of surface and groundwater resources; to properly utilize manure or organic byproducts as a plant nutrient source; to protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen) and the formation of atmospheric particulates; and/or to maintain or improve the physical, chemical and biological condition of soil," as defined by the STEPL guidance documents (Tetra Tech, 2018).

b Grassed waterway nitrogen reduction efficiency estimated from urban grass swale efficiencies in STEPL.

c Concentrated flow must be distributed so the area can slow, filter, and/or soak in runoff. Design specifications will be Field Office Technical Guide (FOTG) 393 Filter strips/area, and/or CRP CP-11 or CP2 Filter recharge areas. Conservation Cover (FOTG 327 and CRP CP-21) would not be designed to treat contributing runoff.

d Nitrogen load reduction for wetlands was calculated using the estimated 5-year average cropland nutrient yield in the Scioto River watershed from 2013-2017 (12.9 lbs/acre nitrogen), provided by Heidelberg University National Center for Water Quality Research.

e If drainage water is routed through restored/created wetlands, it is assumed a 50% reduction in nitrogen from total nutrient yield for the drainage area, with a 25:1 ratio of drainage area to receiving wetland (Hoffmann et al., 2012; Woltemade, 2000). For this objective of 50 wetland acres, total drainage area is 1,250 acres.

f One linear foot of stream is estimated to drain 0.077 acres in this sub-watershed.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint*

Source Management Plan Update (Ohio EPA, 2020c) will be utilized as a reevaluation tool for its listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and,
- High Quality Waters Protection Strategies.

3.3 Critical Area #2: Conditions, Goals & Objectives for Nutrient Reduction from Urban Lands

3.3.1 Detailed Characterization

In urban environments, NPS contributions to stormwater runoff can come from a variety of sources, including fertilizers, detergents, leaves and detritus, wild and domesticated animal excrement, lubricants, sediment erosion, and organic and inorganic decomposition processes (Carpenter *et. al*, 1998; Burton and Pitt, 2001). Urbanization and development often leads to increased pollutant availability, increased runoff, increased peak flows and stream "flashiness", stream instability, decreased stream function, decreased storage and retention capabilities and decreased pollutant assimilation in soils (ODNR, 2006b). Many of these effects have a direct impact on aquatic life. Even in areas of low amounts of urbanization (5-10% imperviousness), stream ecosystems can rapidly decline (Schueler, 1994). The *Olentangy Watershed Planning Partnership Balanced Growth Plan* recognizes stormwater runoff as one of the primary sources of impairment in the Olentangy watershed (MORPC, 2012).

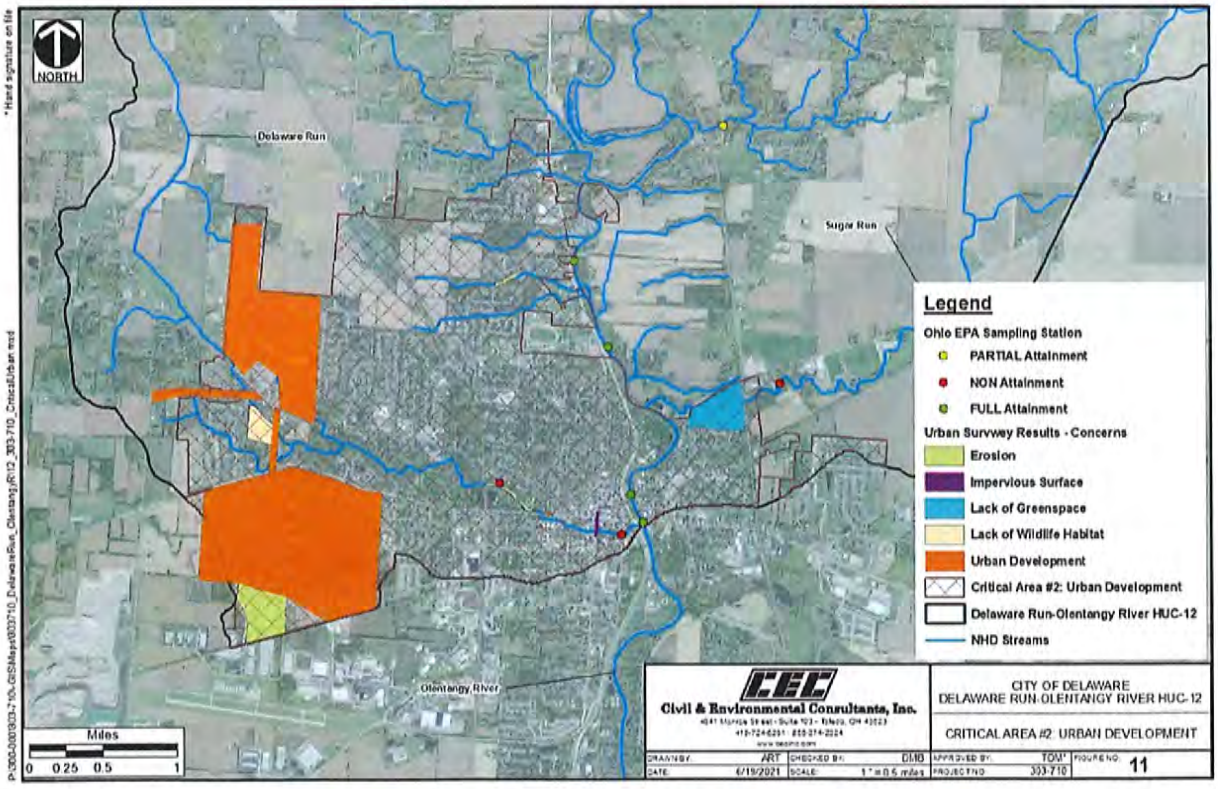

Figure 11: Delaware Run-Olentangy River HUC-12 Critical Area #2

Critical Area #2 contains priority urban lands within the City of Delaware, where development pressure is high and effects of urban runoff are apparent in Delaware Run and portions of Sugar Run. Delaware is the major population center within the **Delaware Run-Olentangy River HUC-12** and covers an area of approximately 19.9 square miles (12,736 acres), of which approximately 39% lies within the **Delaware Run-Olentangy River HUC-12** (~4,939 acres). Approximately 55% of *Critical Area #2* consists of impervious surface dedicated to residential, commercial, industrial or transportation uses (Table 22). *Critical Area #2* contains the final mile of Sugar Run and the lower 4.0 miles of Delaware Run. While *Critical Area #2* contains or is adjacent to a 3.0 mile segment of the Olentangy River (RM 28.8 – 25.8), the Olentangy River Corridor is not listed within *Critical Area #2*, but is instead listed in *Critical Area #4* for its objectives related to protection of High Quality Waters.

Table 22: Critical Area #2 – Land Use Classifications

Land Use	Delaware Run-Olentangy River HUC-12 (05060001 10 07)		
	Area (mi^2)	Area (acres)	% Critical Area
Commercial/Industrial/Transportation	0.35	227.21	4.60%
Crop	2.63	1,682.36	34.06%
Deciduous Forest	0.75	478.50	9.69%
Open Water	0.01	8.75	0.18%
Pasture	0.05	33.32	0.67%
Residential	3.86	2,472.16	50.06%
Urban/Recreational Grasses	0.06	36.61	0.74%
Total	**7.71**	**4,938.91**	**100.00%**

(Source: Homer et al., 2020)

Both the City of Delaware and Delaware County as a whole are known to be areas of intense development—the County has one of the fastest growing housing markets across the country, growing at about 2.2% (Hendrix, 2020). Population estimates cite over 41,280 people living within the City of Delaware in 2019, an 18.7% increase from the last census conducted in 2010 (US Census Bureau, 2021). The 2007 TMDL cited that "the most serious threat to channel stability, and possibly overall water quality and biological integrity in the Olentangy watershed is the rapid conversion of land to urban uses, resulting in increased runoff and sediment transport capacity" (Ohio EPA, 2007). A survey conducted in 2020-2021 as part of the NPS-IS planning effort revealed residents are also concerned with urban development, particularly in the western portion of the city. Areas of concern identified through the survey are shown on Figure 11 (p. 37).

3.3.2 Detailed Biological Conditions

Fish community data for the two sampling locations within *Critical Area #2* in the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 23). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by Ohio EPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. In Delaware Run, fish communities scored in the Fair range. Diversity in catch was low, with only 8-10 species observed at each location. Habitat in Delaware Run was of relatively high quality at RM 1.2 (Limestone Park), despite the abundance of high-influence and moderate-influence MWH attributes and

severely eroding banks. Habitat at RM 0.2 (Henry Street) severely declined, with a score of 40 and a two-fold increase of high-influence MWH attributes from the upstream sampling location in Limestone Park.

Table 23: Critical Area #2 – Fish Community and Habitat Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)							
RM	**Drainage Area (mi^2)**	**Total Species**	**QHEI**	**IBI**	**MIwb[a]**	**Predominant Species (Percent of Catch)**	**Narrative Evaluation**
Delaware Run (WWH)							
[b]1.2[H]	9.5	10	61.0	34*	N/A	Johnny darter (36%), fantail darter (22%), creek chub (11%)	Fair
[b]0.2[H]	10.1	8	40.0	30*	N/A	Johnny darter (24%), central stoneroller (22%), bluntnose minnow (15%)	Fair

(Source: Ohio EPA, 2001)

NOTES
QHEI Qualitative Habitat Evaluation Index
IBI Index of Biotic Integrity
a The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).
H Headwater site
** Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*
N/A Not applicable
WWH Warmwater Habitat
b 1999 sample

Characteristics of the aquatic macroinvertebrate community for the two sampling locations in *Critical Area #2* in the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 24). Analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates found by Ohio EPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. Macroinvertebrate communities at both Delaware Run locations scored poorly. Few sensitive species were found at each location; EPT species were also very low (three at RM 1.2 and one at RM 0.2). Habitat characteristics contributing to these poorly performing communities include sparse to no cover and high amounts of substrate and riffle embeddedness (Ohio EPA, 2001).

Delaware Run is highly channelized and constrained by development. Photo from E.P. Ferris and Associates, 2020.

Table 24: Critical Area #2 – Macroinvertebrate Community Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)			
RM	**ICI Score-Narrative[a]**	**Notes (Density of Ql./Qt.)**	**Predominant Species**
Delaware Run (WWH)			
[b]1.2[H]	N/A – Poor* 1 sensitive taxa	--	River snails
[b]0.2[H]	N/A – Poor* 2 sensitive taxa	--	River snails

(Source: Ohio EPA, 2001)

NOTES

a Narrative evaluation used in lieu of ICI
b 1999 sample
H Headwater site
WWH Warmwater Habitat

3.3.3 Detailed Causes and Associated Sources

The data summarized previously in Table 14 (p.22) reveal a direct link between the presence of attributes in the watershed that have an influence on the aquatic communities throughout Delaware Run in *Critical Area #2*. These contributing attributes in *Critical Area #2* include:

- Channelization
- No Sinuosity
- Fair/Poor Development
- No Fast Current
- High/Moderate Embeddedness
- High/Moderate Riffle Embeddedness

Near-field impairment in Delaware Run is attributed to flow hydrology, habitat alterations and sewage from development, urban runoff and CSO/SSO impacts. Actions taken to address habitat through in-stream work, as well upland activities to make progress towards a reduction in urban nutrients can help address both near-field impairment and impairment on a far-field scale. Reductions in nutrients in urban areas through the use of green infrastructure for the retention, detention and filtration of urban pollutants can help decrease overall NPS pollution and improve aquatic communities. Compared with natural land cover, shallow and deep infiltration, as well as evapotranspiration, decreases while surface runoff increases in urban lands (USEPA, 2003). When watersheds have as little as 10% impervious surface, studies have shown that not only does runoff increase substantially, but pollutant loads also increase (CWP, 1998). The *Lower Olentangy WAP in 2003* encourages the minimization of stormwater, the preservation of existing natural features in the urban landscape, improvements to site design and implementation of stormwater BMPs for the treatment of water quantity and quality throughout the Olentangy watershed (FLOW, 2003).

3.3.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores in order to remove a waterbody's impairment status or protect quality areas to maintain attainment status. Urban land use activities in *Critical Area #2* contribute to not only near-field impairment and stressed aquatic communities in the Delaware Run, but also far-field impairment through excessive nutrient loss to local waterways that flow to the Ohio River. Ohio EPA has estimated nutrient loadings associated with various land uses and sources within targeted HUC-12s in the ORB, and has set nitrogen reduction goals for agricultural and urban sources. To achieve the desired nitrogen reduction from urban land use in the **Delaware Run-Olentangy River HUC-12**, the following goal has been established:

Goal 1. Reduce nitrogen loading contributions in the **Delaware Run-Olentangy River HUC-12** to a level at or below 25,500 lbs/year (20% reduction).
NOT ACHIEVED: Current estimated load contribution is 32,000 lbs/year.

Simultaneous goals relate to the improvement of in-stream conditions within Delaware Run in order to improve and/or maintain the health of aquatic communities. Implementation of BMP objectives geared towards nutrient reduction efforts will generally also help make incremental progress towards the following goals:

Goal 2. Achieve IBI score at or above 40 at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of 34.

Goal 3. Achieve ICI score at or above 36 (Good) at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 4. Maintain QHEI score at or above 60 at Limestone Park in Delaware Run (RM 1.2).
✓ ACHIEVED: Site currently has a score of 61.

Goal 5. Achieve IBI score at or above 40 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 30.

Goal 6. Achieve ICI score at or above 36 (Good) at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 7. Achieve QHEI score at or above 60 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 40.

Objectives

In order to make substantive progress toward the achievement of the nitrogen load reduction goal of 6,500 lbs for the **Delaware Run-Olentangy River HUC-12**, effort must commence on more widespread implementation, according to the following objectives within *Critical Area #2*.

Objective 1: Reduce stormwater inputs and impacts in the sub-watershed by implementing green infrastructure projects within *Critical Area #2* that retain, detain, and/or treat runoff

from at least 2,000 acres of urbanized impermeable surfaces (i.e., parking lots, roads, etc.).

Objective 2: Reduce stormwater inputs and impacts in the sub-watershed by restoring and/or creating floodplain and wetland detention/storage basins to retain, detain and/or treat urban drainage from at least 200 acres.

Objective 3: Reduce excessive sedimentation and associated nutrients by restoring and stabilizing at least one mile (5,280 linear feet) of urban, scoured streambanks in the sub-watershed.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (Ohio EPA, 2020c) will be utilized as a reevaluation tool for its listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and,
- High Quality Waters Protection Strategies.

3.4 Critical Area #3: Conditions, Goals & Objectives for Tributary Streambank and Riparian Restoration

3.4.1 Detailed Characterization

The *Upper Olentangy WAP* addresses the need for streambank stabilization and riparian and floodplain restoration throughout the **Delaware Run-Olentangy River HUC-12** in areas where land use has resulted in bare/denuded banks susceptible to erosion and perennial streams have been disconnected from their floodplains (OWA, 2006). The *Upper Olentangy WAP* identified that at least 88.9 acres of riparian corridor were in need of restoration in order to meet a minimum 33-foot buffer around all streams within the **Delaware Run-Olentangy River HUC-12**, but the plan also recognized that aerial imagery used for that analysis was dated and that this number is likely an underestimation of needs specific to 2006 when the plan was published. Analysis of aerial imagery as part of this NPS-IS planning effort identified 146,360 linear feet (27.72 miles) of denuded banks within tributary locations.

Specific actions suggested for this sub-watershed in the TMDL include replanting and forestation of riparian and floodplain corridors, as well as restoration of streambanks through natural channel design techniques, two-stage ditch installation and bio-engineering techniques (Ohio EPA, 2007). Using the rationale described in the *Handbook for Developing Watershed Plans to Restore and Protect Our Waters*

(USEPA, 2008)(Section 10.3.4): "In general, management practices are implemented immediately adjacent to the waterbody or upland to address the sources of pollutant loads", *Critical Area #3* includes approximately 146,360 linear feet (27.72 miles) of stream length and a 75-foot buffer width on each side[8] (Figure 12). The potential for restoration of approximately 500 acres of riparian corridor and floodplain exists in *Critical Area #3*.

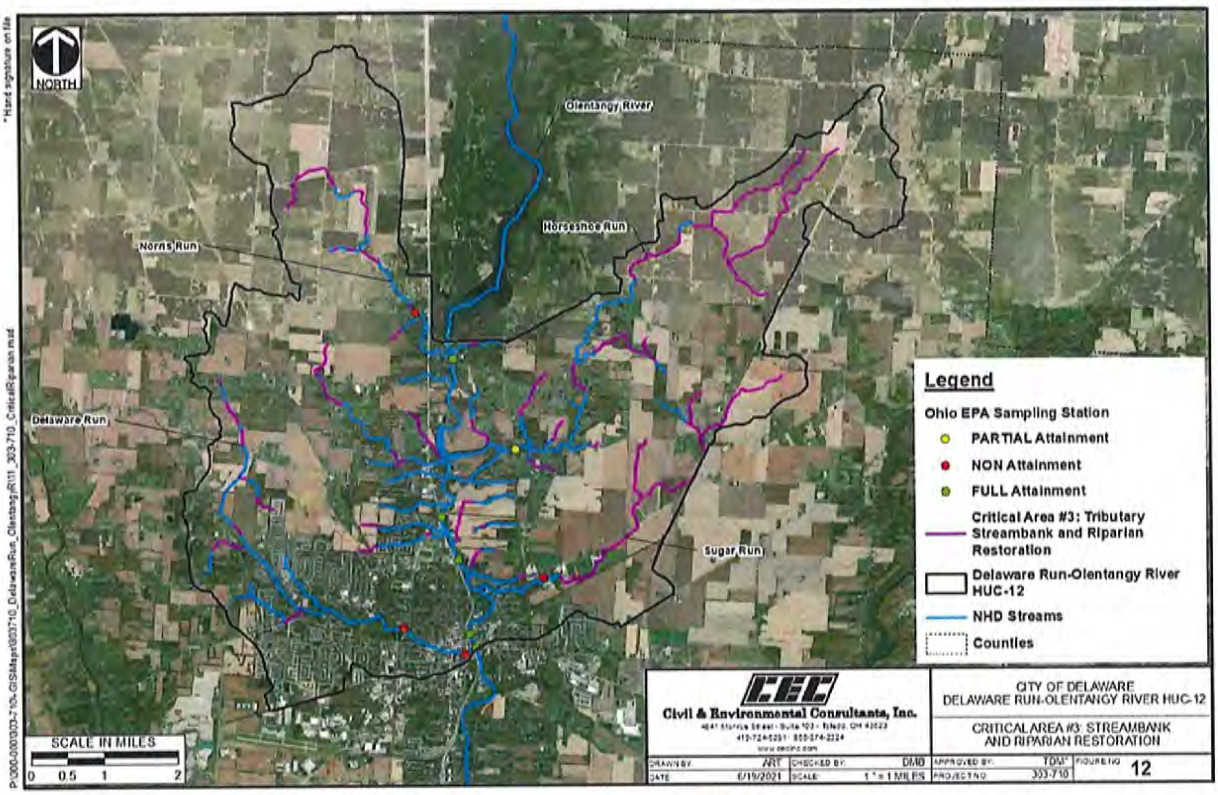

Figure 12: Delaware Run-Olentangy River HUC-12 Critical Area #3

3.4.2 Detailed Biological Conditions

Fish community data for the five sampling locations within the tributaries of Norris Run, Horseshoe Run, Sugar Run and Delaware Run in the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 25). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by Ohio EPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. Habitat scores met expected thresholds for WWH streams (QHEI ≥ 60), with the exception of Delaware Run (addressed in *Critical Area #2* for urban nutrient reduction). However, fish communities generally scored within the Poor to Fair range, indicating stress from adjacent and upstream land use, which was apparent in the abundance of high to moderate-influence MWH attributes.

[8] Recommended width for tributary drainage area size (Cuyahoga SWCD, undated).

Table 25: Critical Area #3 – Fish Community and Habitat Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)							
RM	Drainage Area (mi^2)	Total Species	QHEI	IBI	MIwb[a]	Predominant Species (Percent of Catch)	Narrative Evaluation
Norris Run (WWH)							
[b]1.3[H]	5.8	17	62.0	23*	N/A	Bluntnose minnow (70%), white sucker (8%), creek chub (7%)	Poor
Horseshoe Run (WWH)							
[c]0.3[H]	11.3	13	63.5	38[ns]	N/A	Central stoneroller (43%), creek chub (32%), rainbow darter (6%)	Marginally Good
Sugar Run (WWH)							
[b]1.3[H]	3.5	8	69.0	29*	N/A	Orangethroat darter (54%), green sunfish (27%), white sucker (8%)	Fair
Delaware Run (WWH)							
[c]1.2[H]	9.5	10	61.0	34*	N/A	Johnny darter (36%), fantail darter (22%), creek chub (11%)	Fair
[c]0.2[H]	10.1	8	40.0	30*	N/A	Johnny darter (24%), central stoneroller (22%), bluntnose minnow (15%)	Fair

(Source: Ohio EPA, 2001; Ohio EPA, 2005)

NOTES

QHEI Qualitative Habitat Evaluation Index

IBI Index of Biotic Integrity

a The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).

H Headwater site

** Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*

N/A Not applicable

WWH Warmwater Habitat

b 2003 sample

c 1999 sample

Characteristics of the aquatic macroinvertebrate community for the tributaries in the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 26). Analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates found by Ohio EPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. No macroinvertebrate community within the four tributaries met WWH thresholds, with scores falling in the Poor to Fair range. Communities were consistently populated with intolerant taxa, and counts of sensitive and EPT species were relatively low.

Table 26: Critical Area #3 – Macroinvertebrate Community Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)			
RM	**ICI Score-Narrative[a]**	**Notes (Density of Ql./Qt.)**	**Predominant Species**
Norris Run (WWH)			
[b]1.3[H]	N/A – Low Fair* 5 sensitive taxa	Moderate	Blackflies (F)
Horseshoe Run (WWH)			
[c]0.3[H]	N/A – Fair* 4 sensitive taxa	--	Alder flies, midges
Sugar Run (WWH)			
[b]1.3[H]	N/A – Low Fair* 9 sensitive taxa	Moderate	Blackflies (F), sow bugs (F)
Delaware Run (WWH)			
[c]1.2[H]	N/A – Poor* 1 sensitive taxa	--	River snails
[c]0.2[H]	N/A – Poor* 2 sensitive taxa	--	River snails

(Source: Ohio EPA, 2001; Ohio EPA, 2005)

NOTES

a Narrative evaluation used in lieu of ICI

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

b 2003 sample

c 1999 sample

H Headwater site

WWH Warmwater Habitat

3.4.3 Detailed Causes and Associated Sources

Horseshoe Run. Photo courtesy of Erin Wolfe.

One sampling site within Norris Run is in *Non-Attainment* of the WWH designation due to habitat alteration, nutrient enrichment and siltation from riparian removal and urbanization. One sampling location in Horseshoe Run is in *Partial Attainment* of the WWH designation due to naturally occurring low flow conditions, and one sampling location within Sugar Run is in *Non-Attainment* of the WWH designation due to siltation and nutrient enrichment from urban influences. Two sampling locations within Delaware Run are in *Non-Attainment* of the WWH designation due to flow hydrology, habitat alterations and sewage from development, urban runoff and

CSO/SSO impacts. The data summarized previously in Table 14 (p.22) reveal a direct link between the presence of attributes in the watershed that have influence on the aquatic communities throughout the streams in *Critical Area #3*. These contributing attributes in *Critical Area #3* include:

- Heavy/Moderate Silt Cover (Norris Run, Sugar Run)
- Low Sinuosity (Horseshoe Run, Delaware Run)
- High/Moderate Embeddedness (all streams)
- High/Moderate Riffle Embeddedness (Norris Run, Delaware Run)
- Lack of Riffle (Norris Run, Horseshoe Run, Sugar Run)

Habitat, as scored by the QHEI, is not a WQS; however, habitat is highly correlated with the performance of aquatic communities. In general, sites that score at least 60 (or 55 for headwater streams) are successful at supporting WWH aquatic assemblages. Projects that address the above described habitat-related attributes (e.g., embeddedness, sinuosity, etc.) through in-stream and riparian restoration will have a positive effect in the QHEI scoring index. As the habitat score (QHEI) becomes better, IBI and ICI index scores are also expected to improve.

3.4.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores or meet nutrient reduction goals in order to remove a waterbody's impairment status. For *Critical Area #3,* addressing streambank and riparian habitat conditions within Norris Run, Horseshoe Run, Sugar Run and Delaware Run and their contributing tributaries will help ameliorate stresses from land use and boost index values for aquatic communities.

The remaining goals for *Critical Area #3* of the **Delaware Run-Olentangy River HUC-12** are to reduce sedimentation/siltation and habitat alteration effects to improve the aquatic scores through stabilizing streambanks and restoring floodplains and riparian corridors. These goals are to specifically:

Goal 1. Achieve IBI score at or above 40 at Penry Road in Norris Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of 23.

Goal 2. Achieve ICI score at or above 36 (Good) at Penry Road in Norris Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of Low Fair (~28).

Goal 3. Maintain QHEI score at or above 60 at Penry Road in Norris Run (RM 1.3).
✓ ACHIEVED: Site currently has a score of 62.

Goal 4. Achieve IBI score at or above 40 at Panhandle Road in Horseshoe Run (RM 0.3).
NOT ACHIEVED: Site currently has a score of 38.

Goal 5. Achieve ICI score at or above 36 (Good) at Panhandle Road in Horseshoe Run (RM 0.3).
NOT ACHIEVED: Site currently has a score of Fair (~32).

Goal 6. Maintain QHEI score at or above 60 at Panhandle Road in Horseshoe Run (RM 0.3).
✓ ACHIEVED: Site currently has a score of 63.5.

Goal 7. Achieve IBI score at or above 40 at Salt Storage Road in Sugar Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of 29.

Goal 8. Achieve ICI score at or above 36 (Good) at Salt Storage Road in Sugar Run (RM 1.3).
NOT ACHIEVED: Site currently has a score of Low Fair (~28).

Goal 9. Maintain QHEI score at or above 60 at Salt Storage Road in Sugar Run (RM 1.3).
✓ ACHIEVED: Site currently has a score of 69.

Goal 10. Achieve IBI score at or above 40 at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of 34.

Goal 11. Achieve ICI score at or above 36 (Good) at Limestone Park in Delaware Run (RM 1.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 12. Maintain QHEI score at or above 60 at Limestone Park in Delaware Run (RM 1.2).
✓ ACHIEVED: Site currently has a score of 61.

Goal 13. Achieve IBI score at or above 40 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 30.

Goal 14. Achieve ICI score at or above 36 (Good) at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of Poor (~22).

Goal 15. Achieve QHEI score at or above 60 at Henry Street in Delaware Run (RM 0.2).
NOT ACHIEVED: Site currently has a score of 40.

Objectives

The implementation of these objectives, partnered with implementation throughout other identified critical areas will help ameliorate negative impacts from channelization and habitat alterations made within the tributaries of the **Delaware Run-Olentangy River HUC-12**, and positive gains will be made towards removing both near-field and far-field impairments. In order to achieve the overall NPS restoration goals of reaching *Full Attainment* at all sites within Norris Run, Horseshoe Run, Sugar Run and Delaware Run, the following objectives need to be achieved within *Critical Area #3*.

Objective 1: Stabilize and restore at least six miles (31,680 linear feet) of eroding streambanks through recontouring, regrading and/or natural channel design methods.

Objective 2: Create, enhance or restore at least 120 acres of riparian corridor and/or riparian floodplain wetlands.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (Ohio EPA, 2020c) will be utilized as a reevaluation tool for its listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and,
- High Quality Waters Protection Strategies.

3.5 Critical Area #4: Conditions, Goals & Objectives for High Quality Waters Protection for the Olentangy River

3.5.1 Detailed Characterization

Approximately 22 miles of the Olentangy River, stemming from the Delaware Dam to Old Wilson Bridge in Worthington, Ohio, were adopted into the Ohio Scenic Rivers Program on August 24, 1973. The Ohio Scenic Rivers Program, led by ODNR, works to cooperatively involve local governments, businesses, landowners, non-profit organizations and other state and federal agencies in the protection of resources and terrestrial communities dependent on healthy riparian habitats (ODNR, 2021b). The Scenic Rivers Program recommends a stream buffer of at least 120 linear feet be maintained on each side of a state-designated scenic river (Ohio EPA, 2020c). Construction within this corridor is discouraged, and various mitigation requirements are initiated under the Olentangy Construction General Permit when development is permitted within a streamside buffer of 100 linear feet or an outer buffer within the 100-year floodplain (MORPC, 2012).

Specific actions suggested for the protection of High Quality Waters include stream restoration activities using natural channel design techniques, dedicated management of invasive species and regulated use within riparian corridors (Ohio EPA, 2020c). Recent restoration work within the Olentangy River mainstem has included removal of three lowhead dams, all located within the **Delaware Run-Olentangy River HUC-12**. As development pressures and threats to water quality increase throughout the Olentangy watershed, the protection and further restoration of the Olentangy corridor is of utmost importance to maintain attainment of high-performing aquatic communities. *Critical Area #4* is dedicated to the restoration, enhancement and protection of the riparian corridor of the Olentangy River mainstem, which includes a 120-foot buffer on each side, and any remaining acreage included in the 100-year floodplain (Figure 13). In total, this area covers 6.6 miles of the Olentangy River and 870 acres.

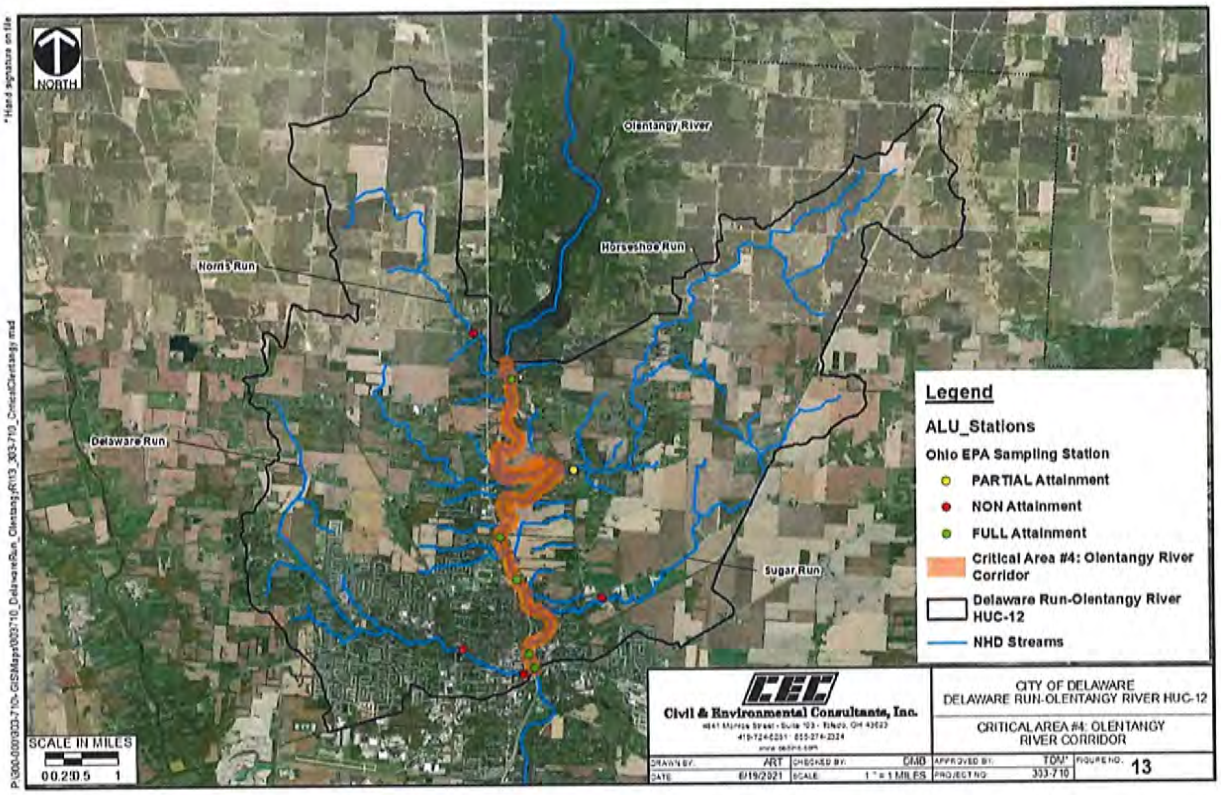

Figure 13: Delaware Run-Olentangy River HUC-12 Critical Area #4

3.5.2 Detailed Biological Conditions

Fish community data for the five sampling locations within the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 27). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by Ohio EPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. Within the Olentangy River, fish communities performed well, with all sites exceeding biocriteria for WWH streams to reach EWH thresholds. The high performance in this stretch of the river is attributed to the removal of three lowhead dams along the mainstem (Ohio EPA, 2020a).

Table 27: Critical Area #4 – Fish Community and Habitat Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)							
RM	Drainage Area (mi^2)	Total Species	QHEI	IBI	MIwb[a]	Predominant Species (Percent of Catch)	Narrative Evaluation
Olentangy River (WWH)							
[b]32.10[W]	393.0	34	80.5	46	10.8	Bluegill sunfish (15%), green sunfish (9%), black crappie (9%)	Very Good – Exceptional
[c]28.20[W]	409.0	29	82.3	50	10.3	Central stoneroller (38%), banded darter (13%), spotfin shiner (8%)	Exceptional
[b]27.50[W]	411.0	33	81.0	43	9.4	Bluntnose minnow (21%), bluegill sunfish (17%), spotfin shiner (11%)	Good – Exceptional

[c]26.00[W]	421.0	30	83.0	48	11.0	Smallmouth bass (14%), central stoneroller (14%), northern hog sucker (11%)	Very Good – Exceptional
[c]25.80[W]	421.1	23	77.5	48	9.6	Central stoneroller (23%), sand shiner (22%), northern hog sucker (13%)	Very Good – Exceptional

(Source: Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES

QHEI	*Qualitative Habitat Evaluation Index*
IBI	*Index of Biotic Integrity*
a	*The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi²).*
W	*Wading site*
*	*Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*
N/A	*Not applicable*
WWH	*Warmwater Habitat*
b	*2011 sample*
c	*2016 sample*

Characteristics of the aquatic macroinvertebrate community for the **Delaware Run-Olentangy River HUC-12** are summarized below (Table 28). Analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates found by Ohio EPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. The macroinvertebrate communities within the Olentangy River mainstem performed well, despite persistence of MWH attributes (i.e., heavy silt cover, high embeddedness, etc.). The prevalence of these habitat characteristics are of particular concern. As impervious surface area increases within the greater Olentangy watershed, water volume and velocity, and the associated sediment and nutrient loads, during storm events become a main threat to the aquatic communities within the river.

Table 28: Critical Area #4 – Macroinvertebrate Community Data

Delaware Run-Olentangy River HUC-12 (05060001 10 07)			
RM	**ICI Score-Narrative[a]**	**Notes (Density of QI./Qt.)**	**Predominant Species**
Olentangy River (WWH)			
[b]32.10[W]	38 – Good 14 sensitive taxa	--	*Rheotanytarsus* sp (F), *Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F)
[c]28.20[W]	38 – Good 23 sensitive taxa	--	*Polypedilum (Uresipedilum) flavum* (F), *Baetis intercalaris* (F), *Cheumatopsyche sp* (F)
[b]27.50[W]	46 – Exceptional 36 sensitive taxa	--	*Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F), *Maccaffertium pulchellum* (MI)
[c]26.00[W]	46 – Exceptional 29 sensitive taxa	--	*Baetis intercalaris* (F), *Cheumatopsyche sp* (F), *Maccaffertium pulchellum* (MI)
[c]25.80[W]	48 – Exceptional 31 sensitive taxa	--	*Baetis intercalaris* (F), *Polypedilum (Uresipedilum) flavum* (F), *Cheumatopsyche sp* (F)

(Source: Ohio EPA, 2020a; Ohio EPA, 2020b)

NOTES

a Narrative evaluation used in lieu of ICI

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

b 2011 sample

c 2016 sample

WWH Warmwater Habitat

3.5.3 Detailed Causes and Associated Sources

Five sampling sites in the Olentangy River mainstem in the **Delaware Run-Olentangy River HUC-12** are currently in *Full Attainment* of the WWH designation. While these sites are meeting (and exceeding WWH) thresholds due to recent dam removal, protection and restoration of problem areas, mainly related to eroding streambanks, along the mainstem are necessary to protect the high-quality status of the river. The data summarized previously in Table 14 (p.22) reveal a direct link between the presence of attributes in the Olentangy mainstem that have influence on the aquatic communities in *Critical Area #4*. These contributing attributes in *Critical Area #4* include:

- Heavy/Moderate Silt Cover
- Low Sinuosity
- High/Moderate Embeddedness
- High/Moderate Riffle Embeddedness

The ODNR samples QHEI throughout the mainstem as well. A comparison of ODNR data from 2007, 2012 and 2017 reveals a general decrease in scores across the river, both within and downstream of the **Delaware Run-Olentangy River HUC-12** (*personal communication and documentation from Caroline Cicerchi, November 18, 2020).*

Table 29: Ohio Department of Natural Resources Olentangy River QHEI Study Results

River Mile	Site Location	2007 Score	2012 Score	2017 Score
31.0	**City of Delaware WWTP**	**84**	**85**	**77.5**
24.45	Stratford Road	81	85	77.75
19.7	Chapman Road	86.5	82	79.25
17.7	State Route 315 and Home Road	--	87	81.25
16.4	State Route 315 and Orange Road	--	82	76.75
14.55	Highbanks	88.5	84.5	81
13.3	Highbanks: River Bluff	82	81	77.25

(Source: Comparison data provided to Caroline Cicerchi, City of Delaware from ODNR Scenic Rivers)

NOTES

Site in bold is located in the Delaware Run-Olentangy River HUC-12.

Habitat, as scored by the QHEI, is not a WQS; however, habitat is highly correlated with the performance of aquatic communities. In general, sites that score at least 60 (or 55 for headwater streams) are successful at supporting WWH aquatic assemblages. Sites that score at least 75 are generally supportive of EWH communities. Projects that address the above described habitat-related attributes (e.g., embeddedness, silt cover, etc.) through in-stream and riparian restoration will have a positive effect in the QHEI scoring index and will help maintain attainment within the Olentangy River.

3.5.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores or meet nutrient reduction goals in order to remove a waterbody's impairment status. For *Critical Area #4,* addressing any degradation to the streambank and riparian habitat conditions within the Olentangy River will aid in the protection of these high quality waters. The remaining goals for *Critical Area #4* of the **Delaware Run-Olentangy River HUC-12** are to maintain and/or improve the aquatic scores within the Olentangy River through the restoration of degrading streambanks and riparian habitat. These goals are to specifically:

Goal 1. Maintain IBI score at or above 40 at a USGS gage downstream of the Delaware Reservoir in Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 46.

Goal 2. Maintain MIwb score at or above 8.3 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 10.8.

Goal 3. Maintain ICI score at or above 36 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 38.

Goal 4. Maintain QHEI score at or above 60 at a USGS gage downstream of the Delaware Reservoir in the Olentangy River (RM 32.10).
✓ ACHIEVED: Site currently has a score of 80.5.

Goal 5. Maintain IBI score at or above 40 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 50.

Goal 6. Maintain MIwb score at or above 8.3 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 10.3.

Goal 7. Maintain ICI score at or above 36 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 38.

Goal 8. Maintain QHEI score at or above 60 at Panhandle Road in the Olentangy River (RM 28.20).
✓ ACHIEVED: Site currently has a score of 82.3.

Goal 9. Maintain IBI score at or above 40 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 43.

Goal 10. Maintain MIwb score at or above 8.3 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 9.4.

Goal 11. Maintain ICI score at or above 36 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 46.

Goal 12. Maintain QHEI score at or above 60 at Hudson Road in the Olentangy River (RM 27.50).
✓ ACHIEVED: Site currently has a score of 81.

Goal 13. Maintain IBI score at or above 40 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 48.

Goal 14. Maintain MIwb score at or above 8.3 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 11.

Goal 15. Maintain ICI score at or above 36 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 46.

Goal 16. Maintain QHEI score at or above 60 at Central Avenue in the Olentangy River (RM 26.00).
✓ ACHIEVED: Site currently has a score of 83.

Goal 17. Maintain IBI score at or above 40 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 48.

Goal 18. Maintain MIwb score at or above 8.3 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 9.6.

Goal 19. Maintain ICI score at or above 36 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 48.

Goal 20. Maintain QHEI score at or above 60 at Williams Street in the Olentangy River (RM 25.80).
✓ ACHIEVED: Site currently has a score of 77.5.

Objectives

The implementation of these objectives, partnered with implementation throughout other identified critical areas will help ameliorate stressors that may negatively impact the high performing communities of the Olentangy River. In order to protect these high quality waters and maintain *Full Attainment* within the Olentangy River within the **Delaware Run-Olentangy River HUC-12**, the following objectives need to be achieved within *Critical Area #4*.

Objective 1: Stabilize and restore at least 1.5 miles (7,920 linear feet) of eroding streambanks through recontouring, regrading and/or natural channel design methods.

Objective 2: Create, enhance or restore at least 220 acres of riparian corridor through active invasive species management and native plantings.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (Ohio EPA, 2020c) will be utilized as a reevaluation tool for its listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and,
- High Quality Waters Protection Strategies.

Steep, exposed banks at Mingo Park. Photo courtesy of Erin Wolfe.

CHAPTER 4: PROJECTS AND IMPLEMENTATION STRATEGY

Projects and evaluation needs identified for the **Delaware Run-Olentangy River HUC-12** are based upon identified causes and associated sources of NPS pollution. Over time, these critical areas will need to be reevaluated to determine progress towards meeting restoration, attainment and nutrient reduction goals. Time is an important variable in measuring project success and overall status when using biological indices as a measurement tool. Some biological systems may show fairly quick response (i.e., one season), while others may take several seasons or years to show progress towards recovery. In addition, reasons for the impairment other than those associated with NPS sources may arise. Those issues will need to be addressed under different initiatives, authorities or programs that may or may not be accomplished by the same implementers addressing the NPS issues.

> Implementation of practices described in this NPS-IS may also contribute to nutrient load reduction (specifically the interim 20% reduction in nitrogen and phosphorus loading in the MARB). Nutrient load reduction efforts are consistent with the HTF Action Plan and New Goal Framework (HTF, 2014).

For the **Delaware Run-Olentangy River HUC-12** there are four *Project and Implementation Strategy Overview Tables* (subsection 4.1, 4.2, 4.3 and 4.4). Future versions of this NPS-IS may include subsequent sections as more critical areas are refined and more projects become developed to meet the requisite objectives within a critical area. The projects described in the *Overview Table* have been prioritized using the following three-step prioritization method:

Priority 1 — Projects that specifically address one or more of the listed Objectives for the Critical Area.

Priority 2 — Projects where there is land-owner willingness to engage in projects that are designed to address the cause(s) and source(s) of impairment or where there is an expectation that such potential projects will improve water quality in the **Delaware Run-Olentangy River HUC-12.**

Priority 3 — In an effort to generate interest in projects, an information and education campaign will be developed and delivered. Such outreach will engage citizens to spark interest by stakeholders to participate and implement projects like those mentioned in Priority 1 and 2.

Project Summary Sheets (PSS) follow the *Overview Tables*, if projects were identified; these provide the essential nine elements for short-term and/or next step projects that are in development and/or in need of funding. As projects are implemented and new projects developed, these sheets will be updated. Any new PSS created will be submitted to the state of Ohio for funding eligibility verification (i.e., all nine elements are included).

4.1 Critical Area #1 Project and Implementation Strategy Overview Table

Table 30: Delaware Run-Olentangy River HUC-12 (05060001 10 07) — Critical Area #1							
Goal	Objective	Project #	Project Title (EPA Criteria g)	Lead Organization (EPA criteria d)	Time Frame (EPA Criteria f)	Estimated Cost (EPA Criteria d)	Potential/Actual Funding Source (EPA Criteria d)
Urban Sediment and Nutrient Reduction Strategies							
Altered Stream and Habitat Restoration Strategies							
Agricultural Nonpoint Source Reduction Strategies							
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

At this time, no short-term projects have been identified for *Critical Area #1*; therefore, no Project Summary Sheets are included.

4.2 Critical Area #2 Project and Implementation Strategy Overview Table

Table 31: Delaware Run-Olentangy River HUC-12 (05060001 10 07) — Critical Area #2							
Goal	**Objective**	**Project #**	**Project Title (EPA Criteria g)**	**Lead Organization (EPA criteria d)**	**Time Frame (EPA Criteria f)**	**Estimated Cost (EPA Criteria d)**	**Potential/Actual Funding Source (EPA Criteria d)**
Urban Sediment and Nutrient Reduction Strategies							
Altered Stream and Habitat Restoration Strategies							
1-7	2,3	1	Hidden Valley Golf Course Stream Restoration	City of Delaware	Short (1-3 years)	$275,000	Ohio EPA §319, Ohio EPA WRRSP
1-7	2,3	TBD	Blue Limestone Park Restoration	City of Delaware	TBD	TBD	TBD
1-7	2,3	TBD	Ruth Melvin Preserve Restoration	City of Delaware	TBD	TBD	TBD
Agricultural Nonpoint Source Reduction Strategies							
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

4.2.1 Project Summary Sheet(s)

The Project Summary Sheets provided below were developed based on the actions or activities needed to achieve urban nutrient reduction targets in the **Delaware Run-Olentangy River HUC-12**. These projects are considered next step or priority/short term projects and are considerably ready to implement. Medium and longer-term projects will not have a Project Summary Sheet, as these projects are not ready for implementation or need more thorough planning.

Table 32: Critical Area #2 – Project #1		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Hidden Valley Golf Course Stream Restoration
criteria d	Project Lead Organization & Partners	City of Delaware
criteria c	HUC-12 and Critical Area	Delaware Run-Olentangy River HUC-12: *Critical Area #2*
criteria c	Location of Project	40.301703, -83.087033
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration
criteria f	Time Frame	Short (1-3 years)
criteria g	Short Description	Stream restoration to a golf course tributary draining to Delaware Run
criteria g	Project Narrative	Approximately 1,000 linear feet of an unnamed tributary flows through the City of Delaware-owned Hidden Valley Golf Course to empty into Delaware Run, just upstream of the Blue Limestone Park (and current biological sampling station at RM 1.2). This unnamed tributary drains approximately 62 acres of heavily fertilized golf course. Currently, the unnamed tributary has no riparian buffer, and erosive flows have eroded the streambanks, causing near vertical banks along a substantial stretch of the stream, which flows directly to empty into Delaware Run. The length of the stream (~1,000 linear feet) will be restored using natural channel design techniques to stabilize the banks and a native grass/shrub riparian buffer will be established along its length to provide surface water filtration benefits for nutrients and pesticides.
criteria d	Estimated Total cost	$275,000
criteria d	Possible Funding Source	Ohio EPA §319, Ohio EPA WRRSP
criteria a	Identified Causes and Sources	Cause: Nutrient loadings, leading to far-field impacts Source: Urban land use activities

Table 32: Critical Area #2 – Project #1		
Nine Element Criteria	**Information needed**	**Explanation**
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?	The overall goal in *Critical Area #2* is to reduce estimated total nitrogen loads. Current estimates indicate the urban contribution to the annual load is 32,000 lbs. of nitrogen. In order to meet the HTF nutrient reduction goals, annual loads must be reduced by 20%, or 6,500 lbs.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	It is expected that this project will cause a decrease in annual nitrogen loadings by 323 lbs. through incremental progress made on Objective #2 and #3 (5% progress).
	Part 3: Load Reduced?	Estimated annual reduction: 324 #N/year; 111 #P/year; 147.4 tons sediment/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Ambient monitoring is conducted throughout the ORB by organizations such as Ohio EPA and Heidelberg University. These entities will continue long term monitoring on various tributaries in the ORB to track load reduction trends. Staff from the Ohio EPA-Division of Surface Water Ecological Assessment Unit may also perform both pre- and post-project in-stream monitoring. The Blue Limestone Park sampling site (Delaware Run, RM 1.2) will be monitored as part of the State of Ohio's ongoing surface water monitoring program cycle to determine progress from *Non-Attainment* to *Full Attainment*.
criteria e	Information and Education	The City of Delaware will promote the project through press releases, website and social media announcements and newsletters, as well as through events hosted by the Olentangy Watershed Alliance and its partnering organizations (i.e., the Olentangy Watershed Forum). Once restoration is complete, the City will host a tour of the site and will install permanent informational signage regarding the importance of stormwater management and providing buffers in urban streams to create awareness of urban nutrient reduction and encourage public practices on their own land. Given the location on a City-owned golf course, a high amount of public exposure is expected.

4.3 Critical Area #3 Project and Implementation Strategy Overview Table

Table 33: Delaware Run-Olentangy River HUC-12 (05060001 10 07) — Critical Area #3							
Goal	Objective	Project #	Project Title (EPA Criteria g)	Lead Organization (EPA criteria d)	Time Frame (EPA Criteria f)	Estimated Cost (EPA Criteria d)	Potential/Actual Funding Source (EPA Criteria d)
Urban Sediment and Nutrient Reduction Strategies							
Altered Stream and Habitat Restoration Strategies							
Agricultural Nonpoint Source Reduction Strategies							
1	4	TBD	Horseshoe Run Stream Stabilization and Restoration	TBD	TBD	TBD	Ohio EPA §319, Ohio EPA WRRSP
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

At this time, no short-term projects have been identified for *Critical Area #3*; therefore, no Project Summary Sheets are included.

4.4 Critical Area #4 Project and Implementation Strategy Overview Table

Table 34: Delaware Run-Olentangy River HUC-12 (05060001 10 07) — Critical Area #4							
Goal	**Objective**	**Project #**	**Project Title (EPA Criteria g)**	**Lead Organization (EPA criteria d)**	**Time Frame (EPA Criteria f)**	**Estimated Cost (EPA Criteria d)**	**Potential/Actual Funding Source (EPA Criteria d)**
Urban Sediment and Nutrient Reduction Strategies							
Altered Stream and Habitat Restoration Strategies							
13-20	1,2	TBD	Mingo Park Restoration	TBD	TBD	TBD	Ohio EPA §319, Ohio EPA WRRSP
Agricultural Nonpoint Source Reduction Strategies							
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

At this time, no short-term projects have been identified for *Critical Area #4*; therefore, no Project Summary Sheets are included.

CHAPTER 5: WORKS CITED

Burton, G.A. Jr., and R. Pitt. 2001. *Stormwater Effects Handbook: A Tool Box for Watershed Managers, Scientists, and Engineers*. CRC Press, Inc., Boca Raton, FL.

Carpenter, S.R., N.F. Caraco, D.L. Correll, R.W. Howarth, A.N. Sharpley and V.N. Smith. 1998. Nonpoint Pollution of Surface Waters with Phosphorus and Nitrogen. *Ecology Applications*, vol. 8, p.559.

Center for Watershed Protection (CWP). 1998. *Rapid Watershed Planning Handbook*. Ellicott City, Md.

City of Delaware. 2007. *Stormwater Management Plan*. http://www.delawareohio.net/wp-content/uploads/20150729110433148.pdf. Accessed January 28, 2021.

City of Delaware. 2021a. *Our Utilities*. http://www.delawareohio.net/about-the-public-utilities-department/public-utilities-services-programs/. Accessed January 27, 2021.

City of Delaware. 2021b. *Park Locations*. http://www.delawareohio.net/parks-natural-resources/parks/. Accessed January 27, 2021.

Cuyahoga Soil and Water Conservation District (SWCD). Undated. *Community Riparian and Wetland Guidance: Putting All the Pieces Together*. https://crwp.org/wp-content/uploads/2020/08/riparian_wetlands_guide_book.pdf. Accessed June 1, 2021.

Delaware County Regional Sewer District (DCRSD). 2015. *Sanitary Sewer Master Plan: Technical Memorandum #1*. https://regionalsewer.co.delaware.oh.us/wp-content/uploads/sites/19/2018/05/DelawareCountyTM1-1.pdf. Accessed February 5, 2021.

E.P. Ferris and Associates. 2020. *Damage Assessment and Recommendations Report, prepared for the City of Delaware, Ohio Engineer's Office.* 58 pp.

Friends of the Lower Olentangy Watershed (FLOW). 2005. *The Lower Olentangy Watershed Action Plan in 2003. http://wwwapp.epa.ohio.gov/dsw/nps/WAPs/OlentangyLower.pdf*. Accessed May 1, 2021.

Friends of the Lower Olentangy Watershed (FLOW). 2020. *The Lower Olentangy Watershed Greenspace Plan*. https://www.olentangywatershed.org/wp-content/uploads/2020/11/GreenSpace-Plan-2020-FINAL-6-19.pdf. Accessed January 2, 2021.

Hendrix, S. 2020. Census data puts Union and Delaware counties among fastest-growing housing markets in US. *The Columbus Dispatch*. https://www.dispatch.com/news/20200521/census-data-puts-union-and-delaware-counties-among-fastest-growing-housing-markets-in-us. Accessed February 2, 2021.

Hoffmann, C.C., L. Heiberg, J. Audet, B. Schønfeldt, A. Fuglsang, B. Kronvang, N.B. Ovesen, C. Kjaergaard, H.C.B. Hansen and H.S. Jensen. 2012. Low phosphorus release but high nitrogen removal in two restored riparian wetlands inundated with agricultural drainage water. *Ecological Engineering*. 46, p.75-87.

Homer, C.G., J.A. Dewitz, S. Jin, G. Xian, C. Costello, P. Danielson, L. Gass, M. Funk, J. Wickham, S. Stehman, R.F. Auch and K.H. Ritters. 2020. Conterminous United States land cover change patterns 2001-2016 from the 2016 National Land Cover Database. *ISPRS Journal of Photogrammetry and Remote Sensing*. v. 162, June 2, 2020, p.184-199. https://doi.org/10.1016/j.isprsjprs.2020.02.019.

Hypoxia Task Force (HTF). 2014. *Mississippi River Gulf of Mexico Watershed Nutrient Task Force New Goal Framework.* https://www.epa.gov/sites/production/files/2015-07/documents/htf-goals-framework-2015.pdf. Accessed April 15, 2020.

Mid-Ohio Regional Planning Commission (MORPC). 2012. *Olentangy Watershed Planning Partnership Balanced Growth Plan.* http://balancedgrowthplanning.morpc.org/OlentangyRiver.aspx. Accessed January 6, 2021.

Natural Resources Conservation Service (NRCS). 2018. *Headquarters Farm Service Agency and EQIP Practice Spreadsheet/* Distributed to the Hypoxia Task Force.

Natural Resources Conservation Service (NRCS). 2019. *Web Soil Survey*. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed June 8, 2020.

Ohio Department of Health (ODH). 2013. *Household Sewage Treatment System Failures in Ohio: A Report on Local Health Department Survey Responses for the 2012 Clean Watersheds Needs Survey.* https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/sewage-treatment-systems/resources-and-education/2012hstsfailureratesinohio. Accessed October 21, 2020.

Ohio Department of Natural Resources (ODNR). 2001. *Gazetteer of Ohio Streams*. 2nd Edition. https://minerals.ohiodnr.gov/Portals/minerals/pdf/industrial%20minerals/gazetteer_ohio_streams.pdf. Accessed June 8, 2020.

Ohio Department of Natural Resources (ODNR). 2006. *Rainwater and Land Development: Ohio's Standards for Stormwater management, Land Development and Urban Stream Protection, 3rd Edition.* http://oilandgas.ohiodnr.gov/portals/oilgas/pdf/stormwater/RLD_11-6-14All.pdf. Accessed February 19, 2020.

Ohio Department of Natural Resources (ODNR). 2020. *Ohio Mussel Survey Protocol, April 2020.* https://ohiodnr.gov/static/documents/wildlife/permits/dow-protocol-ohio-mussel-survey.pdf. Accessed December 30, 2020.

Ohio Department of Natural Resources (ODNR). 2021a. *Delaware State Park.* https://ohiodnr.gov/wps/portal/gov/odnr/go-and-do/plan-a-visit/find-a-property/delaware-state-park. Accessed November 24, 2020.

Ohio Department of Natural Resources (ODNR). 2021b. *Ohio's Scenic Rivers Program.* https://ohiodnr.gov/wps/portal/gov/odnr/discover-and-learn/land-water/rivers-streams-wetlands/scenic-rivers-program. Accessed June 1, 2021.

Ohio Department of Transportation (ODOT). 2020. https://content.govdelivery.com/accounts/OHDOT/bulletins/28ee774. Accessed February 12, 2021.

Ohio Environmental Protection Agency (Ohio EPA). 1999. *Association between Nutrients, Habitat and the Aquatic Biota of Ohio's Rivers and Streams.* https://www.epa.ohio.gov/portals/35/lakeerie/ptaskforce/AssocLoad.pdf. Accessed September 13, 2019.

Ohio Environmental Protection Agency (Ohio EPA). 2001. *Biological and Water Quality Study of the Olentangy River and Selected Tributaries 1999, Delaware and Franklin Counties, Ohio.* https://www.epa.state.oh.us/portals/35/documents/OlentangyTSD.pdf. Accessed October 1, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2005. *Biological and Water Quality Study of the Olentangy River, Whetstone Creek and Select Tributaries 2003-2004, Technical Report EAS/2005-12-16.* https://epa.ohio.gov/portals/35/documents/FinalOlyTSD2003.pdf. Accessed October 1, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2007. *Total Maximum Daily Loads for the Olentangy River Watershed.* https://www.epa.state.oh.us/portals/35/tmdl/OlentangyTMDL_final_aug07.pdf. Accessed October 1, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2013. *Total Maximum Daily Loads for the Ottawa River (Lima Area) Watershed.* https://epa.ohio.gov/Portals/35/tmdl/OttawaLima_Report_Final.pdf. Accessed August 27, 2019.

Ohio Environmental Protection Agency (Ohio EPA). 2016. *Guide to Developing Nine-Element Nonpoint Source Implementation Strategic Plans in Ohio.* https://epa.ohio.gov/Portals/35/nps/319docs/NPS-ISPlanDevelopmentGuidance816.pdf. Accessed June 4, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2020a. *2016 and 2017 Biological and Habitat Studies of the Rivers and Streams in 33 Section 319(h) and SWIF/GLRI Project Areas in Ohio.* https://epa.ohio.gov/Portals/35/documents/DRAFT_2016-2017_319Report.pdf. Accessed November 1, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2020b. *2020 Ohio Integrated Report.* https://www.epa.ohio.gov/dsw/tmdl/OhioIntegratedReport#123145148-2018. Accessed June 4, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2020c. *Nonpoint Source Management Plan Update (FY2019-2024).* https://epa.ohio.gov/Portals/35/nps/2019-NPS-Mgmt-Plan.pdf. Accessed September 22, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2020d. *Nutrient Mass Balance Study for Ohio's Major Rivers 2020.* https://www.epa.ohio.gov/Portals/35/documents/Nutrient-Mass-Balance-Study-2020.pdf. Accessed December 30, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2020e. *River Miles Index Interactive Map.* https://www.arcgis.com/apps/webappviewer/index.html?id=4f93b8e37d4640a6ab3ac43d2914d25e. Accessed December 29, 2020.

Ohio Environmental Protection Agency (Ohio EPA). 2021. *Individual NPDES Permits Interactive Map.* https://oepa.maps.arcgis.com/apps/webappviewer/index.html?id=b680bd65d1874023ae6ec2f911acb841. Accessed January 3, 2021.

Ohio Lake Erie Commission (OLEC). 2020. *Promoting Clean and Safe Water in Lake Erie: Ohio's Domestic Action Plan 2020 to Address Nutrients.* https://lakeerie.ohio.gov/Portals/0/Ohio%20DAP/Ohio%20DAP%202020%20DRAFT%202020-01-28.pdf?ver=2020-01-28-123210-883. Accessed December 8, 2020.

Ohio State University (OSU) Extension. 2018. *A Field Guide to Identifying Critical Resource Concerns and Best Management Practices for Implementation.* Bulletin 969. College of Food, Agricultural, and Environmental Sciences.

Ohio Watershed Alliance (OWA). 2006. *Upper Olentangy Watershed Management and Action Plan.* http://wwwapp.epa.ohio.gov/dsw/nps/WAPs/OlentangyUpper.pdf. Accessed November 1, 2020.

Preservation Parks of Delaware County. 2021. *Parks & Trails.* https://preservationparks.com/parks/. Accessed January 25, 2021.

Schueler, T. 1994. The Importance of Imperviousness. *Watershed Protection Techniques.* 1(3):100-111.

Tetra Tech, Inc. 2017. *Spreadsheet Tool for Estimating Pollutant Load (STEPL) Input Data Server.* https://ofmpub.epa.gov/apex/grts/f?p=109:333. Accessed January 21, 2021.

Tetra Tech, Inc. 2018. *BMP Descriptions for STEPL and Region 5 Models.* http://it.tetratech-ffx.com/steplweb/models$docs.htm. Accessed November 22, 2019.

United States Army Corps of Engineers (USACE). 2020. *Plan for the Ohio River Basin: 2020-2025.* https://www.lrh.usace.army.mil/Portals/38/docs/orba/Plan%20for%20the%20Ohio%20River%20Basin_FINAL.PDF?ver=s5zhd_NfTAZ7ao0bWhBLpA%3d%3d. Accessed December 8, 2020.

United States Census Bureau (US Census Bureau). 2021. *Quick Facts.* https://www.census.gov/quickfacts/delawarecityohio. Accessed January 30, 2021.

United States Department of Agriculture (USDA). 2012. *Census of Agriculture.* https://www.nass.usda.gov/Publications/AgCensus/2012/. Accessed December 2, 2020.

United States Department of Agriculture (USDA). 2019. *Census of Agriculture.* https://www.nass.usda.gov/AgCensus/. Accessed May 20, 2021.

United States Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS). 2018. *ProTracts Data Spreadsheet, as of October 2014.* Received in personal communication from Rick Wilson Ohio EPA-DSW, §319 program.

United States Environmental Protection Agency (USEPA). 2003. *Protecting Water Quality from Urban Runoff.* https://www3.epa.gov/npdes/pubs/nps_urban-facts_final.pdf. Accessed January 9, 2020.

United States Environmental Protection Agency (USEPA). 2008. *Handbook for Developing Watershed Plans to Restore and Protect Our Waters.* https://www.epa.gov/sites/production/files/2015-09/documents/2008_04_18_nps_watershed_handbook_handbook-2.pdf. Accessed on October 28, 2019.

United States Environmental Protection Agency (USEPA). 2013. *Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States.* https://www.epa.gov/eco-research/ecoregion-download-files-state-region-5#pane-33. Accessed April 20, 2020.

United States Environmental Protection Agency (USEPA). 2018. *Spreadsheet Tool for Estimating Pollutant Load (STEPL), Version 4.4.* https://www.epa.gov/nps/spreadsheet-tool-estimating-pollutant-loads-stepl. Accessed September 22, 2020.

United States Environmental Protection Agency (USEPA). 2020. *History of the Hypoxia Task Force.* https://www.epa.gov/ms-htf/history-hypoxia-task-force. Accessed December 8, 2020.

United States Environmental Protection Agency (USEPA). 2021. *Environmental Compliance History Online (ECHO) Database.* https://echo.epa.gov/detailed-facility-report?fid=OH0144843&redirect=echo. Accessed December 1, 2020.

United States Fish and Wildlife Service (USFWS). 2018. *Ohio – County Distribution of Federally-Listed Endangered, Threatened and Proposed Species, updated January 29.* https://www.fws.gov/midwest/endangered/lists/ohio-cty.html. Accessed June 2, 2020.

United States Geological Survey (USGS). 2019. *Protected Areas Database of the United States (PAD-US).* https://maps.usgs.gov/padus/. Accessed June 2, 2020.

United States Geological Survey (USGS). 2021. *StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water-Resources Applications.* https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects. Accessed January 3, 2021.

Woltemade, C.J. 2000. *Ability of Restored Wetlands to Reduce Nitrogen and Phosphorus Concentrations in Agricultural Drainage Water.* Journal of Soil and Water Conservation. 55(3): 303-309.

Date: December 14, 2021

City of Delaware Planning Commission Meeting concerning the Addison Farms Development

Jeffrey Ruhl
258 Kensington Dr.
Delaware, Ohio 43015
Since: March 1982

I thank the Planning Commission and their Staff Recommendations to the Allison Farms latest proposal.

Staff Recommendations by topic was very helpful and gave insight into how the City and Residences can come together for the better good. I still have concerns that the recommendations could be negotiated out.

Like where Staff recommended that Oakhurst Stubs opening to traffic is not warranted, but City Fire has recommended they be opened. I hope middle ground can be found by opening up one of the west Stubs for safety services only. For decades Oakhurst has enjoyed the one-way in, one-way out community access, in fact we feel our low crime has contributed to that type of access. I am totally against opening up any of the 4 stubs giving criminals an escape route. However the south-west Stub could be open for bike path only to Addison Farms.

Tree Preservation is a hot topic for all of us living within the city and out. I am glad to see that Staff Recommend that 50% of the woodland canopy be saved. Replacing large healthy trees with twigs is not my Idea of equitable negotiations! Reference our Tree Preservation Petition.

Staff has recommend changes to the separation between Kensington Dr. and the Sub Area E. Changes are (60 foot buffer with 8 foot mound with 6 foot pine tree). During heavy rains, water from four houses to the west of me runs east into my back yard. Once water is 4-6 inches deep it runs south into the field and then east into the wetland. An 8 ft. mound behind my house will swamp my home. Who will prevent that from happening..... Zoning or PMU?

I highly recommend the PMU only be applied to Sub Areas F and G! The city owes it to our current resident's whose property is touched by Addison Farms! The proposed new housing must have the structure, quality and compliance that only current zoning can provide! Please reference the three community petition outlining our 6 needs, with over 222 signatures it cannot be causally discarded!! We highly recommend that Sub Areas A and B be swapped with Area E. The swap meets many of the 6 items in the petition.

I have faith the City of Delaware will do what is best for the good of its entire people!

Thank you for your time!!

From:	Diane Mungovan
To:	Elaine McCloskey; PlanningAndDevelopment
Cc:	CMO
Subject:	Placement of Merrick Parkway
Date:	Wednesday, December 15, 2021 1:13:42 PM

Caution! This message was sent from outside your organization.

Please forward to all Planning Commission and City Council members, the City Manager's office, plus the Planning Department and the Engineering Department. Thank you.

To whomever reads this . . .

While I was originally hoping to make remarks at tonights meeting (12/15/21), I have been told that the public will not be allowed to make comments even though the Addison Development greatly impacts the quality of my life and those of my family, friends and neighbors. I will try to get a copy of my visual aid to my council rep at a later date since I do not have the technology to upload it for this email.

Concerns Regarding Current Placement of Merrick Parkway

If you look at the Shelbourne Forest neighborhood, when it was developed, the stream corridors surrounded by mature trees were preserved. Note specifically the area between Rutherford Ave. and Federal Circle and the Shelbourne Forest Nature Trail between Orchard Canyon and Pinecrest.

While Addison has moved to make a natural park out of the western stream corridor adjacent to Hayes colony (the same stream that flows through Shelbourne Forest Nature Trail) they need to also do so in the area between Executive Blvd. and the Oakhurst neighborhood.

Merrick Parkway needs to be pushed further north of Shelbourne Forrest to fully preserve the southern most portion of the stream corridor and Wetland A. Keep at least 10-30 yards of trees north of the stream before mounding begins. Keep the bike path directly next to Merrick parkway to provide consistency of path and to make it safer for pedestrians after dark. Leave room to the north of Merrick for future expansion and widening so that the trees and stream to the south will remain protected conservancy areas far into the future.

Move the roundabout connecting Merrick with Woodhaul and Bruce Rd extensions further north and east so that Merrick Parkway will only have to cross the stream in two places versus the three currently proposed. This also moves Merrick away from the neighborhood and homes on Woodhaul. Cause the least harm.

With Merrick and the roundabout being placed further north the proposed Redwood rental units could move to area A & B (this was an original staff recommendation and provides the same acreage) and away from pre-existing single family homes. In Area E place the owner occupied condo units currently proposed for area B and/or single family homes on larger treed lots. This will allow for more preservation of streams and wetlands while also preserving tree canopy. This move also follows city code of like housing by like housing.

The Wickam property design proposal illustrates how the area could still be developed with

single family homes or owner occupied condos while preserving the wetlands, streams, and mature tree canopy. Preserving these corridors will benefit current residents and future residents of Delaware in so many ways. Refer to email on why we need trees.

The city, in its comments regarding the placement of Merrick, often sites how there are other roads (ex. Houk) within the city that are closer to homes. This is a fact, however, in those instances the road was built before the houses. So the homeowner, before they bought their home, was aware of the road. In Shelbourne Forrest we bought our homes with the belief and trust that Merrick would be placed further north as drawn on Delaware city planning maps.

Misleading Measurements

In providing measurements between homes on Executive Blvd. and Pinecrest that border Merrick please give accurate numbers that are a true reflection of how close the road still is to our homes.

The current measurements as presented inflate the distance between our homes and the road. The larger numbers are from the backs of our houses onto the roadway, and the smaller numbers are from the back of our property to the roadway. While better than 20 feet the road is still way to close.

The road needs to be pushed further north to fully preserve the stream that runs behind the homes on Executive as well as Wetland A. Maintain the trees surrounding the stream corridor at least 20 - 30 yards to the north of the stream. As it is currently presented Merrick runs directly next to the stream (at one point it appears to almost be on top of the stream) and crosses the stream in three places. Less than ten yards of tree are preserved in some areas.

Leave room to the north of Merrick for future expansion and widening so that the trees and stream to the south will remain protected conservancy areas far into the future.

The farmers access road is about ten yards wide, with no trees, and often remains soggy and wet in the lower portion. The idea of planting native evergreens in the farmer’s access road is appreciated - with the bike path being placed next to Merrick as originally proposed. This is more convenient and safer for pedestrians using the path after dark.

If Merrick remains where it is drawn there is also the risk of greater flooding. As it stands now the stream, after heavy rains, generally triples in size. While not marked I would even guess some areas to be vernal pools in the spring when the area is especially wet. The proximity of large swaths of impervious surfaces next to an already wet area will not help. Pollution of the groundwater will increase. Maintaining a broad swath of mature trees will aid in cleaning the pollutants before they reach the Olentangy River. I could go on and on.

If Merrick’s current placement is allowed to remain - the homes on Executive and Pinecrest will suffer greatly from increased air, noise and light pollution - not to mention the harm to the wildlife that live in the area. Preserve enough of the tree canopy surrounding the stream to give them a fighting chance and to help offset the increase in carbon emissions from the increase in traffic.

Side Notes

The high density housing units staff mentioned in their report referencing calls to police, were not built between long established single-family housing. This is one more reason why the Redwood Rental Units should be placed in area A and B - no current neighbors - with condos or single family homes in area E - built in harmony with the stream corridor while maintaining wide mature tree borders.

Strange that a sign advertising available retail space was posted by Addison along Route 23 prior to their request being approved!

We do NOT need another gas station or Sheetz along the corridor - there are three already. This site is also too close to the Olentangy and its watershed.

In Conclusion

While I understand Addison wants Merrick Parkway placed as far south as possible to give them larger areas to develop - the city needs to be cognizant of the needs of its current residents as well as the need to preserve our natural resources. Once the stream corridor and wetlands are disrupted, and once the mature tree canopy is cut down - there is no return.

Enacting these changes while still in the planning stage will satisfy the surrounding long established neighborhoods and go a long way in proving that both the City of Delaware and Addison truly care about the environment as well as the needs of current residents.

The area can be developed ethically with protecting the environment as a key component of the development design. If this happens then everyone wins. Addison will gain a reputation for truly caring about the environment and the communities they choose to do business in versus a company only concerned with their own bottom line. Addison will still make a hefty profit if Merrick is moved further north.

I have so many other thoughts and concerns, but my most pressing is moving Merrick Parkway further north, preserving the southern portion of the stream, wetland A and the mature tree canopy surrounding it.

Thank you for your time and your service to our city.

Sincerely,

Diane Mungovan
937 Executive Blvd.
Delaware, Ohio 43015

From: Diane Mungovan
To: Elaine McCloskey; PlanningAndDevelopment
Cc: CMO
Subject: Placement of Merrick Parkway
Date: Wednesday, December 15, 2021 1:13:42 PM

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The current measurements as presented inflate the distance between our homes and the road. The larger numbers are from the backs of our houses onto the roadway, and the smaller numbers are from the back of our property to the roadway. While better than 20 feet the road is still way to close.

The road needs to be pushed further north to fully preserve the stream that runs behind the homes on Executive as well as Wetland A. Maintain the trees surrounding the stream corridor at least 20 - 30 yards to the north of the stream. As it is currently presented Merrick runs directly next to the stream (at one point it appears to almost be on top of the stream) and crosses the stream in three places. Less than ten yards of tree are preserved in some areas.

Leave room to the north of Merrick for future expansion and widening so that the trees and stream to the south will remain protected conservancy areas far into the future.

The farmers access road is about ten yards wide, with no trees, and often remains soggy and wet in the lower portion. The idea of planting native evergreens in the farmer's access road is appreciated - with the bike path being placed next to Merrick as originally proposed. This is more convenient and safer for pedestrians using the path after dark.

If Merrick remains where it is drawn there is also the risk of greater flooding. As it stands now the stream, after heavy rains, generally triples in size. While not marked I would even guess some areas to be vernal pools in the spring when the area is especially wet. The proximity of large swaths of impervious surfaces next to an already wet area will not help. Pollution of the groundwater will increase. Maintaining a broad swath of mature trees will aid in cleaning the pollutants before they reach the Olentangy River. I could go on and on.

If Merrick's current placement is allowed to remain - the homes on Executive and Pinecrest will suffer greatly from increased air, noise and light pollution - not to mention the harm to the wildlife that live in the area. Preserve enough of the tree canopy surrounding the stream to give them a fighting chance and to help offset the increase in carbon emissions from the increase in traffic.

Side Notes

The high density housing units staff mentioned in their report referencing calls to police, were not built between long established single-family housing. This is one more reason why the Redwood Rental Units should be placed in area A and B - no current neighbors - with condos or single family homes in area E - built in harmony with the stream corridor while maintaining wide mature tree borders.

Strange that a sign advertising available retail space was posted by Addison along Route 23 prior to their request being approved!

We do NOT need another gas station or Sheetz along the corridor - there are three already. This site is also too close to the Olentangy and its watershed.

In Conclusion

While I understand Addison wants Merrick Parkway placed as far south as possible to give them larger areas to develop - the city needs to be cognizant of the needs of its current residents as well as the need to preserve our natural resources. Once the stream corridor and wetlands are disrupted, and once the mature tree canopy is cut down - there is no return.

Enacting these changes while still in the planning stage will satisfy the surrounding long established neighborhoods and go a long way in proving that both the City of Delaware and Addison truly care about the environment as well as the needs of current residents.

The area can be developed ethically with protecting the environment as a key component of the development design. If this happens then everyone wins. Addison will gain a reputation for truly caring about the environment and the communities they choose to do business in versus a company only concerned with their own bottom line. Addison will still make a hefty profit if Merrick is moved further north.

I have so many other thoughts and concerns, but my most pressing is moving Merrick Parkway further north, preserving the southern portion of the stream, wetland A and the mature tree canopy surrounding it.

Thank you for your time and your service to our city.

Sincerely,

Diane Mungovan
937 Executive Blvd.
Delaware, Ohio 43015

Elaine McCloskey

From: Jennifer Jenkins <jlphillips83@hotmail.com>
Sent: Wednesday, December 15, 2021 1:38 PM
To: Elaine McCloskey
Subject: Re: public comment for tonight's planning commission meeting regarding the Addison Property

Caution! This message was sent from outside your organization.

Elaine,
It should read the city infrastructure is destroying over 16 acres of trees not, 1 acre.

Respectfully,

Jennifer

On Dec 15, 2021 1:23 PM, Jennifer Jenkins <jlphillips83@hotmail.com> wrote:

Elaine,

Please share with planning commission and appropriate city staff.

Respectfully,

Jennifer Jenkins
544 Rutherford Ave.

Mr. Friedman,

Thank you for noting that you will make all efforts to preserve as many existing trees on site as possible. I look forward to working with you on these efforts. I knew that when you said in your meeting with the community that you care about the environment, that in every development that you do you end up planting more trees than you take down and that you would be following the City's very strict tree regulations that this will be a great project. I was excited to find, according to the Lower Olentangy Watershed's Greenspace Plan, which the City participated in, that your existing large stands of trees are listed as Greenspace Tier 2 and Tier 3 critical areas in the watershed and need protecting to preserve water quality. And the City's recent Nine-Element Nonpoint Source Implementation Strategy for Delaware Run-Olentangy River HUC-12 (05060001 10 07) found 6 threatened and endangered species right here in Delaware County! This should really boost our preservation efforts moving forward. Also, did you know that a nationwide study by NGO American Forest gave the City of Delaware a tree equity score of 80? The existing trees in our city work hard to sequester 431 tons of carbon, filter nearly 4 tons of pollution and intercept 87 thousand cubic meters of rain every single year?!? Our trees are so important! Especially since kids in Delaware are getting asthma at higher rates than the rest of the state. By the way, the Community Forest grant application is due Jan 10th. The portions of forest that you are already planning on preserving, along with other potential sponsor

donations, could be used as a match for this grant opportunity. This is a great opportunity for even more preservation!

City,

I do have some concerns with the City approving tree removal plans.

1. What city regulation for cutting trees down on a development is authorized by the City of Delaware?
2. Does the Developer have a General Stormwater Construction Permit issued by the Ohio EPA Division of Surface Water?
3. Has a recent study been done by the city or developer to determine if any wildlife species that are listed by ODNR Division of Wildlife have been identified to live or migrate on the Addison property? If so, what were the results of that study, what specific wildlife lives in this area, and who made the determination?

In order for the city of Delaware to make a decision on the number of trees that can or cannot be cut down, a study of the 122 endangered species listed must be completed and reviewed by the Ohio EPA. To conform with current permitting regulations for a General Stormwater Permit applied for by the developer and issued by the Ohio EPA Division of Surface Water before any construction work can be done to develop the land. The city of Delaware is not the sole governing authority nor principal governing authority of this development.

Also, I see Mr. Friedman is planning on preserving some trees. What is the City doing for the trees destroyed by infrastructure? Heritage, Merrick, Bruce Rd, and the regional basins are destroying over 1 acres of trees. How and where is the city going to replace this loss? As the city participated in the above mentioned studies, we are fully aware of the importance of these trees. What alternatives have been analyzed which might allow for more tree preservation?
There are trees in reserve areas 1 & 2 that are in the r/w. Are those credited for the city or the developer? Are any of the trees being counted a safety hazard in the clear zone? Is everyone ok with that redwood apartment on the existing stream? Why are fair trees being counted differently than good trees? What is the definition of a good tree? What is the definition of a fair tree? Many of the trees listed as fair do not have any notes as to why. Can we get an independent analysis as to which trees are good and which are fair? How are large 36" trees going to be saved if they aren't identified on the plan? Has the City of Delaware's Watershed and Sustainability Coordinator been given the opportunity to provide input on this proposal?

Also, there is less tree preservation on these PMU lots (15') than what was just approved for the straight R-3 zoned Parkview(20'). I thought that additional buffering was an advantage to PMUs. My lot lines don't even line up to the narrower lots behind my house.

Other thoughts - Let's take the conditional use bed and breakfast out of the single family pods. If individual property owners want to run a rental property, they can apply for a permit. Leaving that in could open the whole for sale neighborhood up as rentals. Also, why is there a "minimum square footage requirement" in many of the sub area development text? Shouldn't the setbacks control the building envelope? The dwelling unit can be as large as the building envelope permits. Let's not define things twice and then have to decide which one to follow.

I'm still confused if this is being reviewed as infill or new development. I've seen it referenced as both in different places.

I'm sure I have a lot more comments, but I haven't had enough time to review all of the updates. I hope that the Planning Commission will devote the appropriate time and consideration to this proposal as it is a large, complex development, perhaps the most complex PMU ever proposed in the city. It will set a precedent for future developments.

Respectfully,

Jennifer Jenkins

https://www.olentangywatershed.org/wp-content/uploads/2020/11/GreenSpace-Plan-2020-FINAL-6-19.pdf (A staff member, Caroline Cicerchi, represented the City of Delaware on the Steering Committee

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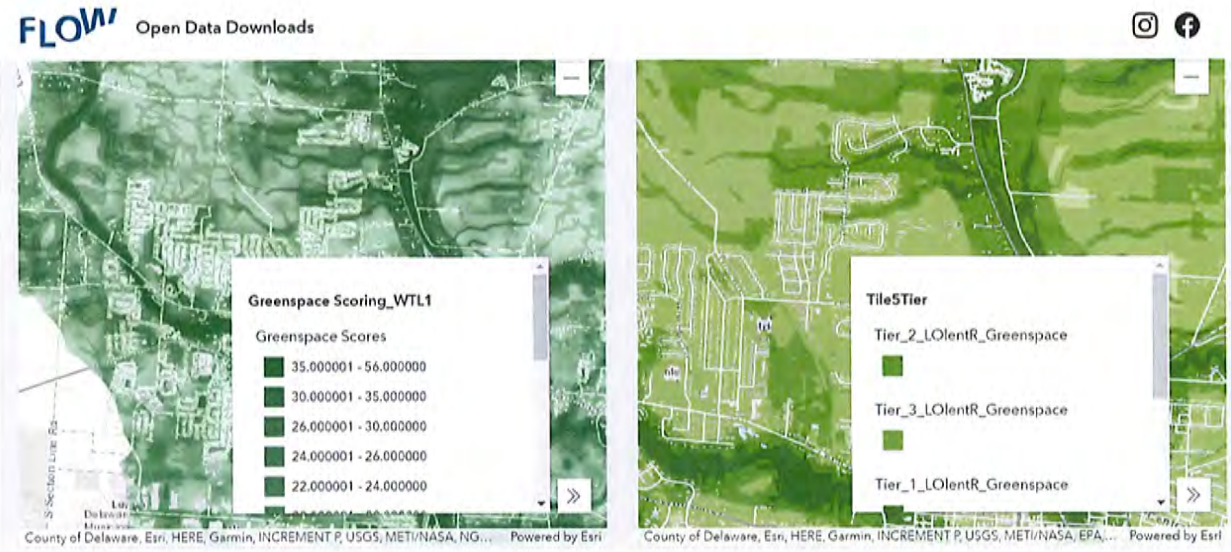
Jennifer Jenkins



https://www.olentangywatershed.org/wp-content/uploads/2020/11/GreenSpace-Plan-2020-FINAL-6-19.pdf (A staff member, Caroline Cicerchi, represented the City of Delaware on the Steering Committee

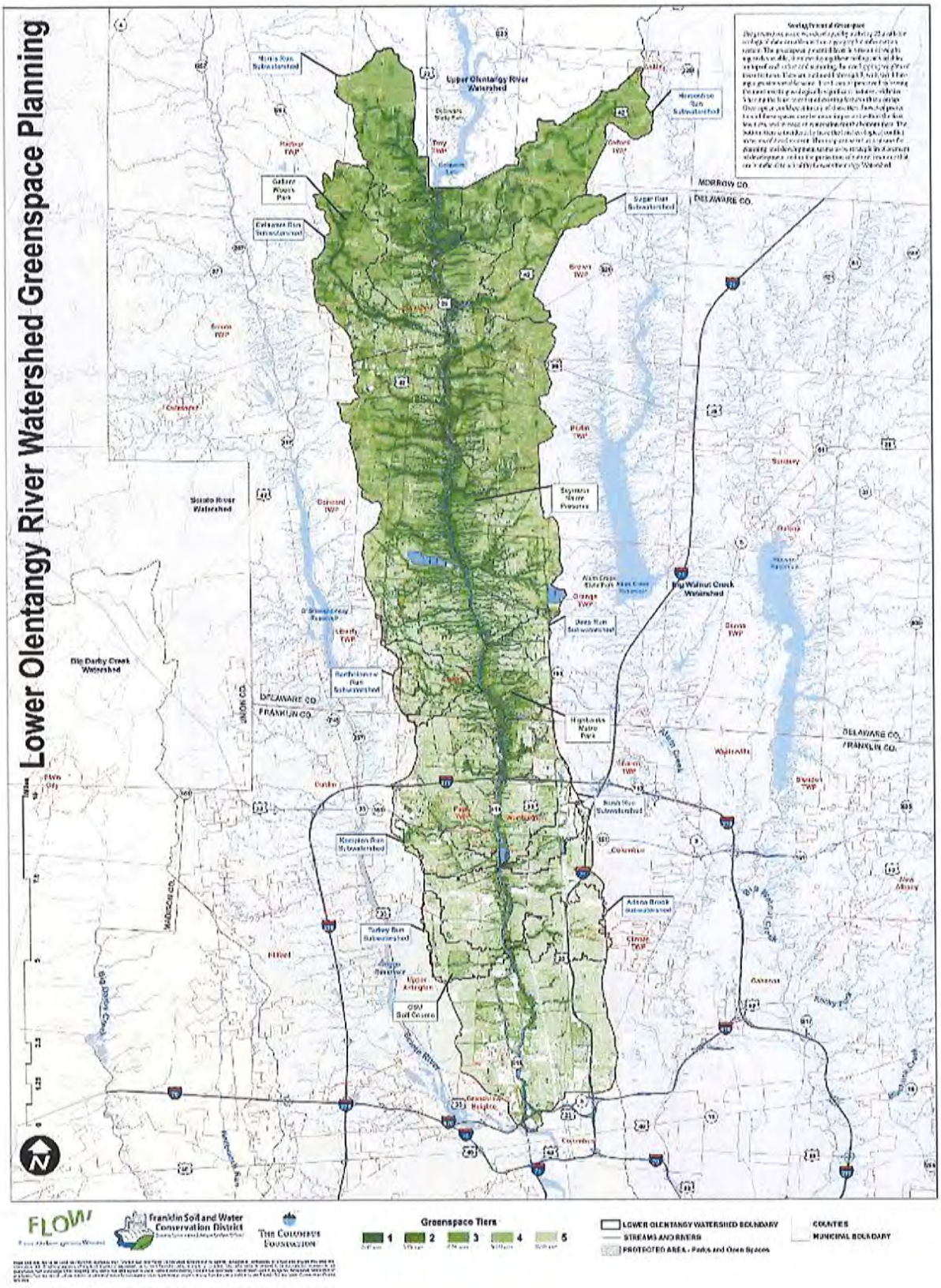

Lower Olentangy River Watershed Greenspace Planning
Upper Olentangy River Watershed
Scioto River Watershed
Big Walnut Creek Watershed
Big Darby Creek Watershed
DELAWARE CO.
FRANKLIN CO.
MORROW CO.
UNION CO.
Greenspace Tiers
1
2
3
4
5
LOWER OLENTANGY WATERSHED BOUNDARY
STREAMS AND RIVERS
PROTECTED AREA - Parks and Open Spaces
COUNTIES
MUNICIPAL BOUNDARY
FLOW
Franklin Soil and Water Conservation District
The Columbus Foundation

Table 7: Threatened and Endangered Species in Delaware County

Species	Status	Habitat Characteristics
Indiana bat *(Myotis sodalis)*	Endangered	Hibernates in caves and mines and forages in small stream corridors with well-developed riparian woods, as well as upland forests
Northern long-eared bat *(Myotis septentrionalis)*	Threatened	Hibernates in caves and mines and swarms in surrounding wooded areas in autumn; roosts and forages in upland forests during late spring and summer
Rabbitsfoot *(Quadrula cylindrical cylindrica)*	Threatened	No information available
Rayed bean *(Villosa fabalis)*	Endangered	Mainly headwater creeks, but sometimes larger rivers
Snuffbox *(Epioblasma triquetra)*	Endangered	Small to mid-sized creeks and larger rivers in swift current areas
Running buffalo clover *(Trifolium stoloniferum)*	Endangered	Disturbed bottomland meadows and disturbed sites that are partially shaded

(Source: USFWS, 2018)

https://www.epa.state.oh.us/Portals/35/nps/Approved%209-Element%20Plans/DelawareRun-OlentangyRiver_Ver1.0_6-29-2021.pdf

Nine-Element Nonpoint Source Implementation Strategy (NPS-IS) for Delaware Run-Olentangy River HUC-12 (05060001 10 07)

•Chris Roshon, Preservation Parks • Jeff Kaufmann, Del-Co • Scott Stephens, Delaware Soil and Water Conservation District • Janelle Valdinger, City of Delaware • John Krygier, Ohio Wesleyan University • Laura Fay, Friends of the Lower Olentangy River • Heather Doherty, Ohio Department of Natural Resources, Scenic Rivers • Caroline Cicerchi, formerly of the City of Delaware

www.epa.state.oh.us

https://www.fs.usda.gov/managing-land/private-land/community-forest/program

How the Community Forest Program Works | US Forest Service - USDA

Photo by Steve Neel. The Community Forest and Open Space Conservation Program (Community Forest Program) of the Forest Service offers a unique opportunity for communities to acquire and conserve forests that provide public access and recreational opportunities, protect vital water supplies and wildlife habitat, serve as demonstration sites for private forest landowners, and provide economic ...

www.fs.usda.gov

Asthma in Delaware County and Ohio

What is asthma?

Asthma is a chronic disease that affects the airways in the lungs. During an asthma attack, airways become inflamed, making it hard to breathe. Asthma attacks can be mild, moderate, or serious — and even life threatening.

Symptoms of an asthma attack include:

- Coughing
- Shortness of breath or trouble breathing
- Wheezing
- Tightness or pain in the chest

We don't know for sure what causes asthma, but we do know that attacks are sometimes triggered by:

- Allergens (like pollen, mold, animal dander, and dust mites)
- Exercise
- Occupational hazards
- Tobacco smoke
- Air pollution
- Airway infections

There's no cure for asthma. People with asthma can manage their disease with medical care and prevent attacks by avoiding triggers.

1 in 9
adults in Ohio have asthma

1 in 7
children in Ohio have asthma

Is asthma really a problem?

Yes. Asthma is a serious health and economic concern in the United States and Ohio.

- In 2014, an estimated 830,000 adults[1,2] and 420,000[2,3] children in Ohio had asthma.
- In Ohio, 10.8 percent of adults have asthma compared to 9.7percent in Delaware County[1].
- An estimated 7,976 adults in Delaware County have asthma[1,2].
- In Ohio, 14.2 percent of children have asthma, compared to 15.8 percent in Delaware County[1].
- An estimated 1,272 children in Delaware County have asthma[2,3].

Ohio Department of Health

National Center for Environmental Health
Division of Environmental Hazards and Health Effects

CDC

What makes a person more likely to have asthma?

Gender:

- Women are more likely to have asthma. In Ohio, 14.3 percent of women and 7 percent of men have asthma[1].
- Boys are more likely to have asthma than girls. In Ohio, 17 percent of boys and 12 percent of girls have asthma[3].

Race and ethnicity:

- Black children and adults are more likely to have asthma than white children and adults.
- More than 1 in 5 black children in Ohio have been diagnosed with asthma[3].

Education level:

- In Ohio, adults who didn't finish high school are more likely to have asthma than adults who graduated high school or college[1].

Income level:

- In Ohio, adults with an annual household income of $15,000 or less are more likely to have asthma than adults with incomes $35,000 and above[1].

It can make you sick.

- In Ohio during 2012, more than 17,000 inpatient hospital visits were made for asthma, at a rate of 15.1 visits per 10,000 residents[4].
- In Delaware County, 98 visits were made for asthma in 2012 a rate of 6.6 per 10,000 residents[4].
- In Ohio during 2012, more than 65,000 emergency department visits were made for asthma, at a rate of 54.1 visits per 10,000 residents[4].
- In Delaware County, 460 visits were made for asthma in 2012, at a rate of 25.9 per 10,000 residents[2,4].

It's deadly.

- Twelve people in Ohio die from at asthma every month.
- In 2012, 146 people in Ohio died from asthma. In Delaware County, there were one death in 2012 [5].

Sources:

1. Centers for Disease Control, Behavioral Risk Factor Surveillance System, Year 2014
2. US Census, 2014
3. Ohio Medicaid Assessment Survey, 2012
4. Ohio Hospital Association Clinical-Financial Database, 2011-2012
5. Death Data, Ohio Department of Health, Center of Health and Vital Statistics, 2012

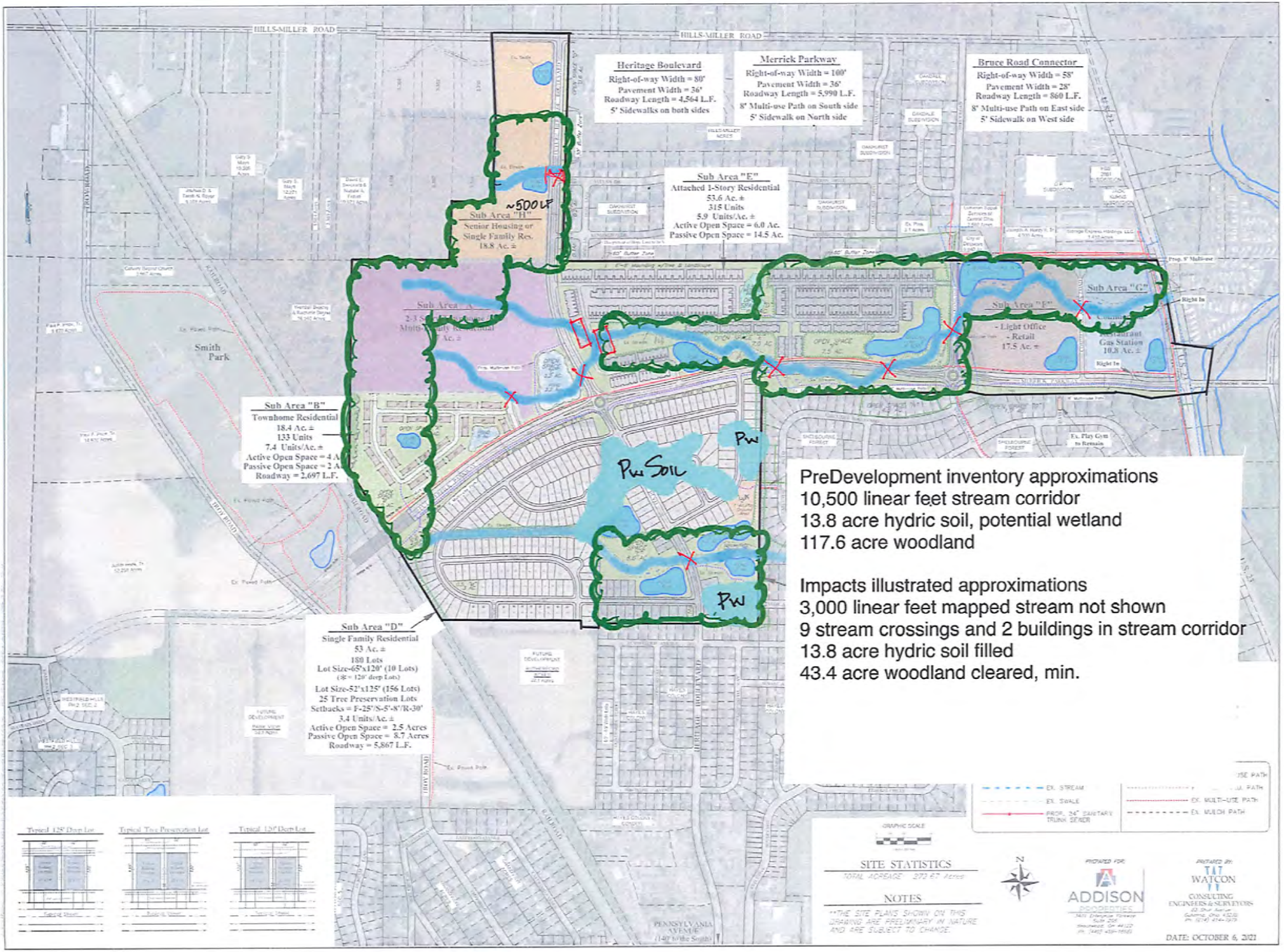
1 in 5
black Children in Ohio have asthma

1 in 5 Children below the poverty level in Ohio have asthma

Almost 66,000 ED visits in 2012 for asthma in Ohio

For more information about asthma, contact Cynthia Weiss at:

Ohio Department of Health
Asthma Program
614.728.3620
www.odh.ohio.gov/asthma



PreDevelopment inventory approximations
10,500 linear feet stream corridor
13.8 acre hydric soil, potential wetland
117.6 acre woodland

Impacts illustrated approximations
3,000 linear feet mapped stream not shown
9 stream crossings and 2 buildings in stream corridor
13.8 acre hydric soil filled
43.4 acre woodland cleared, min.

Annual Service Benefits

Carbon Sequestered	Carbon Monoxide	Nitrogen Dioxide
431.8 tons	0.2 tons	0.4 tons
Sulfur Dioxide	**PM10* Pollution**	**PM2.5 Pollution**
0.2 tons	3.5 tons	0.4 tons
Ozone	**Runoff Avoided**	**Rain Interception**
7.0 tons	15,118 m^3	87,084 m^3

From:	Tony Bonofiglio
To:	Elaine McCloskey; saradanderson@gmail.com; tbakare@ctconsultants.com; stroud_g@yahoo.com; stacy_simpson1976@yahoo.com; avolenik@gmail.com; cstaver@ymail.com; Carolyn Riggle
Cc:	Lisa Bonofiglio
Subject:	Re: Addison Farms Development
Date:	Wednesday, December 15, 2021 1:32:17 PM

Caution! This message was sent from outside your organization.

Dear City of Delaware Planning Commission Members;

In relation to the Addison Farms in-fill development plan should it continue to move forward the Delaware City Planning and Development Staff along with the Planning Commission should first and foremost consider the impact the plan has on the existing tax paying residents of Hayes Colony, Shelbourne Forest, Oakdale, and Oakhurst. To borrow a guideline from the "Delaware Together Plan" and we quote; "When development occurs adjacent to existing development an appropriate transition is needed and adjacent lots should be consistent in use and size. Smaller lots or more intense uses may be located in the interior of the development." Our group has provided our City Council Representative a sample of a counter development proposal that would align similar properties with those that currently exist in these respective neighborhoods. Incoming residents purchasing the new homes and properties are making a conscious decision when they make their purchase and know that other areas within the overall development plan may include high density residential and commercial spaces.

We would also like to borrow a few lines from the City's Planning and Development website, the role of:

The Department also protects and enhances the public health, safety, and general welfare, including property values, through the administration of the zoning, subdivision, and building codes, while responding to unique physical, economic, and social challenges that require planning expertise.

The City's Planning and Development Staff continues to table the concerns of tax paying residents of the community for the ongoing needs of the developer. The Planning Commission and City Council are where we the people can express our concerns and have our voices be heard. To date our voices have been muffled by the wants and needs of an out-of-town developer versus those of the tax paying residents of our community. We implore you to stand up for the current tax paying residents of the community and hold this developer accountable for this "in-fill" development. Nix the Planned Mix Use (PMU) requests and hold the developer to the City's current zoning standards. This developer was aware of the City's current zoning standards and did not seem to take them into consideration with this development plan.

In closing, we once again implore the Planning Commission to take all the concerns expressed by the tax paying residents of the community along with the submitted counter proposal into consideration, hold the developer accountable for a development that meets the City's current zoning standards.

Thank you for your consideration.

Lisa and Tony Bonofiglio
321 Kensington Dr.

Delaware, OH 43015
740-972-2764 Tony's Cell

From: Carrie Tackett
To: Elaine McCloskey
Subject: Addison Proposal-FOR PUBLIC RECORD
Date: Wednesday, December 15, 2021 1:53:08 PM

Caution! This message was sent from outside your organization.

FOR PUBLIC RECORD:

I am writing in response to tonight's planning commission meeting. Despite what some may believe, our neighborhood (Shelbourne Forest) & equally, our friends in Oakhurst are not necessarily against development. Sometimes, development is wanted and necessary. We just ask that it be done in such a way that Delaware's own rules and practices are followed and that we don't allow the developers, who typically don't live in the communities they develop to dictate what they will and won't do, to the detriment of our wonderful city of Delaware. Delaware is such a unique city with a lot of positive aspects to it, which is why we need to fight back against development that takes away from everything that draws people to move here. Through many conversations with our community, I have talked to a lot of people who shared why they moved AWAY from places like Dublin, Westerville and such, with development being the number one factor. We are supposed to be a "Tree City", yet we don't seem to be challenging developers, including Addison, to minimize how many trees are cut down in the process. It takes decades for new tree growth to adequately help with noise, privacy, the environment and the general overall health of a community. We already have a lot of trees bordering the neighborhoods of Shelbourne Forest and Oakhurst, which would help minimize the impact of Addison's development. Why not require the majority of those there to be kept? So what, the developer gets to build a few less homes, I'm sure he'll still make quite a profit. And a "more natural" park, similar to Preservation Parks would always be a welcome addition. We are also concerned about the increased likelihood of additional flooding, which has already been a concern. The fact that Addison can even get the park credit from some of the land to be added to Smith Park is ridiculous, especially since we aren't even likely to benefit much from it until a bridge or tunnel gets us safely over/under the railroad tracks, which sounds like it could be a decade from now. Not to mention that until a viable method to connect the existing Merrick Blvd. to the planned Merrick Parkway, it won't likely help traffic be re-routed around the north end of the city.

All that being said, we ARE encouraged by many of the changes to Addison's proposal. The placement of Merrick Parkway is better, though still not ideal. The preservation of more of the wetlands and the addition of a nature trail behind our homes, connected by the empty lot between 829 and 841 Executive Blvd. rather than a proposed road are awesome. The addition of a small park and keeping the existing "red park" on Pinecrest, and decreasing the number of stub/connecting is appreciated, as well as the roundabout to slow down traffic, though its placement very close to the homes at the end of Executive doesn't seem very safe.

Please hold the developers to higher standards and keep Delaware the unique, wonderful community that we all know and love!

Carrie Tackett
829 Executive Blvd.

Delaware, OH 43015

Sent from Mail for Windows 10

December 15, 2021

Stefanie Hauck, MS
Public Comment for the record
RE: Tree Preservation Practices, Addison Farms

To members of the City of Delaware Planning Commission,

As a board member of Sustainable Delaware Ohio and Delaware Together Comprehensive Plan Steering Committee Member, I wish to express my concern regarding the potential of losing hundreds of trees in favor of a high density built environment in the proposed PMU-Addison Farms development.

The endangered Indiana Brown Bat, Little Brown Bat, Big Brown Bat, thousands of native bees and other pollinators plus numerous species of birds use the more than 100 acres of forest as a migratory stopover, a place to hibernate in winter and a place to raise their young. Bats, especially the Indiana Bat are endangered species and are listed. As such, at the very least a species survey must be done to determine if any of these species are present in the forested area before felling ANY trees.

A healthy balance of nature must also exist to ensure the health of our community in the face of ongoing climate change which will result in warmer seasons and wetter weather. Flooding despite conventional gray water stormwater treatment will be a big issue in the future and green infrastructure like trees will help save lives and curb property damage due to more violent storms and higher volume of precipitation. And this is not the first time perfectly good habitat was destroyed for progress. For Coughlin's Crossing, hundreds of viable trees were cut down, and the proposed Addison development does not bode well for mature tree preservation. Trees are important to our community for many reasons, such as:

1. **Social and Community**: Trees increase our quality of life by bringing natural elements and wildlife habitats into urban settings. We gather under the cool shade they provide during outdoor activities with family and friends. Many neighborhoods are also the home of very old trees that serve as historic landmarks and a great source of town pride.
2. **Ecological and Health**: Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife. According to the U.S. Department of Agriculture, "One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people." Trees and other vegetation also filter air by removing dust and absorbing other pollutants like carbon monoxide, sulfur dioxide and nitrogen dioxide. Trees control climate by moderating the effects of the sun, rain and wind. Trees have shown to reduce the heat island effect caused by pavement, buildings and other impervious surfaces.
3. **Property and Economic Value**: A mature tree can have an appraised value between $1000 and $10,000.– *Council of Tree and Landscape Appraisers*. Neighborhoods with trees tend to have higher property values and are widely regarded as more desirable places to live. In addition, cooling costs are reduced in a tree-shaded home, and heating costs lowered when a tree serves as a windbreak.

As Delaware continues to grow, we must continue to protect our tree canopy. This can be accomplished by upholding Chapter 1168 of the Delaware City Code in all development zones, including those with Planned Mixed Use overlays. Also additional metrics, as described in the city's comprehensive plan should be considered to allow for a more comprehensive accounting of development-imposed risks to our tree canopy and generally for more protection of our natural resources.

The trees in Delaware give us so much and ask for so little. As a "Tree City USA" we must continue to do the important work of protecting our tree canopy. Thank you for your time and attention to this matter.

SIGNED

Stefanie Hauck, MS
99 Camden Lane
Delaware, Ohio 43015
740-972-1680

Member of the Delaware Together Comprehensive Plan Steering Committee

Boardmember of Sustainable Delaware

From: Debora Fuchs
To: Elaine McCloskey
Subject: Dec 15, 2021 meeting
Date: Wednesday, December 15, 2021 2:42:15 PM

Caution! This message was sent from outside your organization.

December 15, 2021

Dear Planning Commission Members,

In reviewing the agenda for tonight's meeting, it appears you are being asked to approve all PMU zoning requests for the Addison Farms development. Before you do that please consider the impacts, both positive and negative, to the surrounding neighbors and neighborhoods. This development will greatly stress the already overworked City services. How will we pay for all that will be needed for infrastructure, police, fire, schools, etc? Especially if you grant the developer significant financial support? All these needs appear downplayed in the information provided and/or unrealistic to what we as a City are actually experiencing. Merrick Parkway should be moved as far north and west as possible, the Woodhaul connection should be for emergency use only, trees need to be preserved, the Olentangy Watershed needs to be protected, storm water controls need to be properly in place, no more gas stations needed in this area. You all know the lists of concerns we, your current city residents and taxpayers, have.
Newly seen advertisement for the Addison development states there are 2000 units and way less trees with more parking lots, etc. It does not match what we have previously seen. This is concerning. I suggest that this process be tabled again to give all those involved more time to make sure everything is properly in place to the benefit of All of us, the environment, the whole City, not just the developer.

Sincerely,

Deb Fuchs
788 Executive Blvd

From:	MichKohler
To:	Elaine McCloskey
Subject:	Fwd: Addison Development
Date:	Wednesday, December 15, 2021 3:29:06 PM

Caution! This message was sent from outside your organization.

Begin forwarded message:

From: MichKohler <michkohler62@gmail.com>
Date: November 22, 2021 at 3:40:08 PM EST
To: stackett@delawareohio.net
Subject: Addison Development

Hello

I am out of the state and cannot attend the December 1 meeting regarding the Addison Development.

I have been a resident of the city for 30+ years and 20 of those years have been at 925 Executive Blvd.

While I understand that this is the Developers right to bring this development to the City, I do have some concerns.

My main concern is the proposed road that will be developed behind my house. There has to be another way for the Developers to build this development without impacting all of the homes along this proposed road. This proposed
road will bring a magnitude of noise to our Development.

Years, ago there was a proposed development in this same area and the proposed road, if I remember correctly, was no where near the backs of our homes.

This Developers should build this road inside their development and not at the border of our homes.

The bikepath is necessary but not along the border of our homes.

I do have some concerns regarding the traffic and the burden on the schools, however, I believe the Developer is within their rights to build what is legally allowed and that we will all have to deal with it.

I do not fully oppose this development. I really believe that the Developer needs revisit the road placement and the bikepath and make sure that it does not border our homes.

If the road and bikepath are relocated there may be less criticism of this development. It would show that the Developers are willing to work with the already established development

and the residents living there.

Thank you
Michele Richards
Jim Ballinger
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michkohler62@gmail.com