OHIO PUBLIC WORKS FOR YOU

State of Ohio

Public Works Commission

Application for Financial Assistance

IMPORTANT: Please consult "Instructions for Financial Assistance for Capital Infrastructure Projects" for guidance in completion of this form.

Applicant

Applicant: Village of Wayne Subdivision Code: 173-82334

District Number: 5 County: Wood Date: 09/11/2020

Contact: Melissa Repasz Phone: (419) 288-3075
(The individual who will be available during business hours and who can best answer or coordinate the response to questions)

Email: villageofwayne@yahoo.com FAX:

Project

Project Name: 2021 Storm Sewer Improvements Zip Code: 43466

Subdivision Type (Select one)

- ☐ 1. County
- ☐ 2. City
- ☐ 3. Township
- ☒ 4. Village
- ☐ 5. Water (6119 Water District)

Project Type (Select single largest component by $)

- ☐ 1. Road
- ☐ 2. Bridge/Culvert
- ☐ 3. Water Supply
- ☐ 4. Wastewater
- ☐ 5. Solid Waste
- ☒ 6. Stormwater

Funding Request Summary (Automatically populates from page 2)

Total Project Cost:	545,000 .00
1. Grant:	239,800 .00
2. Loan:	245,250 .00
3. Loan Assistance/ Credit Enhancement:	0 .00
Funding Requested:	485,050 .00

District Recommendation (To be completed by the District Committee)

Funding Type Requested (Select one)

- ☐ State Capital Improvement Program
- ☐ Local Transportation Improvement Program
- ☐ Revolving Loan Program
- ☐ Small Government Program

District SG Priority: _____

SCIP Loan - Rate: ____ % Term: ____ Yrs	Amount:	.00
RLP Loan - Rate: ____ % Term: ____ Yrs	Amount:	.00
Grant:	Amount:	.00
LTIP:	Amount:	.00
Loan Assistance / Credit Enhancement:	Amount:	.00

For OPWC Use Only

STATUS

Project Number:

Release Date:

OPWC Approval:

Grant Amount: .00

Loan Amount: .00

Total Funding: .00

Local Participation: %

OPWC Participation: %

Loan Type: ☐ SCIP ☐ RLP

Date Construction End:

Date Maturity:

Rate: %

Term: Yrs

1.0 Project Financial Information (All Costs Rounded to Nearest Dollar)

1.1 Project Estimated Costs

Engineering Services

Preliminary Design:	10,000 .00		
Final Design:	30,000 .00		
Construction Administration:	5,000 .00		
Total Engineering Services:	a.)	45,000 .00	10 %
Right of Way:	b.)	.00	
Construction:	c.)	454,540 .00	
Materials Purchased Directly:	d.)	.00	
Permits, Advertising, Legal:	e.)	.00	
Construction Contingencies:	f.)	45,460 .00	10 %
Total Estimated Costs:	g.)	545,000 .00	

1.2 Project Financial Resources

Local Resources

Local In-Kind or Force Account:	a.)	.00	
Local Revenues:	b.)	59,950 .00	
Other Public Revenues:	c.)	.00	
ODOT / FHWA PID:	d.)	.00	
USDA Rural Development:	e.)	.00	
OEPA / OWDA:	f.)	.00	
CDBG: ☐ County Entitlement or Community Dev. "Formula" ☐ Department of Development	g.)	.00	
Other:	h.)	.00	
Subtotal Local Resources:	i.)	59,950 .00	11 %

OPWC Funds (Check all requested and enter Amount)

Grant: 49 % of OPWC Funds	j.)	239,800 .00	
Loan: 51 % of OPWC Funds	k.)	245,250 .00	
Loan Assistance / Credit Enhancement:	l.)	0 .00	
Subtotal OPWC Funds:	m.)	485,050 .00	89 %
Total Financial Resources:	n.)	545,000 .00	100 %

1.3 Availability of Local Funds

Attach a statement signed by the Chief Financial Officer listed in section 5.2 certifying all local resources required for the project will be available on or before the earliest date listed in the Project Schedule section. The OPWC Agreement will not be released until the local resources are certified. Failure to meet local share may result in termination of the project. Applicant needs to provide written confirmation for funds coming from other funding sources.

2.0 Repair / Replacement or New / Expansion

2.1 Total Portion of Project Repair / Replacement:	545,000 .00	100 %	A Farmland Preservation letter is required for any impact to farmland
2.2 Total Portion of Project New / Expansion:	0 .00	0 %	
2.3 Total Project:	545,000 .00	100 %	

3.0 Project Schedule

3.1 Engineering / Design / Right of Way	Begin Date: 06/01/2021	End Date: 09/01/2021
3.2 Bid Advertisement and Award	Begin Date: 09/01/2021	End Date: 10/01/2021
3.3 Construction	Begin Date: 10/01/2021	End Date: 01/01/2022

Construction cannot begin prior to release of executed Project Agreement and issuance of Notice to Proceed.

Failure to meet project schedule may result in termination of agreement for approved projects. Modification of dates must be requested in writing by project official of record and approved by the Commission once the Project Agreement has been executed.

4.0 Project Information

If the project is multi-jurisdictional, information must be consolidated in this section.

4.1 Useful Life / Cost Estimate / Age of Infrastructure

Project Useful Life: 33 Years Age: 1968 (Year built or year of last major improvement)

Attach Registered Professional Engineer's statement, with seal or stamp and signature confirming the project's useful life indicated above and detailed cost estimate.

4.2 User Information

Road or Bridge: Current ADT _____ Year _____ Projected ADT _____ Year _____

Water / Wastewater: Based on monthly usage of 4,500 gallons per household; attach current ordinances.

Residential Water Rate Current $_____ Proposed $ _____

Number of households served: _____

Residential Wastewater Rate Current $ _____ Proposed $ _____

Number of households served: _____

Stormwater: Number of households served: 160

4.3 Project Description

A: SPECIFIC LOCATION (Supply a written location description that includes the project termini; a map does not replace this requirement.) 500 character limit.

The Village of Wayne is experiencing large amounts of flooding in the residential properties on Watson Street and Railroad Street during rain events of approximately two inches and greater. To improve the storm water drainage system, the Village intends to install new storm sewer main along the rear lots of the western properties on Watson Street and construct a detention basin and ultimately outlet the storm sewer to the existing County regulated ditch to the south.

B: PROJECT COMPONENTS (Describe the specific work to be completed; the engineer's estimate does not replace this requirement) 1,000 character limit.

The area experiencing large amounts of flooding (Watson Street and Railroad Street) is one of the lowest elevations in the Village; causing it to be a natural ponding area for a large area of the community. A county ditch that runs perpendicular to the ends of both streets to the south is the ultimate outlet for the storm water. To improve the storm drainage, the Village plans to replace an existing 8" storm drainage tile with new 36" storm sewer and construct a detention basin to manage the storm water during larger rain events.

The existing drainage system is insufficient for the runoff it receives. The storm tiles near the affected streets are significantly past there useful life, causing them to be inefficient at draining storm-water into the county ditch.

Additionally, during high rain events, the ditch begins to back up further preventing the area from draining. The proposed detention basin will aid in providing a storage area for the runoff to release slower over time. The outlet from the detention basin coordinated with the County Engineer.

C: PHYSICAL DIMENSIONS (Describe the physical dimensions of the existing facility and the proposed facility. Include length, width, quantity and sizes, mgd capacity, etc in detail.) 500 character limit.

The proposed project includes the following approximate quantities of components:
2125 feet of storm sewer (sized between 8" and 36").
15 catch basins.
16,880 cubic yards of excavation, 25 cubic yards of rock channel protection, and 10,000 square yards of seeding and mulching (for detention basin).

5.0 Project Officials

Changes in Project Officials must be submitted in writing from an officer of record.

5.1 Chief Executive Officer

(Person authorized in legislation to sign project agreements)

Name: Craig Everett

Title: Mayor

Address: 125 Schoolhouse Road

P.O. Box 39

City: Wayne State: OH Zip: 43466

Phone: (419) 288-3075

FAX: (419) 288-1020

E-Mail: villageofwayne@yahoo.com

5.2 Chief Financial Officer

(Can not also serve as CEO)

Name: Melissa Repasz

Title: Fiscal Officer

Address: 125 Schoolhouse Road

P.O. Box 39

City: Wayne State: OH Zip: 43466

Phone: (419) 288-3075

FAX: (419) 288-1020

E-Mail: villageofwayne@yahoo.com

5.3 Project Manager

Name: Ryan J. Lefeld, PE

Title: Project Manager, Choice One Engineering

Address: 440 E. Hoewisher Road

City: Sidney State: OH Zip: 45365

Phone: (937) 497-0200

FAX:

E-Mail: rjl@choiceoneengineering.com

6.0 Attachments / Completeness review

Confirm in the boxes below that each item listed is attached (Check each box)

- [x] A certified copy of the legislation by the governing body of the applicant authorizing a designated official to sign and submit this application and execute contracts. This individual should sign under 7.0, Applicant Certification, below.

- [x] A certification signed by the applicant's chief financial officer stating the amount of all local share funds required for the project will be available on or before the dates listed in the Project Schedule section. If the application involves a request for loan (RLP or SCIP), a certification signed by the CFO which identifies a specific revenue source for repaying the loan also must be attached. Both certifications can be accomplished in the same letter.

- [x] A registered professional engineer's detailed cost estimate and useful life statement, as required in 164-1-13, 164-1-14, and 164-1-16 of the Ohio Administrative Code. Estimates shall contain an engineer's seal or stamp and signature.

- [ ] A cooperative agreement (if the project involves more than one subdivision or district) which identifies the fiscal and administrative responsibilities of each participant.

- [ ] Farmland Preservation Review - The Governor's Executive Order 98-IIV, "Ohio Farmland Protection Policy" requires the Commission to establish guidelines on how it will take protection of productive agricultural and grazing land into account in its funding decision making process. Please include a Farm Land Preservation statement for projects that have an impact on farmland.

- [ ] Capital Improvements Report. CIR Required by O.R.C. Chapter 164.06 on standard form.

- [x] Supporting Documentation: Materials such as additional project description, photographs, economic impact (temporary and/or full time jobs likely to be created as a result of the project), accident reports, impact on school zones, and other information to assist your district committee in ranking your project. Be sure to include supplements which may be required by your local District Public Works Integrating Committee.

7.0 Applicant Certification

The undersigned certifies: (1) he/she is legally authorized to request and accept financial assistance from the Ohio Public Works Commission as identified in the attached legislation; (2) to the best of his/her knowledge and belief, all representations that are part of this application are true and correct; (3) all official documents and commitments of the applicant that are part of this application have been duly authorized by the governing body of the applicant; and, (4) should the requested financial assistance be provided, that in the execution of this project, the applicant will comply with all assurances required by Ohio Law, including those involving Buy Ohio and prevailing wages.

Applicant certifies that physical construction on the project as defined in the application has NOT begun, and will not begin until a Project Agreement for this project has been executed with the Ohio Public Works Commission. Action to the contrary will result in termination of the agreement and withdrawal of Ohio Public Works Commission funding from the project.

Craig Everett, Mayor

Certifying Representative (Printed form, Type or Print Name and Title)

Craig Everett 09-08-2020

Original Signature / Date Signed

Resolution No. 8-20-766

Passed Aug. 19, 2020

A RESOLUTION AUTHORIZING THE MAYOR TO PREPARE AND SUBMIT AN APPLICATION TO PARTICIPATE IN THE OHIO PUBLIC WORKS COMMISSION STATE CAPITAL IMPROVEMENT AND/OR LOCAL TRANSPORTATION IMPROVEMENT PROGRAM(S) AND DECLARING AN EMERGENCY

WHEREAS, the State Capital Improvement Program and the Local Transportation Improvement Program both provide financial assistance to political subdivisions for capital improvements to public infrastructure; and

WHEREAS, the Village of Wayne is planning to make capital improvements to its storm sewer system; and

WHEREAS, the maintenance and improvements of the Village sewer system is necessary to protect the health, safety, and welfare of the residents of the Village; and

WHEREAS, the infrastructure improvement herein above described is considered to be a priority need for the community and is a qualified project under the OPWC programs.

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE VILLAGE OF WAYNE, STATE OF OHIO, WITH TWO-THIRDS VOTING IN FAVOR, AS FOLLOWS:

SECTION 1. The Mayor is hereby authorized to apply to the OPWC for funds as described above.

SECTION 2. The Mayor is hereby authorized to enter into any agreements as may be necessary and appropriate for applying for this financial assistance.

SECTION 3. Effective Date

This Ordinance shall become effective from and after its passage at the earliest period allowed by Law.

SECTION 4. Emergency Clause

This resolution constitutes an emergency measure necessary for the immediate preservation of the public peace and fundamental rights of the residents of the Village of Wayne, and shall go into immediate effect upon the passage thereof. The reason for the emergency is that the deadlines imposed by said grant process do not provide sufficient time to have three readings of this resolution and that the Village requires this financial assistance during the time of this declared pandemic in order to properly and prudently provide for the health, safety, and welfare of the Village residents.

SECTION 5. Public Meetings

All formal actions of Council relating to the adoption of this Resolution and all deliberations of Council and any of its committees leading to such action were held in meetings open to the public, as required by Law.

Passed: 9 / 19 / 2020

President of Council

Mayor

Attest:

Village Fiscal Officer

Approved:

Village Solicitor

CHIEF FINANCIAL OFFICER'S CERTIFICATION OF LOCAL FUNDS / LOAN REPAYMENT LETTER

Date: 8/24/2020

I, **Fiscal Officer** of the **Village of Wayne**, hereby certify that **Village of Wayne** has the amount of **$59,950** in the **General Fund** and that this amount will be used to pay the local share for the **2021 Storm Sewer Improvements** when it is required.

{NOTE: If the application is for a loan or grant / loan combination the following paragraph is also required.}

I, **Fiscal Officer** of the **Village of Wayne**, hereby certify that **Village of Wayne** has / will have / will collect the amount of **$245,250** in the **General Fund** and that this amount will be used to repay the Ohio Public Works Commission SCIP or RLP loan requested for the **2021 Storm Sewer Improvements** over a **30 years** term.

Melissa Repasz

Melissa Repasz, Fiscal Officer

2021 STORM SEWER IMPROVEMENTS
VILLAGE OF WAYNE, WOOD COUNTY
PRELIMINARY CONSTRUCTION ESTIMATE

August 7, 2020

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QTY.	UNIT PRICE	TOTAL
201	CLEARING AND GRUBBING, AS PER PLAN	LUMP	1	$10,000.00	$10,000.00
202	REMOVED, AS PER PLAN	LUMP	1	$10,000.00	$10,000.00
203	TOPSOIL STRIPING AND REPLACING	C.Y.	1000	$5.00	$5,000.00
203	EXCAVATION INCLUDING EMBANKMENT, AS PER PLAN	C.Y.	16880	$7.00	$118,160.00
204	SUBGRADE COMPACTION, AS PER PLAN	S.Y.	60	$1.00	$60.00
304	AGGREGATE BASE, AS PER PLAN	C.Y.	20	$45.00	$900.00
407	TACK COAT, 0.09 GAL/S.Y.	GAL.	16	$5.00	$80.00
441	2-1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448)	C.Y.	4	$300.00	$1,200.00
441	1-1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG 64-22	C.Y.	3	$300.00	$900.00
601	TYPE C ROCK CHANNEL PROTECTION	C.Y.	25	$100.00	$2,500.00
602	CONCRETE MASONRY	C.Y.	1.1	$5,000.00	$5,500.00
611	8" STORM SEWER	FT.	128	$30.00	$3,840.00
611	12" STORM SEWER	FT.	350	$60.00	$21,000.00
611	15" STORM SEWER	FT.	180	$65.00	$11,700.00
611	18" STORM SEWER	FT.	210	$70.00	$14,700.00
611	24" STORM SEWER	FT.	235	$80.00	$18,800.00
611	36" STORM SEWER	FT.	1020	$110.00	$112,200.00
611	TYPE 2-2B CATCH BASIN	EACH	7	$2,000.00	$14,000.00
611	TYPE 2-3 CATCH BASIN	EACH	1	$2,500.00	$2,500.00
611	TYPE 2-4 CATCH BASIN	EACH	7	$3,000.00	$21,000.00
614	MAINTAINING TRAFFIC	LUMP	1	$8,000.00	$8,000.00
630	REMOVE AND RESET SIGN	EACH	5	$100.00	$500.00
638	MISC. WATER WORK: 6" WATER MAIN RELOCATED	FT.	100	$100.00	$10,000.00
638	MISC. WATER WORK: 8" WATER MAIN RELOCATED	FT.	100	$100.00	$10,000.00
659	SEEDING AND MULCHING, AS PER PLAN	S.Y.	10000	$4.00	$40,000.00
832	EROSION CONTROL	EACH	7000	$1.00	$7,000.00
832	STORM WATER POLLUTION PREVENTION PLAN	LUMP	1	$5,000.00	$5,000.00
	SUBTOTAL				$454,540.00
	10% CONTINGENCY				$45,460.00
	TOTAL CONSTRUCTION				**$500,000.00**
	ENGINEERING				$45,000.00
	TOTAL PROJECT COSTS				**$545,000.00**

Choice One Engineering

We make no warranty, express or implied, that the actual construction cost of the work associated with these estimated quantities and costs will not vary. The cost reflects our opinion of current probable construction cost.

Ryan J. Lefeld, P.E.

8-7-2020
Date

STATE OF OHIO
RYAN J LEFELD
E-81213
REGISTERED
PROFESSIONAL ENGINEER

A weighted useful life statement stamped/sealed and signed by a licensed professional engineer must be included with the project application.

This spreadsheet has formulas to make a weighted useful life calculation and is populated with an example for illustrative purposes. Items can be added to column a.

Weighted Useful Life & Design Service Capacity Calculations

Major Component	Cost ($1,000)	Portion Repair / Replacement (%)	Repair / Replace Product	Useful Life (Years)	Useful Life Product
Full-depth road construction w/ drainage	247.506	100	24750.6	25	6187.65
Full-depth road construction w/o drainage				25	
Partial-depth road construction w/ drainage	1.98	100	198	15	29.7
Partial-depth road construction w/o drainage				15	
Storm Sewers	250.514	100	25051.4	40	10020.56
Sanitary Sewers				40	
Water Lines				40	
Bridge				75	
Pumps, Lift Stations				15	
Sidewalks				25	
Bike Facility				7	
Totals	500		50000		16237.91

Weighted Useful Life: 32.5 Years

Design Service Capacity (Project Application, Section 2.0):

Portion Repair / Replace 100 %

Portion New / Expansion %

Ryan J. Lefeld, P.E.

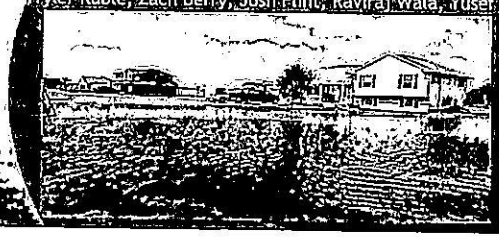
8-7-2020

Date

STATE OF OHIO
RYAN J
LEFELD
E-81213
REGISTERED
PROFESSIONAL ENGINEER

Village Of Wayne Stormwater Management System

Tyler Ruble, Zach Berry, Josh Flint, Ravtraj Wala, Yuser Obeid



Disclaimer

COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

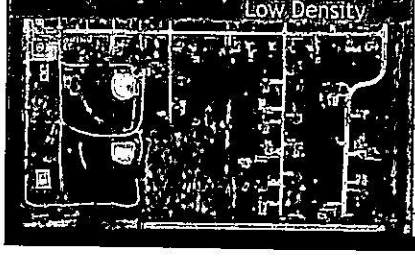
This presentation is student work. The contents of this presentation reflect the views of the students who are responsible for the facts and accuracy of the data presented. The contents do not necessarily reflect the views of The University of Toledo. The recommendations, drawings, and specifications in this report should not be used without consulting a professional engineer.

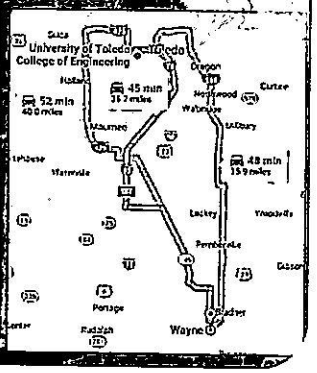
Project Location:

Village: Wayne (35 miles southeast of Toledo)

Population: Approx 1000

Characteristics: Rural
Low Density





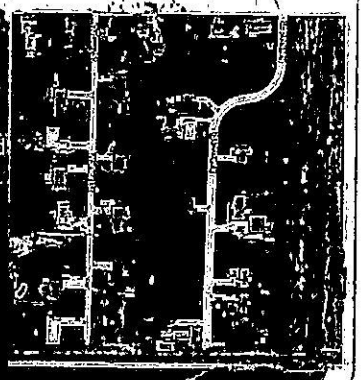
Problem Statement

Localized flooding occurs after 2 inches or more of rainfall

Between Watson and Railroad Streets

County ditch located on the south edge of this area

Aging infrastructure



Current Conditions

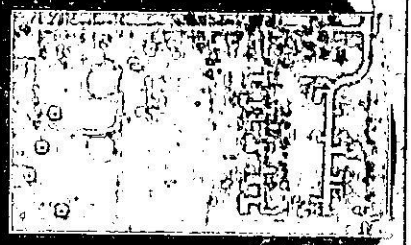
Constraints

County ditch can not be altered due to downstream concerns

EPA Isolation Zone around well field

Budget does not allow for a large-scale project

Land must be acquired



Project Goals/Deliverables

Reduce the flooding in the area

Restore property values

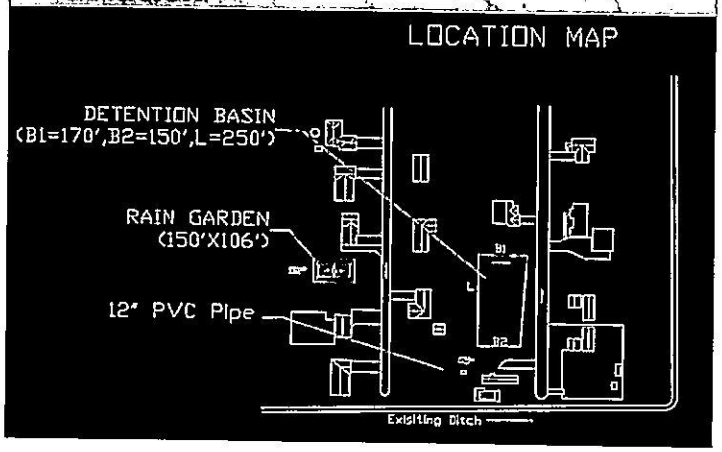
Restore peace of mind for the residents affected

Provide the Village of Wayne with a detailed report with multiple options to pursue

Original Proposed Solutions

1. Update of drainage system
   - Not designed due to minimum benefit
2. Large Detention Basin
   - Eliminated due to EPA concerns with well field
3. Reroute Ditch
   - Eliminated due to Wood County Engineer opposition

Solution



Redesigned Detention Basin

The redesigned detention basin is trapezoidal in shape and located off Railroad street on four empty lots.

Dimensions:

$Base_1$ = 170' $Base_2$ = 150' Length = 250' & Depth = 5'

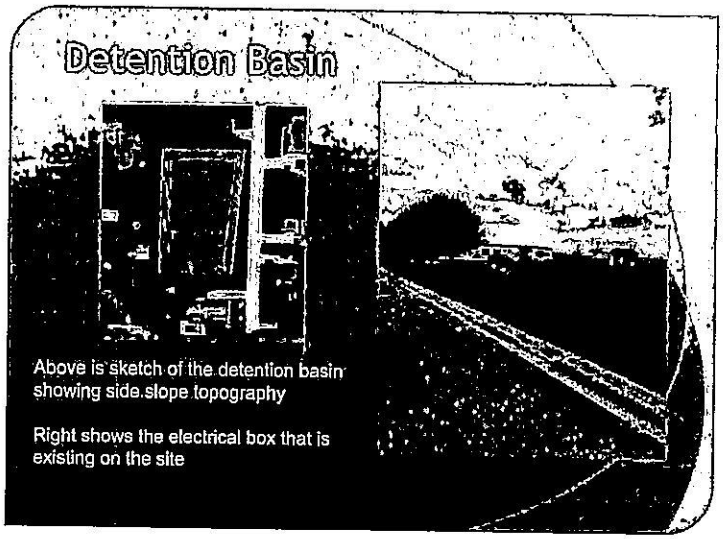
Approximate Volume = 168,000 ft^3

Side Slopes = 4:1

175' long 12" PVC drain pipe

Invert Elevations: upper 686.67' & lower 686.48"

Detention Basin



Above is sketch of the detention basin showing side slope topography

Right shows the electrical box that is existing on the site

Detention Basin Cost Estimate

Item	Material Cost	Labor Cost
Drain Piping 12" Schedule 40 PV	$ 2,340	
Excavation Volume = 6,261 yd^3		$ 34,433
Grass Seeding Area = 40,000 ft^2	$ 4,800	$ 5,600
Total	$ 7,140	$ 40,033
Grand Total (Labor + Material)	$	47,173

Excavation estimate from Innovative Excavating

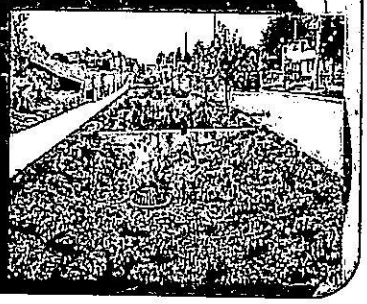
Rain Garden

Green Infrastructure

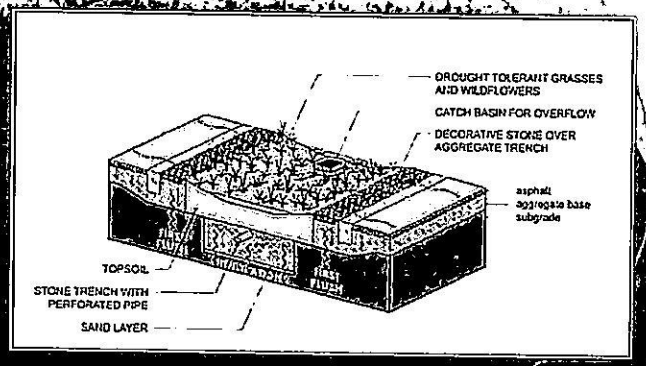
Used to hold water to prevent flooding

Allows for infiltration

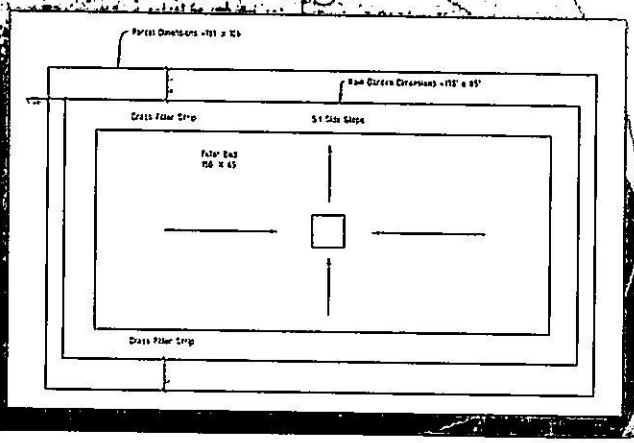
Reduces stormwater runoff



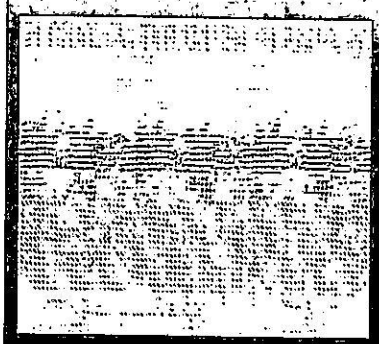
Rain Garden

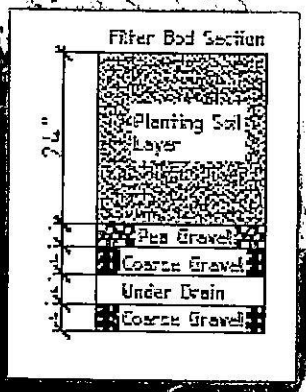


Rain Garden Design



Rain Garden





Rain Garden Cost Estimate

Item	Material Cost	Labor Cost
Underdrain (150 ft)	$ 209	
Misc	$ 65	
Pea Gravel (137 tons)	$ 4,084	
# 57 Coarse Gravel (361 tons)	$ 7,229	$ 3,170
Grass Seeding Area = 14,450 ft^2	$ 1,734	$ 2,023
Planting Soil = 703 yd^3	$ 39,560	
Excavation Volume = 1,174 yd^3		$ 6,455
Total	$ 52,881	$ 11,648
Grand Total (Labor + Material)	$	64,529

Planting Soil estimate from North Branch Nursery

Rain Garden

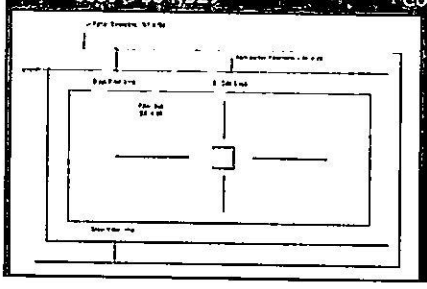
- Better Location
- Green Infrastructure
- Higher Cost

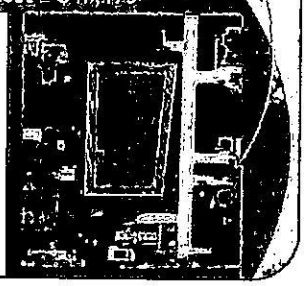
Cost = $64,529

Detention Basin

- Larger Water Volume
- Lower Cost
- More Property Acquired

Cost = $47,173





Questions?

Village of Wayne Stormwater Management System

Department of Civil Engineering
Senior Design Project
Fall 2017

Submitted by:
Zachary Berry
Joshua Flint
Yusef Obeid
Tyler Ruble
Raviraj Wala

Disclaimer

Table of Contents

COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

Department of Civil Engineering
Senior Project
Executive Summary

Fall Semester 2017

Team Members:
Tyler Ruble
Joshua Flint
Zach Berry
Yusef Obeid
Raviraj Wala

Faculty Mentor:
Douglas Nims, Ph.D., P.E.
Professor
Douglas.Nims@utoledo.edu
419.530.8122

Consulting Mentor:
Client Rep
Craig Everett
Mayor of Wayne
Everett.33@osu.edu
419-806-6961

For copies of this final report go to
http://www.eng.utoledo.edu/civil/classes/c3210.html#4750
or call 419-530-8120.
University of Toledo
Department of Civil Engineering
2801 W. Bancroft Street
Toledo, Ohio 43606
Mail Stop #307

Problem Statement

The Village of Wayne experiences flooding several times a year near Watson and Railroad Streets. This is due to both insufficient drainage, as well as a nearby drainage ditch exceeding its banks.

Objectives

This project addresses the Village's flooding issue. The team provided low-cost options to allow for immediate implementation despite budget constraints.

Solution Approach

Analyze flow data for rainfall in the area.
Select a solution based on the client's needs.
Obtain accurate layouts to determine workable area.
Calculate design measurements.
Create final report.

Constraints

EPA Regulations
EPA Isolation zone around the water tower
Wood County Engineer Approval regarding the ditch

Economics

No funding has been secured for this project currently. The Village of Wayne is currently seeking FEMA grants.

Implementation Potential

The Village of Wayne can implement the selected design if the needed resources, specifically funding, are obtained.

Conclusion and Recommendations

The recommendation of this project is a two-phase approach: implementation of a rain garden and a detention basin. The approach will allow the village to pursue these projects despite budget constraints. The detention basin will cost approximately $47,000, while the rain garden will cost approximately $65,000. These costs do not include any land acquisition costs.

2. Project Overview

2.1 Problem Statement

Background

The Village of Wayne is experiencing large amounts of flooding on Watson Street and Railroad Street during rain events of approximately two inches and greater. This area has one of the lowest elevations in the Village; causing it to receive runoff from a large area. A county ditch that runs perpendicular to the ends of both streets is the outlet for the storm water. This problem is comprised of two separate issues, which must be addressed to successfully resolve the flooding issue.

Problem 1

The first facet of the problem deals with the drainage system being insufficient for the water it receives. The drain tiles near the affected street are old, causing them to be inefficient at draining storm-water into the county ditch. At least one of the tile drains is no longer carrying water to the ditch. This causes water to back up and flood the yards and streets in this neighborhood. To counteract this, the village is currently routing the water to a catch basin across the street and using a thrasher pump to move the stormwater from the catch basin to the ditch.

Problem 2

The second facet of the problem is the flooding of the ditch. During high rain events, the ditch begins to back up and then breaches its banks. Once this point is reached the flooding intensifies to point of the entire street being underwater and inaccessible. The standing water lasts for several days until the water level in the ditch recedes. Once the ditch recedes, the flood waters quickly dissipates.

2.2 Village of Wayne History

Wayne Ohio is a rural, low-density village with a population of around 1000 people. It is located just 35 miles southeast of Toledo. The current village mayor is Craig Everett. The village currently has six council members comprised of Andy Gross, Council President, and five other members: Doreen Ault, Terry Stearns, Mike Bechstein, Mandy Camden, and Danny Ziegler.

The Village of Wayne was originally founded in 1836. In 1836, the village was laid out and named Freeport. When the government added a post office in 1852, the village was renamed Prairie Depot because there was another Freeport within the state. As the village grew, the Toledo & Ohio Railroad added tracks through the area. The railroad then named the village Kremlin. Finally, the village post office name was changed to Wayne in honor of General Anthony Wayne in 1927, who gained popularity during the revolutionary war. In 1931, residents petitioned to permanently use the name Wayne and discard the other names.

2.3 Sustainability

As engineers, we have a duty to ensure the safety of future generations. One key way to ensure this is through sustainability. Sustainability allows us to promote actions today that help ensure tomorrow. Several of the design alternatives we considered have a positive impact on sustainability. For example, a rain garden promotes sustainability by allowing runoff the chance to be absorbed into soil instead of going directly into a steam or a river.

Stormwater runoff has the potential to contain a variety of harmful chemicals. As water infiltrates through the soil, many of these chemicals are cleaned and captured. The remaining water is used by the plants in the garden. By the time the water reaches the river or stream, it is cleaner and safer. A rain garden is also sustainable in the sense that once it has been established, it can take care of incoming water on its own without a significant amount of human interaction. This form of stormwater management can renew itself for years to come, all the while allowing for infiltration and filtration of harmful chemicals.

2.4 Photographic Documentation

Figure 1. Flooding on Watson Street looking west.

Figure 2. Flooding on Watson Street looking east.

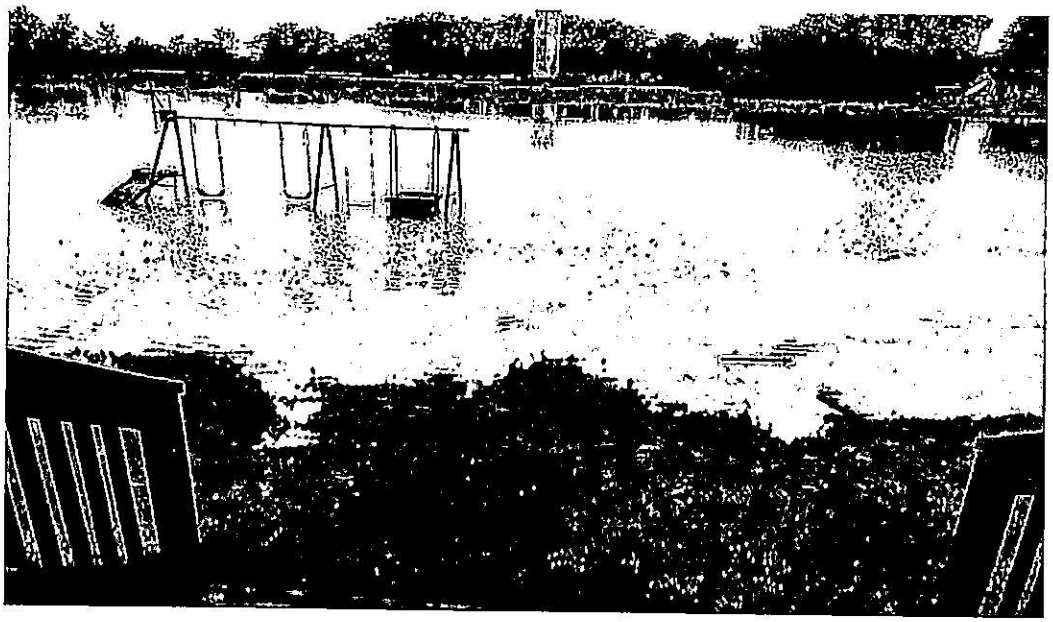


Figure 3. Flooding in the backyard of a residence on Watson Street.

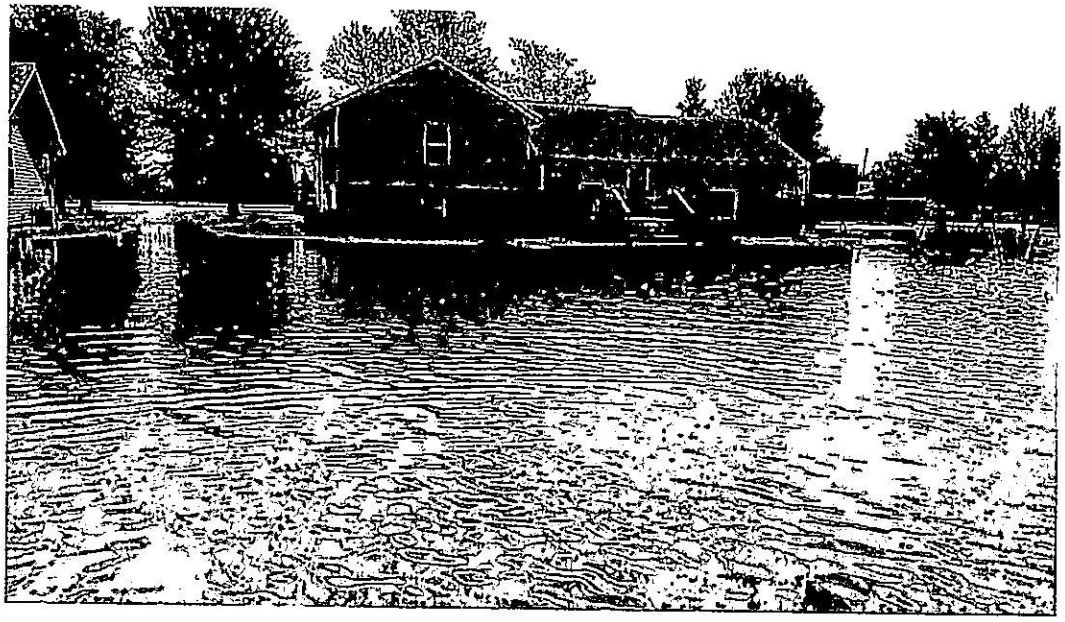


Figure 4. Flooding in the backyard of a residence on Watson Street.

Figure 5. Flooding in the backyards of residences on Watson Street.

3. Site Visit Information

3.1 Client Goals

From our initial client meeting, the client expressed interest in presentation of several, well-developed options. By presenting multiple options, the client can evaluate the design that is most practical for their problem. Due to lack of funding, the client may have to split the project into multiple stages. Having a variety of options will allow for immediate action, as well as long-term planning. The client wants at least one design to permanently address the flooding.

The affected residents expressed a desire for any solution that may reduce flooding. One resident stated his property value has become virtually worthless because of this issue. This issue also lends itself to health concerns for these residences, as the flood waters could contain harmful substances.

3.2 Photographic Documentation

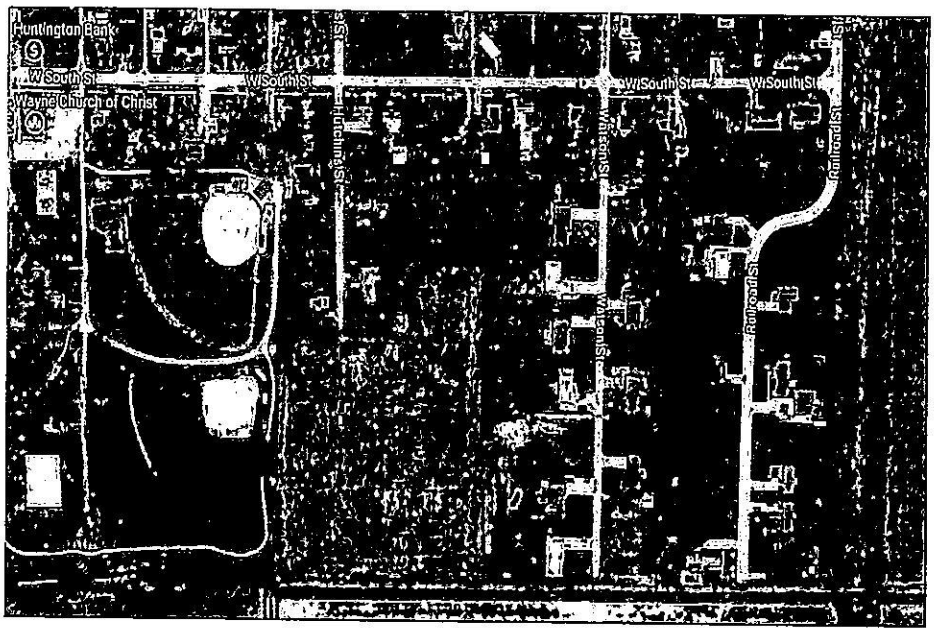


Figure 6. Aerial map from Google Maps of the affected area. Note the ditch located just south of the affected streets.

Figure 7. Photograph showing the drainage ditch in question.

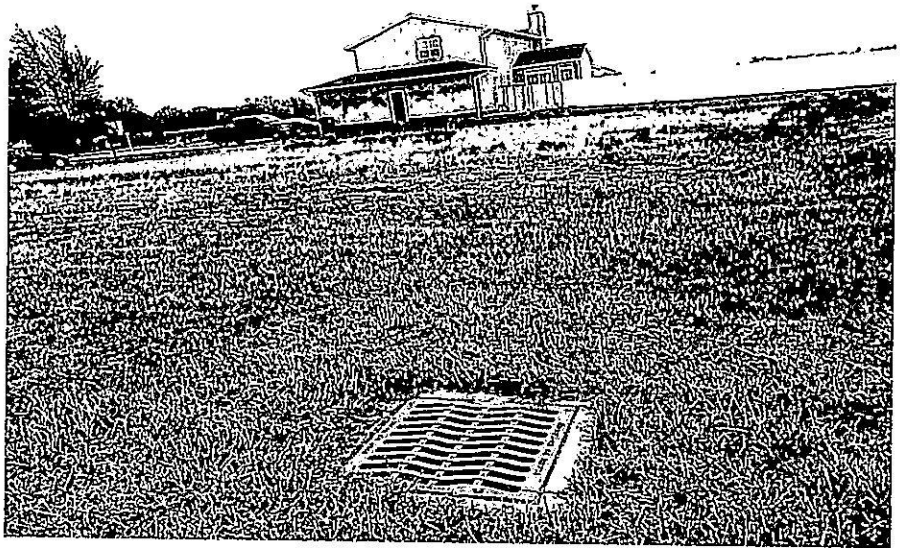


Figure 8. Photograph showing the current drainage system. This is also the proposed location of the rain garden.

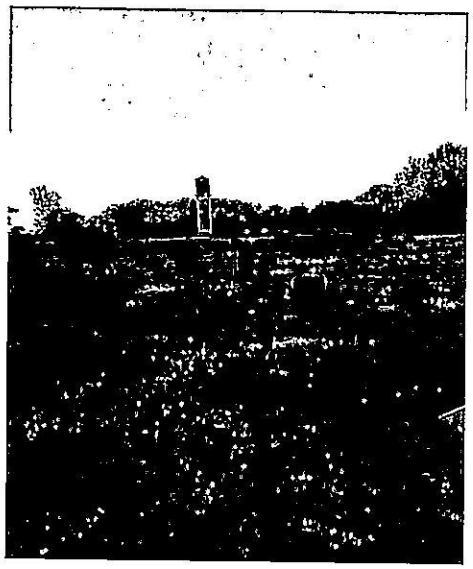


Figure 9. Photograph showing the affected flood area as well as the potential site of the large detention basin. Note the water tower beyond the detention basin site.

Figure 10. This is the site of the proposed redesigned detention basin. Note the electrical box near the tree line.

4. Project Alternatives

4.1 Initial Design Alternatives

As previously stated there are two factors to consider regarding this situation. As a result, we will take multiple solutions into consideration. The alternatives stated below were considered as they aim to address the multifaceted problem.

4.1.1 Updated Infrastructure

This alternative aims to repair the drainage tiles in the affected area so that they can drain runoff to the ditch in a more efficient manner. The outdated infrastructure currently in this area greatly reduces efficiency. By updating the system and considering additional drainage tiles and catch basins, the system will function better in smaller more frequent rain events. Additionally, this alternative will allow for quicker removal of the storm water and allow floodwaters from greater rain events to recede in a more efficient manner.

4.1.2 Large Detention Basin

This solution involves the creation of a detention basin on the large plot of land adjacent to the streets experiencing flooding. The detention basin will have an inlet and an outlet drain going to and from the ditch. Each of these drains will have floodgates positioned along the path in between the detention basin and the ditch. The floodgates at the inlet and outlet would be opened when the area experiences a large rainfall period. The detention basin will collect water from the ditch to prevent the water level from exceeding the banks of the ditch. Once the rainwater is at a manageable level in the ditch, the water will be allowed to drain out of detention basin back into the ditch at a steady rate. This solution is intended to meet the client's goal of a permanently reducing or preventing the flooding at the lowest possible price.

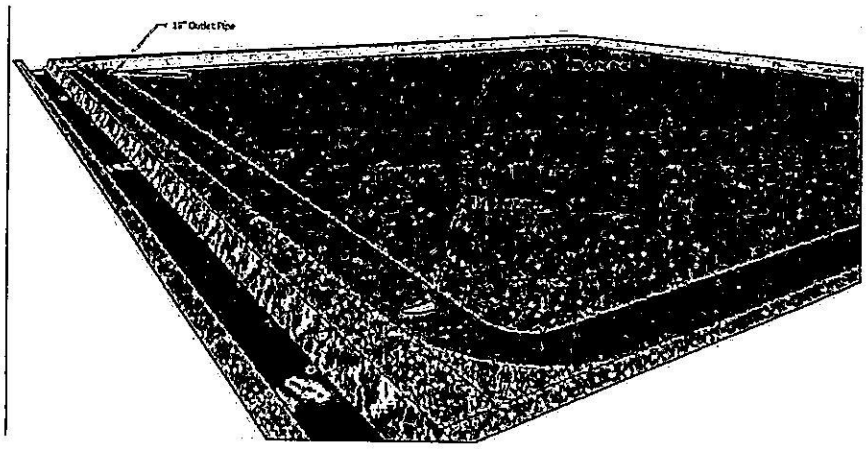


Figure 11. Sketch of potential large detention basin.

4.1.3 Alteration of Drainage Ditch

This solution is the most complex way to solve the flooding problem. It involves reconfiguring the county ditch to the north, so that it follows a natural and direct path to the Portage River. In this area water flows north towards Lake Erie. This ditch currently flows slightly to the south, before turning north. If the ditch was altered to follow a direct course, the stormwater will flow faster into the Portage River. However, there are a few roadblocks posed by this solution. Specifically, this would require the approval of the Wood County Engineer's Office. Additionally, the new route will affect local property owners and require land to be acquired.

4.2 Revised Design Alternatives

The original plan for the design of the detention basin was for the basin to occupy approximately five acres. By utilizing the large empty field adjacent to Watson Street, the detention basin could be built substantially larger than at any other location. This size would have been able to accommodate a greater volume of stormwater runoff, thus reducing flooding for larger rain events. Via conversations with the Ohio Environmental Protection Agency (EPA) and the client, we became aware of an isolation zone located near the village's well field and the potential for future expansion of this zone. This information forced the team to reevaluate the large detention basin.

Initially the idea of altering the county drainage ditch was proposed. Altering the ditch would solve the current problem of the ditch exceeding its banks. If the county ditch was widened, deepened, or rerouted, the chances of it affecting this neighborhood would be reduced. However, during our investigation of this option, we scheduled a meeting with the Wood County Engineer's Office. In our meeting with Duane Abke of the Wood County Engineer's Office, it became apparent that the drainage ditch could not be altered in any way due to downstream concerns. As a result, the previously mentioned project alternatives had to be changed.

4.2.1 Rain Garden

Due to the elimination of the initial detention basin and the ditch alteration, we were left with only one viable initial design alternative. To meet our client's goal of multiple solutions, we then considered implementing some form of green infrastructure. The design team determined that a rain garden would provide the neighborhood with sufficient flooding relief, while being a sustainable option to ensure protection of the nearby drinking water aquifer. This alternative helps in the infiltration of stormwater. Infiltration naturally filters many contaminants from the stormwater, helping to ensure the purity of the water reaching the nearby aquifer. Due to this filtration capability, the team decided to locate this design in the vacant lot on the west side of Watson Street. Placing the rain garden in this location will provide maximum filtration for the groundwater aquifer. Additionally, this location is subjected to a majority of the flooding.

Figure 12. Aerial view of proposed location of the rain garden.

4.2.2 Redesigned Detention Basin

Once it was determined that the Ohio EPA regulations would potentially hinder the installation of a larger detention basin, the team began to look for another location that would fit the constraints of a large detention basin. Unfortunately, there was not sufficient land available to accommodate a large basin. The design team then determined a smaller, redesigned detention basin could be feasible. The redesigned detention basin would be located on four adjacent lots near Railroad Street.

Figure 13. Aerial view of proposed location of the redesigned detention basin.

5. Constraints

5.1 Project Design Time

One of the constraints of designing a project solution for the Village of Wayne was that the design needed to be completed in the span of a semester, 15 weeks. The flooding that occurs on Railroad and Watson Street is a problem that has many complex aspects that contribute to the problem. If time were not a constraint, it would be possible to devise a solution tailored to each aspect of the overall problem.

One alternative that was explored was providing a new stormwater piping design layout and replacing the network that is already there. The pipe network that is currently in place does not have a current set of plans, and the time that it would take to create these plans would take up a significant portion of the time needed for this project. For the purposes of this design project, it was paramount that the time used for designing a solution was directed towards a design that would have the largest impact on reducing the flooding in the affected area. By ensuring the design team focused on the most effective solutions, the team could maximize the value of the design to the client.

5.2 Funding

The Village of Wayne does not have the proper funding for a large-scale project. One possible source of funding is a grant, so the project idea has been submitted to the Federal Emergency Management Agency (FEMA). As a result, the project is designed to be as cost effective as possible. It incorporates two possibilities that the village can implement as funds become available.

5.3 Soil Types

The soil type of this area consists mostly of clay. One of the properties of clay is that it has low permeability. As a result, it takes a long time for it to absorb water, increasing the effects of flooding. Because the detention basin is being built in a clay area, there will be less of a need for a barrier between the soil. The water that will be stored in the detention basin is less likely to be absorbed into the soil, making it easier for it to flow into the county ditch.

The rain garden also relies on soil that allows for rapid infiltration, therefore requiring a soil with high permeability. Additionally, the rain garden requires many nutrients to

support the plants within. Due to the low permeability and lack of nutrients in the clay, the construction of the rain garden will require planting soil to be used in place of the current soils.

5.4 Governing Agencies

Governing agencies for the area include the Ohio EPA and the Wood County Engineer's Office. As the drainage ditch is county property, any alterations to the ditch must be approved by the Wood County Engineer's Office. The design must also comply with applicable Ohio EPA standards.

5.5 Wood County Engineer's Office

The Wood County Engineer's Office has stated that widening or deepening the ditch is not a feasible option due to the culverts located throughout the course of the ditch and is very resistant to making any adjustments to it.

5.6 Land Acquisition

The village does not own the land where the alternatives are proposed. Many of the previously stated alternatives will require land to be purchased for their implementation. Many of these locations are heavily affected by the current flooding and would provide ideal locations for flooding mitigation practices.

5.7 Environmental Protection Agency Isolation Zone

The village's water tower is located near the proposed large detention basin and has an Ohio EPA Isolation Zone of 250 feet from the well field. This zone requires that all activities in this area be approved by the Ohio EPA.

5.8 Future EPA Isolation Zone Expansion

Based on conversations with the client, the Ohio EPA has expressed interest in the Village of Wayne purchasing additional land around the well field to ensure the security of the aquifer in the future. After reviewing a Drinking Water Source Assessment Report written by the Ohio EPA, the design team opted to redesign their previous alternatives. The Ohio EPA report provided the team with Figure 14, shown below. This figure shows the drinking water protection area.

The Village of Wayne's drinking water wells are shown by the four white circles with a black dot, located on the left side of the figure. The blue circle surrounding these dots contains the "1-year time of travel" area. This 1 year time of travel is defined as the area that provides ground water to the Village's wells within one year of pumping. A chemical spill in this area poses the greatest risks to the Village's water supply. The remainder of the figure falls within the "5-year time of travel" area. Similarly, this area contributes to the drinking water within five years of pumping. Due to the concerns associated with the 1 year time of travel, the design team opted to move their designs into the 5-year time of travel.

Figure 14. Ohio EPA Time of Travel Figure

6. Selected Alternatives

Upon consideration of the stated alternative, the rain garden and the redesigned detention basin were selected as the design choice. Of the constraints presented by this project, the lack of available funds to construct a large-scale project was the most critical. By creating two possible solutions that were not dependent upon one another, the village would be able to choose a design that best meets its needs.

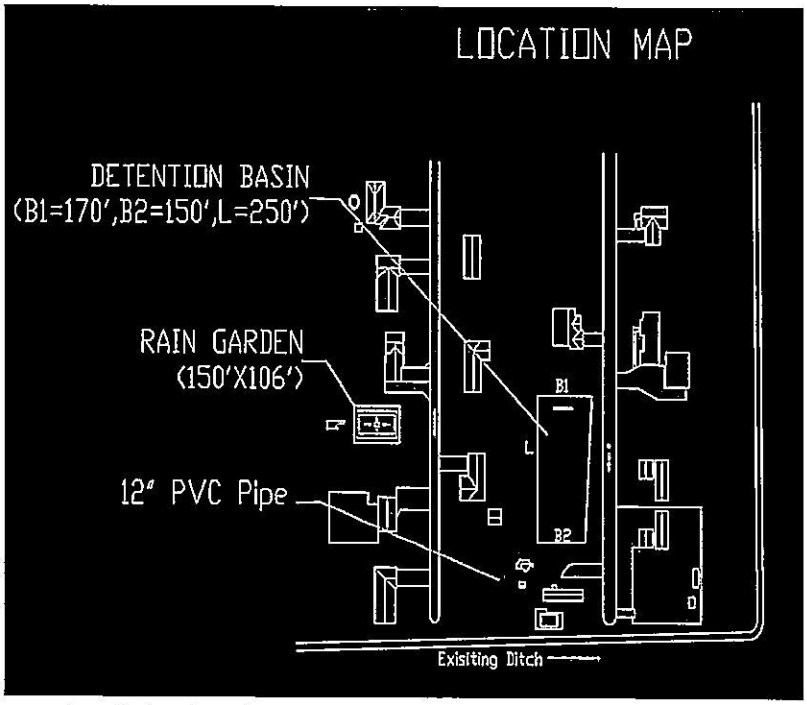


Figure 15. CAD drawing showing location of the selected alternatives.

6.1 Rain Garden

As described previously, a rain garden is an asset to a community because it is a sustainable solution. Not only does a rain garden provide the previously discussed advantages, it also helps to reduce soil erosion. While the plants are using up the water and absorbing nutrients from the soil, the root systems are holding the soil in place. A rain garden may also be a project that the Village of Wayne could build with a grant. The idea of building a sustainable project may attract the favor of the Ohio EPA, as well as other organizations looking to support green infrastructure. The rain garden can be implemented in

an area with a limited amount of space. Additionally, the proposed location is a strategic place, as it receives a large portion of the flooding and can be implemented despite the relatively small plot of land. The location and benefits provided make the rain garden one of the top choices for implementation.

6.2 Redesigned Detention Basin

Given that the flooded area drains after a few days, the implementation of a detention basin could provide flooding relief. A detention basin is used to temporarily store water until the water level in the surrounding area recedes. Then, when the water level reaches a specified point, the water in the detention basin will drain into the outlet.

The affected residents expressed concerns stemming from standing water in the area. Standing water can lead to a high number of mosquitos. These mosquitoes can spread deadly diseases, as well as being a nuisance. Given these concerns, the team chose to implement a detention basin as opposed to a retention basin. A retention basin is designed to always retain a minimum water level.

The proposed detention basin would be able to hold a volume of 6,261 cubic yards of water. For this reason, the detention basin would have a large impact on reducing the amount of flooding in on both Watson and Railroad Streets. The design of the basin would allow for water to be stored for as long as needed, before being discharged into the county drainage ditch. The detention basin is also less expensive compared to the other project alternatives. Once the detention basin has been completed, maintenance would be relatively inexpensive. These factors make the redesigned detention basin one of the top choices for implementation.

7. Design Calculations

7.1 Rainfall Accumulation

The flooding in the area is directly associated with insufficient drainage of rainwater runoff. Upon further analysis of the area, using a point cloud survey provided to us by the Wood County Engineer's Office, we found that the ground elevation is naturally lower in the area where the flooding occurs. According to the residents, their neighborhood floods after rain events greater than 2 inches. For our calculations, we sourced rainfall data from the Bowling Green Wastewater Treatment Plant weather station from the National Oceanic and Atmospheric Administration as shown in the table below.

Storm	Rainfall intensity for a 2-hour storm (inches per hour)	Rainfall intensity for a 6-hour storm (inches per hour)	Rainfall intensity for a 12-hour storm (inches per hour)
2 year	0.649	0.236	0.151
5 year	0.869	0.351	0.201
10 year	1.030	0.416	0.238
25 year	1.240	0.508	0.290
50 year	1.410	0.582	0.332
100 year	1.590	0.662	0.378
200 year	1.780	0.749	0.428
500 year	2.040	0.874	0.500
1000 year	2.250	0.977	0.560

Table 1. Rainfall Intensity

The rational method determines the runoff by the using rainfall intensity, size of the drainage area, and runoff coefficient for any given storm to find the peak flow rate. The equation for the rational method is the stated below:

$$Q = C * i * A$$

Q = peak flow rate (cfs)

A = drainage area (ft^2)

C = runoff coefficient

i = rainfall intensity for a given storm duration

Ground Cover	Area (ft^2)	Acres	C	C x A
Pavement	79748	1.83	0.80	1.46
Roof	17300	0.40	0.95	0.38
Woodland	86200	1.98	0.15	0.30
Grassland	1321468	30.34	0.40	12.13
Total	1504716	34.54		14.27

Table 2. Area and Runoff Coefficient

The following shows the calculations of the flow rate and volume of rainwater per storm.

Flow from 2 Hour Storm			Flow from 6 Hour Storm			Flow From 12 Hour Storm		
Design Storm	Flow (cfs)	Volume (ft^3)	Design Storm	Flow (cfs)	Volume (ft^3)	Design Storm	Flow (cfs)	Volume (ft^3)
2 year	9.26	66696.9	2 year	3.37	72760.2	2 year	2.16	93108.4
5 year	12.40	89306.0	5 year	5.01	108215.4	5 year	2.87	123939.0
10 year	14.70	105851.8	10 year	5.94	128255.3	10 year	3.40	146753.7
25 year	17.70	127433.2	25 year	7.25	156619.5	25 year	4.14	178817.5
50 year	20.13	144903.9	50 year	8.31	179434.1	50 year	4.74	204715.2
100 year	22.69	163402.2	100 year	9.45	204098.6	100 year	5.40	233079.4
200 year	25.41	182928.1	200 year	10.69	230921.3	200 year	6.11	263910.0
500 year	29.12	209648.1	500 year	12.47	269459.5	500 year	7.14	308306.1
1000 year	32.12	231229.6	1000 year	13.95	301215.0	1000 year	7.99	345302.8

Table 3. Rainfall Runoff Flow and Volume of Water

Since we had limited space, we generated a topographic map of the area to see where the rainwater will concentrate.

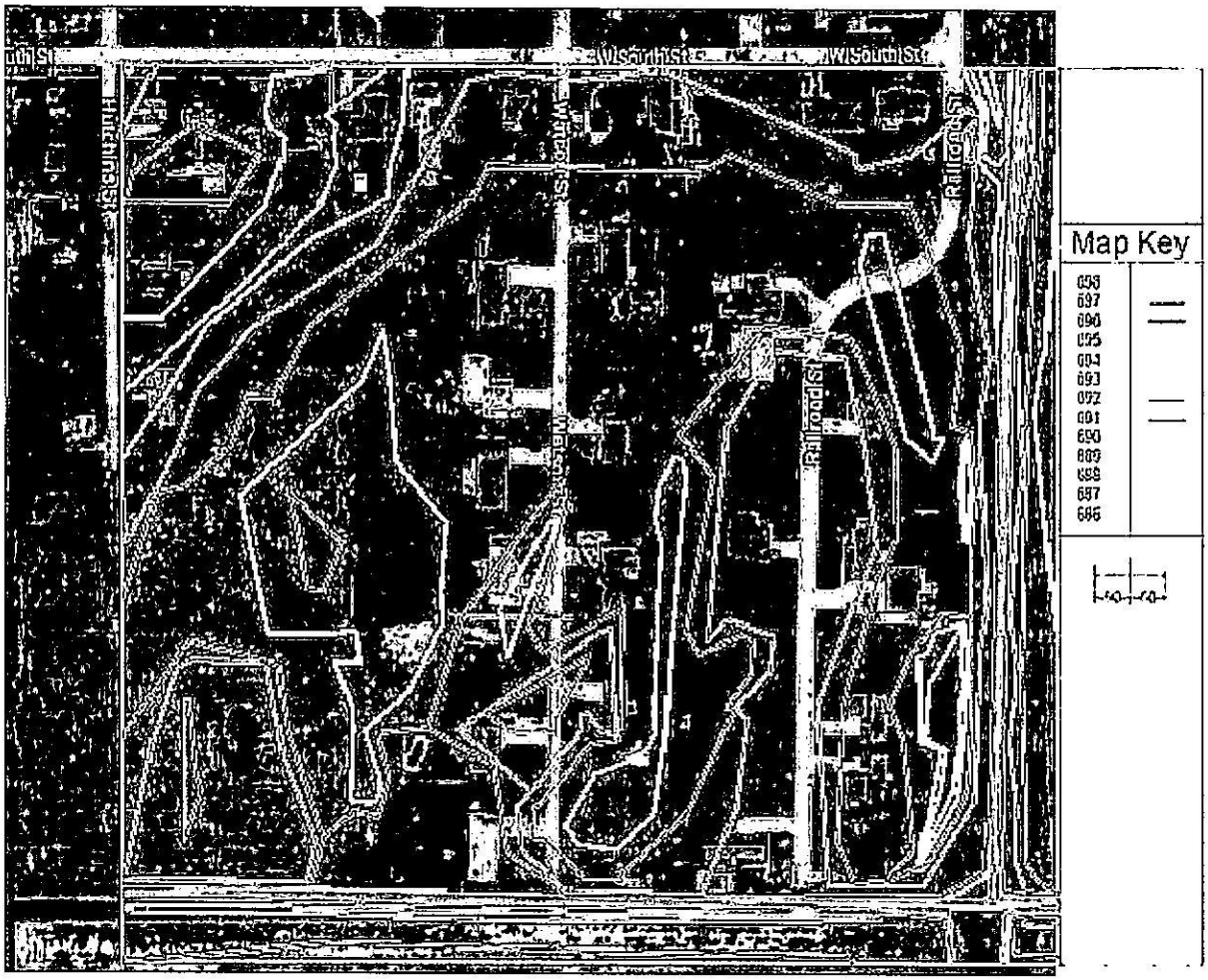


Figure 16. Google Maps aerial view of the site overlaid with a topographic map generated by the design team.

7.2 Rain Garden

7.2.1 Design

The rain garden was designed based on the 2006 Ohio Department of Natural Resources, Rainwater and Land Development Manual (ODNR). This manual was updated in 2014 to include many of the new rainwater management technologies. Included in this update is a bio retention area, also known as a rain garden.

The design process started by calculating the water quality volume (WQv). Using the given equation:

$$WQv = C * P * \frac{A}{12}$$

WQv = water quality volume in acre-feet
C = runoff coefficient
P = 0.75-inch precipitation depth
A = drainage area

To get this value, the team first had to calculate the runoff coefficient (C). The C value is given by:

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

C = runoff coefficient
i = planned site imperviousness

This equation relies on the planned site imperviousness (i). From a quick Google Maps measurement, the site was determined to be 12% impervious as the area is occupied by mostly grass. Using i = 0.12, the runoff coefficient was calculated to be 0.123. Using this value in the first equation, along with an assumed drainage area of 8 acres, the WQv was calculated to be 0.0615 acre-feet.

Then, the size of the filter bed was determined by dividing the WQv by the maximum ponding depth. Following the recommendation of Dr. Cyndee Gruden, a maximum of 6 inches was used in the calculations. The minimum filter bed size was determined to be 0.123 acres, or approximately 5350 square feet.

In the process of verifying the available area for the rain garden, the team determined the parcel size of the available land via the Wood County Auditor. The parcel dimensions are listed as 181 feet x 106 feet. As shown in Table 2.10.1 in the ODNR manual, the rain garden requires a 10 feet setback from building foundations or basements when using an underdrain system. Additionally, the table requires a two feet setback from roadways. Due to these required setbacks, the largest size this rain garden could be is 171 feet x 104 feet.

The rain garden requires a form of pretreatment to filter out sedimentation. This is vital to the long-term functionality of the rain garden, as sediment can cause clogging of the filter bed and overflow drain. This is achieved by implementing grass filter strips that are 10 feet wide with a 5:1 slope. This reduces the maximum filter bed size to 151 feet x 84 feet. To simplify measurements, as well as reduce the chance of damage to the nearby structures and roadway, the team utilized a filter bed size of 150 feet x 65 feet. This design allows for 9,750 square feet, greater than the 5,350 square feet minimum. However, it is important to note that this increase will allow for the rain garden to treat a drainage area greater than the assumed 8 acres. This increase in size will also allow for quicker drainage of the stormwater in the rain garden. Figure 17 shows the dimensions of the rain garden. Additionally, Figure 18 shows a 3D rendering of the rain garden.

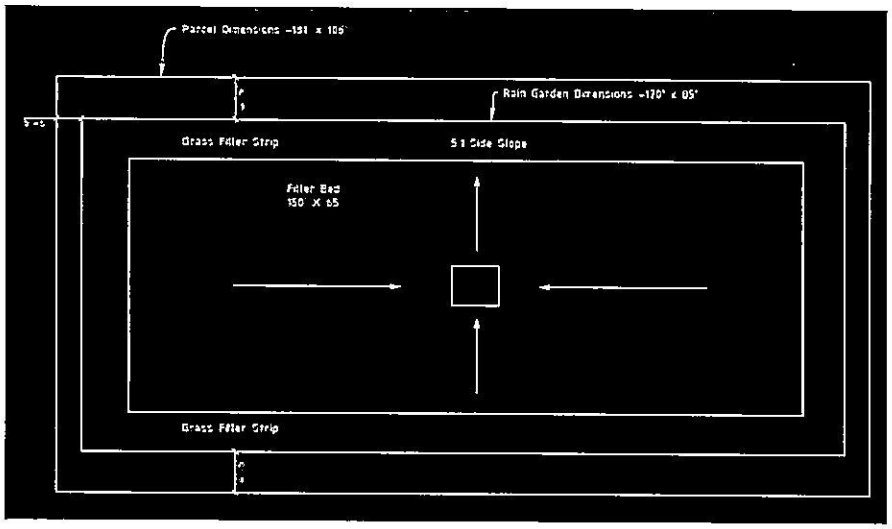


Figure 17. Rain garden plan view

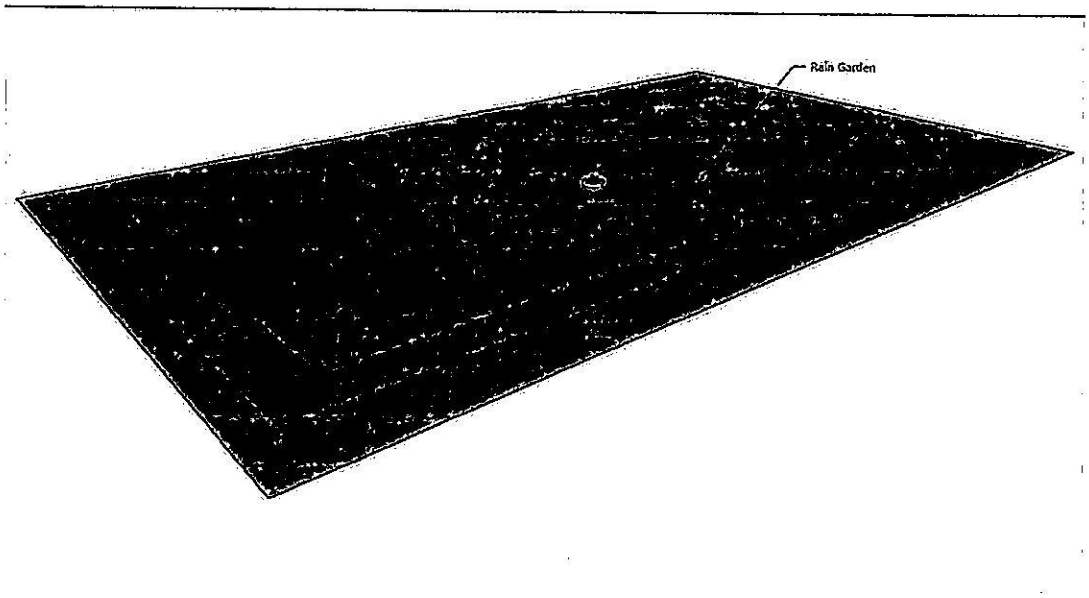


Figure 18. 3D rendering of the rain garden

As seen in Figure 18, the rain garden is constructed in several layers. These layers allow the rain garden to provide accelerated drainage as well as hold a portion of the stormwater. Without these layers, the rain garden would not be as effective in at retaining and draining stormwater.

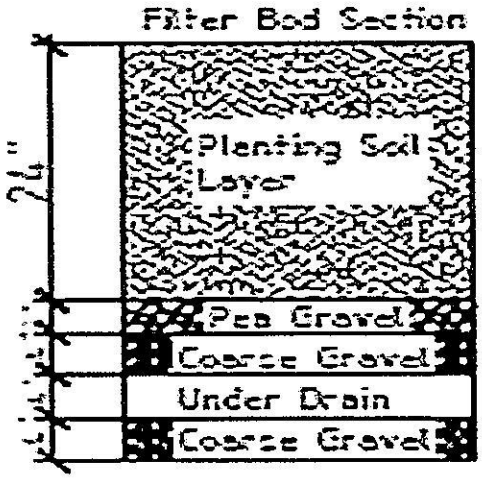


Figure 19. Filter bed section view.

Once the initial excavation is complete, a coarse gravel layer 4 inches thick is placed across the filter bed area. This layer serves as a base for the underdrain. Then the underdrain is placed as indicated by the arrows in Figure 17. The underdrain is a 4-inch perforated PVC pipe, as recommended by the ODNR manual. This layer aids in drainage, as the clay soils in the area prevent natural drainage. On top of the underdrain another 4 inches of coarse gravel is placed to protect the underdrains. Next, a layer of 4 inches of pea gravel is placed. This layer bridges the gap in size between the coarse gravel and the planting soil. Because there is a large size difference between the coarse gravel and the soil, the pea gravel helps to fill in the voids of the coarse gravel.

Finally, the rain garden is topped with 24 inches of planting soil. The planting soil is an engineered soil media that contains nutrients and filters runoff. This soil is often costly as it requires laboratory certification. The soil contains the necessary nutrients to support the biological needs of the plants and microorganisms within the rain garden. The soil also is the medium that provides filtration of the stormwater prior to it reaching the groundwater aquifer.

As can be seen in Figure 20, a common design feature of rain gardens is a catch basin. The catch basin is located in the center of the rain garden. This catch basin serves several purposes for our design. First, it will act as an overflow catch basin. When the water level exceeds 6 inches of ponding, the water will then flow into the basin and into the existing stormwater infrastructure. This catch basin will also serve as the central junction of the underdrain system.

Another important aspect of the design process is the types of plants within the rain garden. Many rain gardens are planted with native plants. These plants provide the garden with aesthetic value to the rain garden. It is important these plants must be water-tolerant, as they will be subjected to a large amount of water. These plants will also require varying levels of maintenance. For maintenance purposes, this design implements the use of common grass seed. The Village can explore other vegetation options at their discretion.

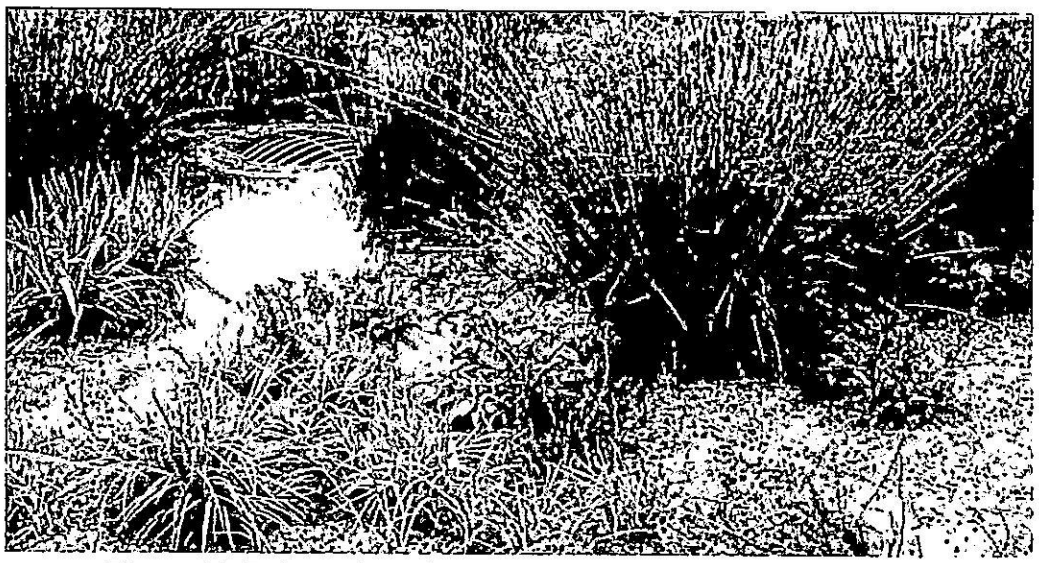


Figure 20. Rain garden with existing native plants and catch basin.

7.2.2 Cost Estimate

Item	Material Cost	Labor Cost
Underdrain (150 ft)	$ 209.25	
Misc	$ 64.98	
Pea Gravel (137 tons)	$ 4,084.33	
# 57 Coarse Gravel (361 tons)	$ 7,228.80	$ 3,170.00
Grass Seeding Area = 14,450 ft^2	$ 1,734.00	$ 2,023.00
Planting Soil = 703 yd^3	$ 39,560.00	
Excavation Volume = 1,174 yd^3		$ 6,454.76
Total	$ 52,881.36	$ 11,647.76
Grand Total (Labor + Material)	**$**	**64,529.12**

Table 4. Cost estimate of the rain garden.

The cost of constructing the rain garden is broken down into several categories. The most expensive category of cost is the material used in the rain garden to absorb and infiltrate most of the water. Figure 19 shows a detail of the rain garden layers. It will need 24-inches of planting soil with the excavated rain garden having an area of 9,750 square ft. This translates to roughly 703 cubic yards of planting soil. North Branch Nursery has estimated that planting soil in this quantity would be $39,560. This cost is due to the large volume of planting soil needed and the composition of the soil.

In addition to the planting soil, the rain garden will need to be filled with both pea gravel and coarse gravel. To determine the cost of the pea gravel, the volume needed was multiplied by its density and converted into tons. This is shown in the following equation.

$$2437.5\, ft^3 * 112.5\, \frac{lbs}{ft^3} = 274{,}219\, lbs.$$

$$274{,}219\, lbs. = 137\, tons$$

From Select Stone Company, the cost of pea gravel is $29/ ton. So, 137 tons would cost $4,084. The cost of coarse gravel from the same company is $20/ ton. Using a similar formula, 361 tons of #57 coarse gravel will add up to $7,228. This value also includes the delivery fee associated with both types of gravel. To distribute such large quantities of gravel, the assistance of a backhoe is necessary. The cost of renting a

backhoe from somewhere like Home Depot for a week is about $770. Paying two people to work for one week distributing the gravel, is about $2,400 for a total cost of $3,170.

For the 150 ft. of underdrain piping, it will cost $209.25 given 15 (10 ft. sections) at $13.95 per section. Miscellaneous costs of the project are $64.98, with the inclusion of the tee for $12 and the square catch basin for $52. To buy grass seed for 14,450 square feet of grass area, it would cost $1,734. The cost associated with planting the seeds, watering them, and caring for the grass throughout the first few months would be $2,023.

For the excavation costs, the team contacted Innovative Excavating. They provided an estimate of $5.50 per cubic yard of excavation. Given an excavation volume of 1,174 cubic yards, the labor fee would be approximately $6,454.

7.3 Redesigned Detention Basin

7.3.1 Design

The design of the detention basin is limited by the area available, therefore to optimize the use of the space and avoid moving existing infrastructure a trapezoidal shape was chosen. The design volume of 169,000 cubic feet was selected based on the existing ground elevation to allow for gravity flow. The side slopes were designed at 4:1 which is the maximum slope according the Ohio Department of Transportation. Using this size, the basin is adequate for the 25-year design storm. The calculations for the detention basin dimensions and volume are shown in the table below.

Dimensions: Base 1 = 150 (*ft.*), Base 2 = 170 (*ft.*), Length = 250 (*ft.*)

Volume Calculation assuming 4:1 side slopes	
Elevation (*ft.*)	Volume (ft^3)
691	39992.0
690	36771.4
689	33679.1
688	30715.1
687	27879.5
Total	169037.1

Table 5. Detention basin volume calculation

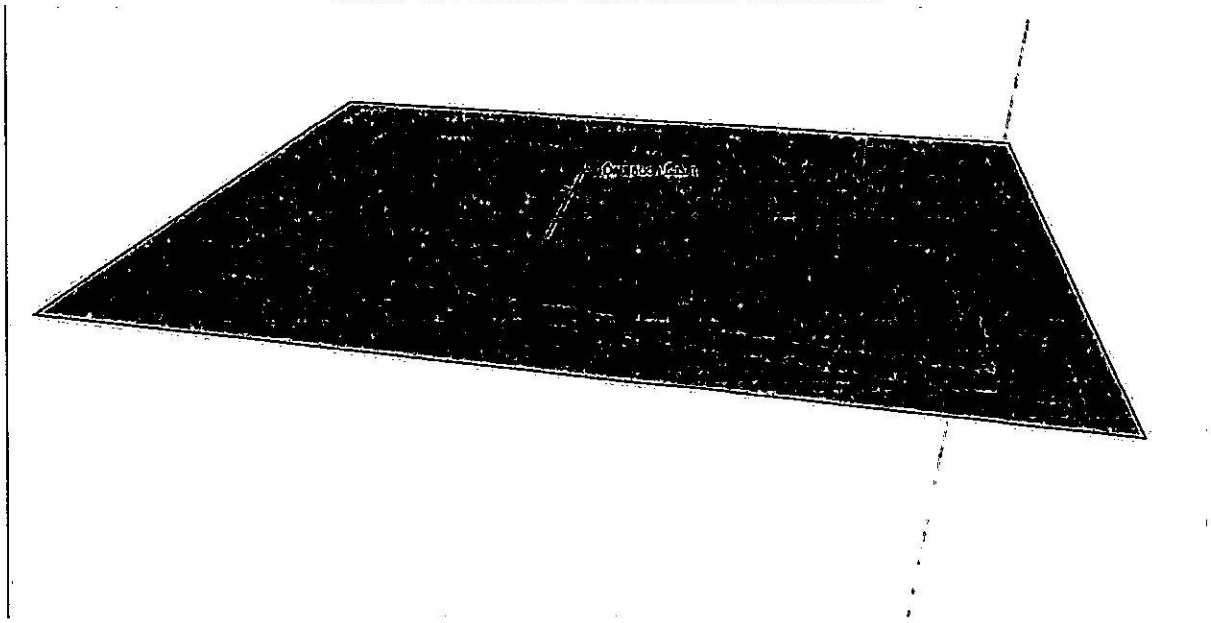


Figure 21. 3D detention basin design

Detention Basin Outflow Pipe

The detention basin outlet pipe was designed assuming the detention time is 24 hours which is half the required time specified by the Ohio Department of Transportation. The pipe size of 12 inches was chosen because it is the minimum pipe size the Ohio Department of Transportation requires for storm drains. In addition, the floor of the detention basin is sloped to be 4 inches lower, towards the outlet pipe, to ensure better drainage.

The outflow rate was determined assuming the basin is completely full and has a detention time of 24 hours:

$$169{,}037.1\ (ft^3)/86400\ (sec) = 1.96\ (cfs)$$

The pipe slope was determined using Manning's Equation through the following steps.

Pipe cross sectional area assuming 12-inch pipe:

$$(\pi(12(in)/12(in/ft))^2)/4 = 0.785\ (ft^2)$$

Pipe perimeter:

$$\pi(12(in)/12(in/ft)) = 3.142\ (ft)$$

Hydraulic radius:

$$0.785\ (ft2)/3.142\ (ft.) = 0.25\ (ft.)$$

Slope of the pipe run using n = 0.010 for PVC:

$$\left(\frac{1.96(cfs)}{(\frac{1.5}{0.010})((0.25\ (ft))^{2/3})}\right)^2 = 0.00108$$

Therefore, the fall in the pipe assuming the length is 175 (ft.)

$$(0.00108)\ (175\ (ft.)) = 0.189\ (ft.)$$

Pipe Invert Elevations		
Upper (*ft.*)	Fall (*ft.*)	Lower (*ft.*)
686.67	0.189	686.48

Table 6. Pipe Invert Elevations

7.3.2 Cost Estimate

Item	Material Cost	Labor Cost
Drain Piping 12" Schedule 40 PVC	$ 2,340.00	
Excavation Volume = 6,261 yd^3		$ 34,433.30
Grass Seeding Area = 40,000 ft^2	$ 4,800.00	$ 5,600.00
Total	$ 7,140.00	$ 40,033.30
Grand Total (Labor + Material)	**$ 47,173.30**	

Table 7. Cost estimate of redesigned detention basin.

The most expensive part of the detention basin is the cost of the excavation. Using the estimate that Innovative Excavating gave, the total cost of excavating 6,261 cubic yards would be around $34,433. To plant grass seed in this area, the total cost, including the labor of maintenance will be a total of $10,400.

The outlet pipe will need 180 feet of 12 inch PVC pipe. At $13/ ft. from the Maumee Supply store, the cost of the piping would be $2,340. Adding these costs together gives a grand total of $47,173

8. Conclusion

The goal of this project was to provide sufficient design choices to the Village of Wayne to address the flooding of the southeastern quadrant of the village. The flooding has reduced property values, as well as caused costly insurance claims for the affected residences. This has added a great deal of stress to these property owners' lives as flooding is a constant concern. The design choices this project has delivered are the plans for both a detention basin and a rain garden. These designs were selected because they best met the client's goal and project constraints. Using the information shown through this report, the provided designs can address the flooding of an average rain event when implemented to the appropriate standards. Ideally both alternatives in this design can be implemented simultaneously. However, if funding is only available for one of the alternatives, it is this group's recommendation the detention basin be constructed first. The basin will provide the best value due to its ability to mitigate a greater volume of water at a lower cost.

9. Qualifications of Team Members:

The design team is comprised of five senior Civil Engineering students from the University of Toledo. These students have completed an ABET Accredited Curriculum consisting of work in fluid mechanics, soil mechanics, and catch basin design. In conjunction with at least three co-op experiences, this curriculum has provided each member with the skill set required to complete this project.

Team Members:

Tyler Ruble

Tyler Ruble is pursuing a Bachelor of Science in Civil Engineering at the University of Toledo. He is a member of the Jesup Scott Honors College and intends to graduate with honors in December of 2017. He has completed three co-ops with MWH Global, the Douglas Company, and TTL Associates. While working with MWH Global, Tyler was a part of the Fremont City Water Pollution Control Center renovation and assisted in the field engineering aspect of this project. With the Douglas Company, he assisted in the project management side of elderly care construction. Finally, with TTL Associates, he conducted testing and inspection at several different projects. Through these experiences, Tyler has gained a well-rounded knowledge of the various phases of construction, as well as learning valuable time management and leadership skills. These skills will greatly benefit the project, project schedule, and client relationship.

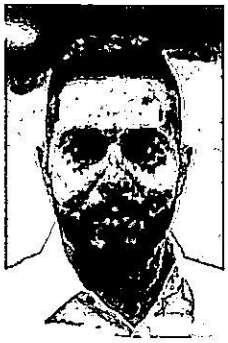
Zachary Berry

Zachary Berry is attending the University of Toledo and will be graduating December of 2017 with a Bachelor of Science in Civil Engineering. He has completed three co-ops, one with Stansley Industries where he was part of a small team excavating a settling lagoon at the Toledo Wastewater Treatment Plant. The other two were with HRI, Inc. at the 53.5 million-dollar upgrade project of the Martinsburg Wastewater Treatment Plant, in West Virginia. Through both his academic and field experiences he is very good at accessing a situation and determining a practical solution as well as project management and has obtained a

good understanding of the construction process. Zachary brings experience with piping and hydraulics to this project.

Joshua Flint

Joshua Flint is pursuing a Bachelor's in Civil Engineering at The University of Toledo and will be graduating December of 2017. He has completed three engineering co-ops. The first co-op was for the City of Toledo in the Division of Environmental Services. He worked on monitoring air pollution, test stations and collecting water samples from various locations throughout Toledo. The second co-op was at Alfred Benesch & Company at the Brighton Michigan office, where he oversaw roadway projects. The third co-op that he completed was at Sigma Technologies where he edited and updated design maps for cable construction projects using Microstation. Joshua's work with the Division of Environmental Services brings this project valuable knowledge regarding EPA Standards.



Yusef Obeid

Yusef Obeid is a senior majoring in Civil Engineering at the University of Toledo. He has completed three internships throughout his college career. He has worked with the City of Ann Arbor, designing stormwater systems and road design work. He has also completed an internship in Saudi Arabia in the oil and gas field, working as a structural engineer, assisting engineers on multimillion dollar projects. He has worked on many gas dispensing facilities in previous jobs, providing estimates and finding suitable subcontractors to make sure the job gets done on time. These experiences have given him stronger problem-solving skills in the engineering field, as well as great communication skills. Yusef's experience with stormwater design systems brings additional ideas and expertise to this team.

Raviraj Wala

Raviraj Wala is senior student majoring in Civil Engineering at The University of Toledo and will be graduating in December 2017. He has completed three engineering co-ops. First, at SSOE in Toledo he worked on CAD and created detail sheets. His second and third co-ops were completed with ODOT. He worked on the I-75 project and inspected piling, as well as working in the testing laboratory, collecting samples, and studying various construction materials. Through these co-ops, he has gained experience in construction and designing. Additionally, he has learned time management and problem-solving skills. Raviraj's CAD skills will be beneficial to this team upon completion of a design.

10. Professional Contacts

University of Toledo Department of Civil Engineering
Cyndee Gruden
Associate Dean for Academic and Student Affairs

Dr. Habib Kaake
Ohio EPA Senior Environmental Engineer/Part-time Faculty

Dr. Douglas K. Nims
Senior Design Faculty Course Coordinator

Village of Wayne
Mr. Craig Everett
Mayor of Wayne

Mrs. Mandy Camden
Council Member/Resident in affected area

Affiliated Companies and Sponsors
Wood County Engineer
Mr. Duane Abke
Wood County Drainage Construction Coordinator

Mr. Kevin Laughlin
Wood County GIS/Stormwater Contact

Ohio Environmental Protection Agency – Wood County
Mr. Ken Brock
Division of Source Water Assessment and Protection

Mrs. Patricia Tebbe
EPA Division of Storm Water

11. References

AVCalc LLC. (2017). Substances. Retrieved November 24, 2017, from https://www.aqua-calc.com/page/density-table

Fixr. (2017, March 1). Lawn Seeding Cost. Retrieved November 23, 2017, from https://www.fixr.com/costs/lawn-seeding

Home Depot Product Authority, LLC. (2017). Large Equipment Rental. Retrieved December 3, 2017, from https://www.homedepot.com/c/large_equipment_rental

Innovative Excavating. (2017). Innovative Excavating Contractor in Toledo. Retrieved November 25, 2017, from https://toledoexcavating.com/

Mathews, J. (2014, November 6). Rainwater and Land Development [PDF]. Columbus: Ohio Department of Natural Resources Division of Soil and Water Conservation.

Maumee Supply. (2017). PVC Schedule 40. Retrieved November 23, 2017, from https://www.maumeesupply.com/index.jsp?ID=,Plumbing,Pipe.Valves.Fittings,Pipe,PVC,PVC.SCHEDULE.40,dept-1K9&path=find&ds=dept&a=1

North Branch Nursery Inc. (2017). Mulch and Topsoil. Retrieved November 23, 2017, from http://www.northbranchnursery.com/

Prier, J. (2016, July 27). Extended Detention Basin Design [PDF]. Ohio Department of Transportation.

Satterfield, Z. (2010, Spring). Tech Brief Fundamentals of Hydraulics: Flow [PDF]. Morgantown: National Environmental Services Center.

Select Stone Company. (2017). Bulk Stone. Retrieved November 23, 2017, from http://www.selectstoneohio.com/groundcover.html

US Department of Commerce, National Oceanic and Atmospheric Administration, & National Weather Service. (2017, April 21). NOAA Atlas 14 Point Precipitation Frequency Estimates: OH. Retrieved November 27, 2017, from https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=oh

Village of Wayne Council. (2017). Village of Wayne. Retrieved December 12, 2017, from https://www.wayneohio.us/home.html

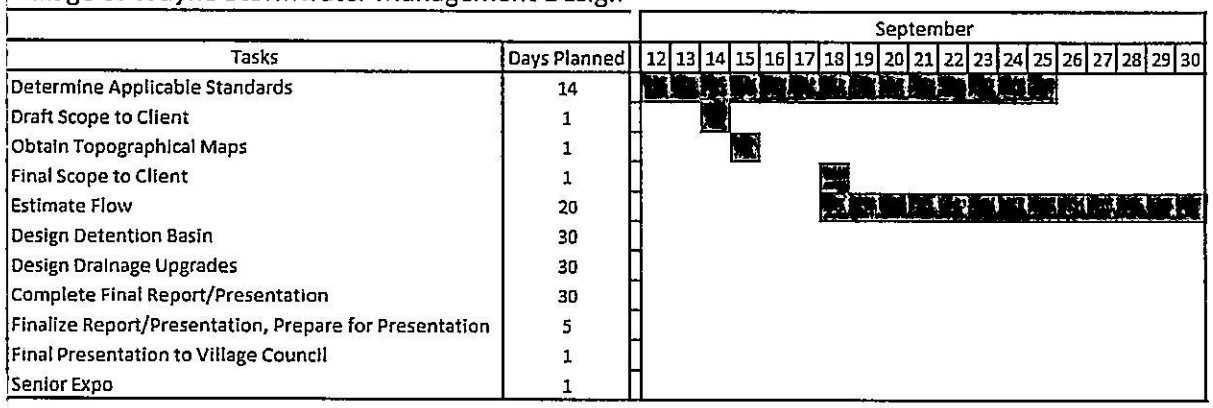
Wolfe, D. (1985, October 19). A Short History of Prairie Depot, Ohio; Wayne 150th Birthday Really 600-Year Event. Toledo Blade. Retrieved November 17, 2017, from http://bisbeefamily.com/showfolio.php?mediaID=327

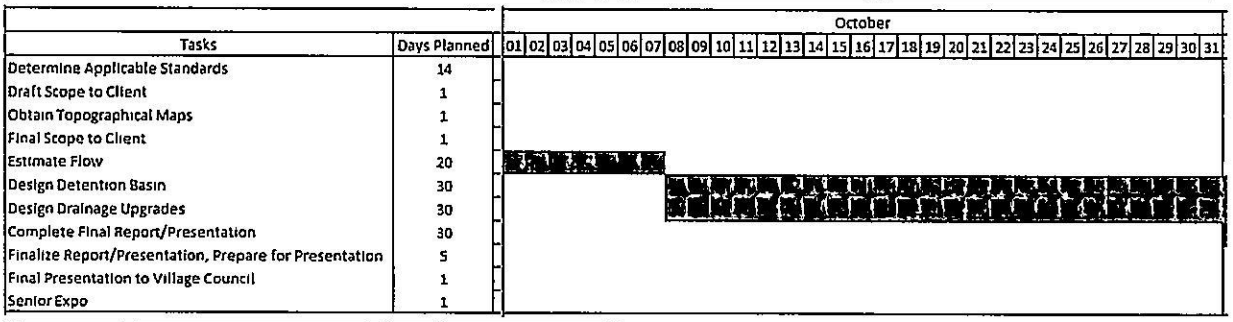
Wood County Planning Commission. (2014, August 5). Wood County Subdivision and Site Improvement Manual [PDF]. Bowling green: The Office of the Wood County Engineer.

12. Appendices:

12.1 Project Schedule

Village of Wayne Stormwater Management Design





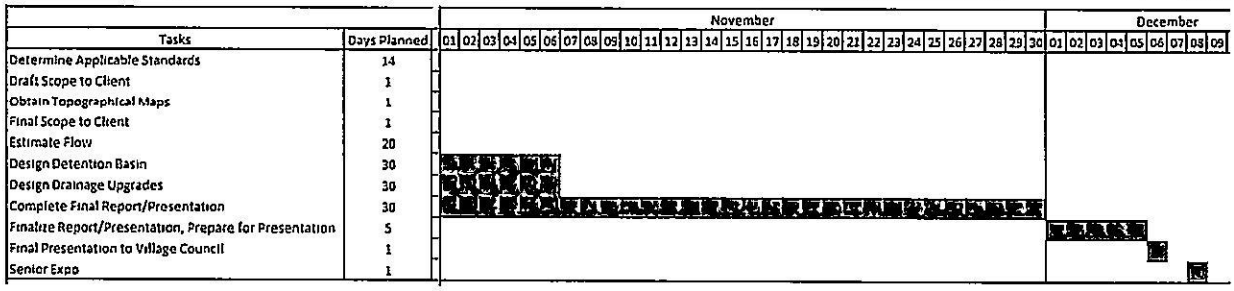


Figure 1. Flooding on Watson Street looking west.

Figure 2. Flooding on Watson Street looking east.

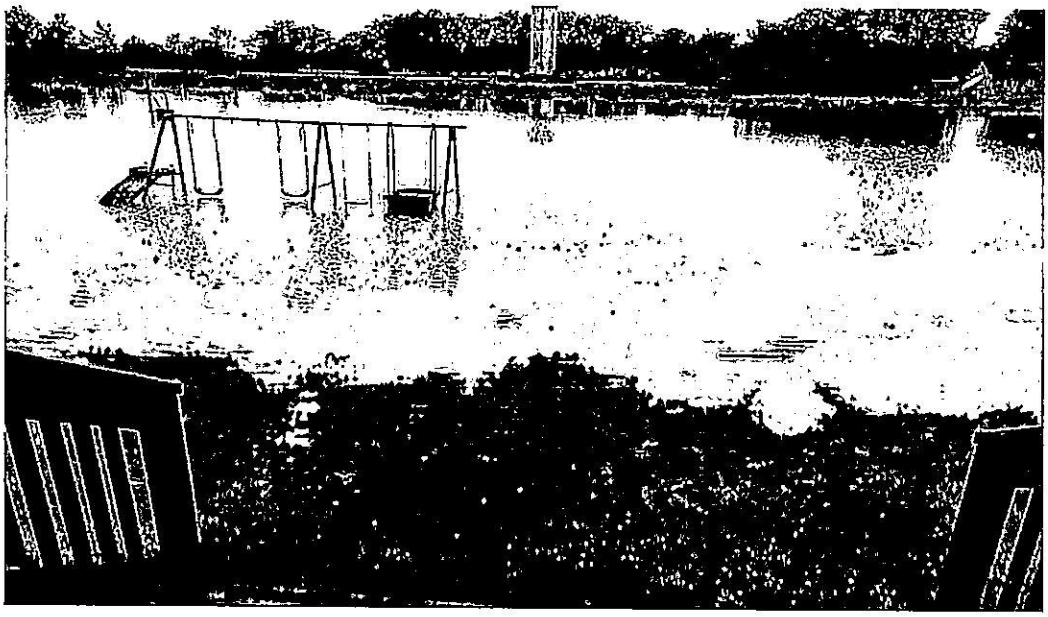


Figure 3. Flooding in the backyard of a residence on Watson Street.

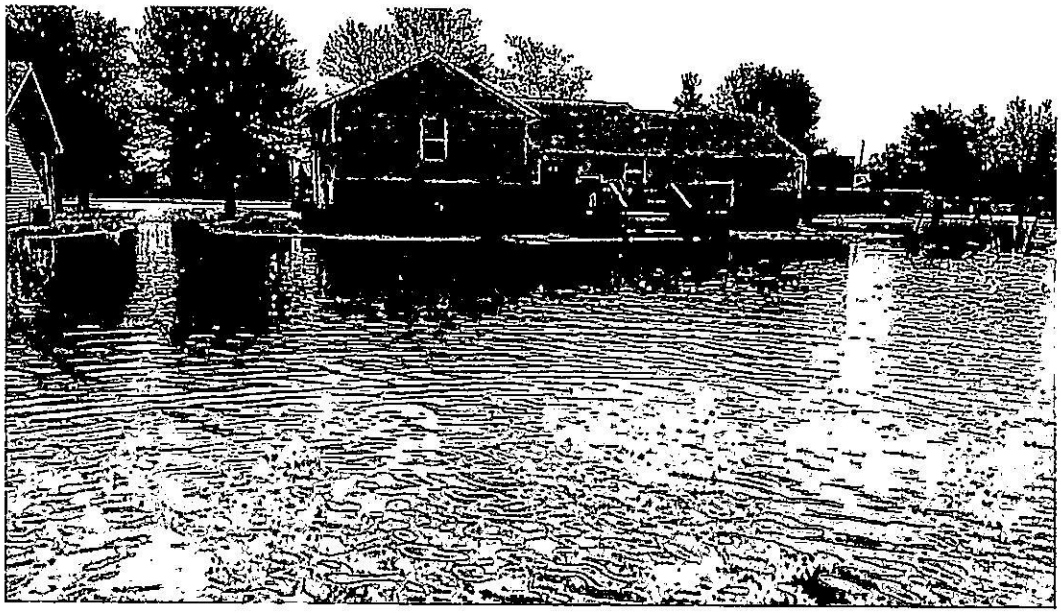


Figure 4. Flooding in the backyard of a residence on Watson Street.

Figure 5. Flooding in the backyards of residences on Watson Street.

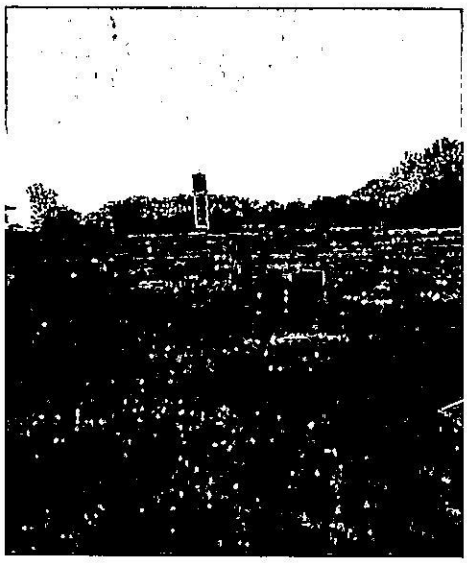
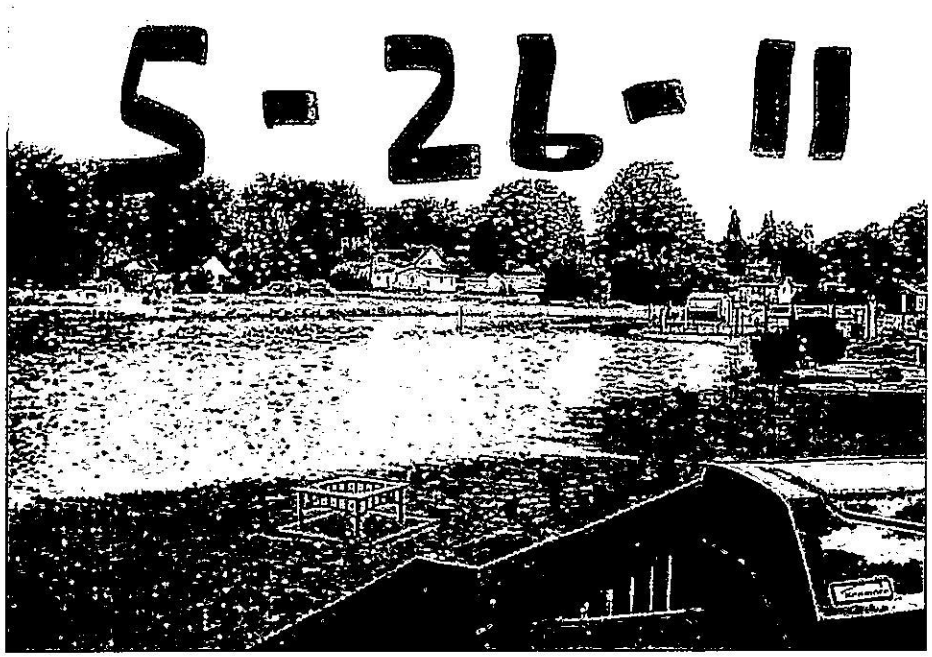
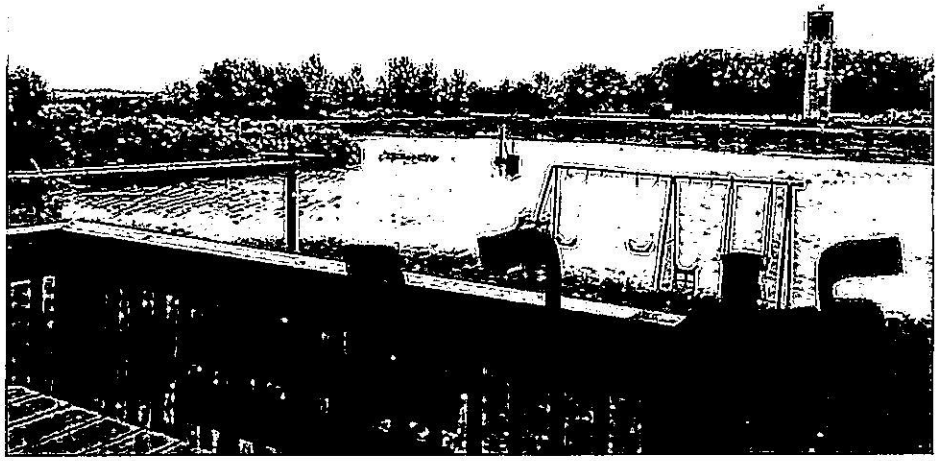


Figure 9. Photograph showing the affected flood area as well as the potential site of the large detention basin. Note the water tower beyond the detention basin site.

Figure 10. This is the site of the proposed redesigned detention basin. Note the electrical box near the tree line.


5-26-11




11-5-17


5-29-15


7-9-15


7-14-15


7-29-15


7-13-17

DISTRICT 5
CAPITAL IMPROVEMENT PROJECTS
QUESTIONNAIRE
ROUND 35

Name of Applicant: Village of Wayne
Project Title: 2021 Storm Sewer Improvements

The following questions are to be answered for each application submitted for State Issue II SCIP, LTIP and Loan Projects. Please provide specific information using the best documentation available to you. Justification of your responses to these questions will be required if your project is selected for funding, so please provide correct and accurate responses. **Communities and Townships under 5,000 in population should also complete the Small Government Criteria.**

1. What percentage of the project in repair A= __%, replacement B=100 %, expansion C= __%, and new D= ___%? (Use dollar amounts of project to figure percentages and make sure the total equals one hundred(100) percent) A+B= 100 % C+D= 0 % **ORC Reference(s):164.06(B)(1); 164.14(E)(10)**

Repair/Replacement =Repair or Replacement of public facilities owned by the government (any subdivision of the state).

New/Expansion = Replacement of privately owned wells, septic systems, private water or wastewater systems, etc.

2a. Existing Physical Condition of Infrastructure **ORC Reference(s):164.06(B)(2);164.14(E)(9);164.14(E)(2); 164.14(E)(8)**

Points	Category	Description	Examples
10	Failing	Infrastructure has reached a point where it requires replacement, reconstruction or reconfiguration to fulfill its purpose	-Intersection Reconfiguration due to accident problem-Structural paving of 3.5" or greater of additional pavement - Pavement Widening to meet ODOT L&D Standards - Complete Pavement Reconstruction -Water or Sewer Line Replacement - Water or Sewer Plant Replacement - Widening graded shoulder width to ODOT L&D Standard -Complete Bridge or Culvert replacement
8	Poor	The condition is substandard and requires repair or restoration in order to return to the intended level of service and comply with current design standards. Infrastructure contains deficiency and is functioning at a diminished capacity.	-Multiple course of paving - Structural Culvert Lining - Bridge Deck Replacement - Replacement of a significant part of a water or sewer plant - Single course of paving with 25% base repair-Widening graded shoulder width to less than ODOT L&D Standard

6	Fading	The condition requires reconditioning to continue to function as originally intended.	-Single course of paving -Sewer Lining Projects -Water tower painting -Replacement of pumps, hydrants, valves, filters, etc in existing water and sewer systems-Widening aggregate berm on existing graded shoulder width
4	Fair	The condition is average, not good or poor. The infrastructure is still functioning as originally intended. Minor deficiencies exist requiring repair to continue to function as originally intended and/or to meet current design standards	
2	Good	The condition is safe and suitable to purpose. Infrastructure is functioning as originally intended, but requires minor repairs and/or upgrades to meet current design standards	
0	Excellent	The condition is new or requires no repair. Or, no supporting documentation has been submitted	

2b. Age of Infrastructure **ORC Reference(s):164.06(B)(2)**

Life	20	30	50
Project Type	Road	Wastewater and Water Treatment	Bridge/Culvert, Sanitary Sewer, Water Supply, Storm Water, Solid Waste
Points			
0	0-4 Years	0-6 Years	0-10 Years
1	5-8 Years	7-12 Years	11-20 Years
2	9-12 Years	13-18 Years	21-30 Years
3	13-16 Years	19-24 Years	31-40 Years
4	17-20 Years	25-30 Years	41-50 Years
5	20+ Years	30+ Years	50+ Years

3. Health and Safety Rating: **ORC Reference(s):164.06(B)(4),164.14(E)(1); 164.14(E)(10)**

If the proposed project is not approved what category would best represent the impact on the general health and/or public safety?

ROADS

Extremely Critical: Resurfacing, Restoration, Rehabilitation and Reconstruction (4R) of a Major Access Road.*

Critical: Resurfacing, Restoration and Rehabilitation (3R) of a Major Access Road.*

Major:	Resurfacing, Restoration, Rehabilitation and Reconstruction (4R) of a Minor Access Road.*
Moderate:	Resurfacing, Restoration and Rehabilitation (3R) of a Minor Access Road.*
Minimal:	Preventative Maintenance of a Major Access Road.
No Impact:	Preventative Maintenance of a Minor Access Road.

Projects that have a variety of work will be scored in the <u>LOWEST</u> category of work contained in the Construction Estimate.

Road/Street Classifications:

Major Access Road:	*Roads or streets that have a dual function of providing access to adjacent properties and providing through or connecting service between other roads.*
Minor Access Road:	*Roads or streets that primarily provide access to adjacent properties without through continuity, such as cul-de-sacs or loop roads or streets.*
Preventative Maintenance:	*Non Structural Pavement work such as chip sealing, cape sealing, micro-surfacing, crack sealing, etc.*

*(3R) Resurfacing, Restoration and Rehabilitation - Improvements to existing roadways, which have as their main purpose, the restoration of the physical features (pavement, curb, guardrail, etc.) without altering the original design elements. **(Surface and Intermediate layer Mill and Fills, overlays with less than or equal to 3.5" of additional pavement, etc....)**

*(4R) Resurfacing, Restoration, Rehabilitation and Reconstruction - Much like 3R, except that 4R allows for the complete reconstruction of the roadway and alteration of certain design elements (i.e., lane widths, shoulder width, SSD, **overlays with greater than 3.5" of additional pavement**. etc.).

<u>BRIDGES SUFFICIENCY RATING</u>

Extremely Critical:	0-25, or a General Appraisal rating of 3 or less.
Critical:	27-50, or a General Appraisal rating of 4.
Major:	51-65 or a General Appraisal rating of 5 or 6.
Moderate:	66-80 or a General Appraisal rating of 7.
Minimal:	81-100 or a General Appraisal rating of more than 7.
No Impact:	Bridge on a new roadway.

<u>WASTEWATER TREATMENT PLANTS</u>

Extremely Critical:	Environmental Protection Agency (EPA) orders in the form of a consent decree, findings and orders or court order. Health Department Construction Ban.

Critical:	Improvements ordered by the Environmental Protection Agency (EPA) in the form of NPDES Orders.
Major:	Replace deficient appurtenances. Update existing processes due to EPA recommendations.
Moderate:	Increase capacity to meet current needs or update processes to improve effluent quality.
Minimal:	New/Expansion project to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

WATER TREATMENT PLANT

Extremely Critical:	EPA orders in the form of a consent decree, findings and orders or court order.
Critical:	Improvements to meet Environmental Protection Agency (EPA) Safe Drinking Water Regulations and/or NPDES Orders.
Major:	Replace deficient appurtenances. Update existing processes due to EPA recommendations.
Moderate:	Increase capacity to meet current needs or update processes to improve water quality.
Minimal:	New/Expansion project to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

COMBINED SEWER SEPARATIONS (May be construction of either new storm or sanitary sewer as long as the result is two separate sewer systems.)

Extremely Critical:	EPA orders in the form of a consent decree, findings and orders or court order. Health Department Construction Ban.
Critical:	Separate, due to chronic backup or flooding in basements.
Major:	Separate, due to documented water quality impairment, or due to EPA recommendations.
Moderate:	Separate, due to specific development proposal within or upstream of the combined system area.
Minimal:	Separate, to conform to current design standards.
No Impact:	No positive health effect.

STORM SEWERS

Extremely Critical:	EPA orders in the form of a consent decree, findings and orders or court order.
Critical:	Chronic flooding (structure damage).
Major:	Inadequate capacity (land damage).
Moderate:	Inadequate capacity with no associated damage.
Minimal:	New/Expansion to meet current needs.
No Impact:	New/Expansion to meet future or project needs.

CULVERTS

Extremely Critical:	Structurally deficient or functionally obsolete. Deterioration has already caused a safety Critical: hazard to the public.
Critical:	Inadequate capacity with land damage and the existing or high probability of property damage.
Major:	Inadequate capacity (land damage).
Moderate:	Inadequate capacity with no associated damage.
Minimal:	New/Expansion to meet current needs.
No Impact:	New/Expansion to meet future or projected needs.

SANITARY SEWERS

Extremely Critical:	EPA orders in the form of a consent decree, findings and orders or court order. Health Department Construction Ban.
Critical:	Replace, due to chronic pipe failure, chronic backup or flooding in basements. Improvements ordered by the Environmental Protection Agency (EPA) in the form of NPDES Orders.
Major:	Replace, due to inadequate capacity or infiltration, or due to EPA recommendations.
Moderate:	Rehabilitate to increase capacity to meet current needs or to reduce inflow and infiltration.
Minimal:	New/Expansion project to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

SANITARY LIFT STATIONS AND FORCE MAINS

Extremely Critical:	Structurally deficient. Deterioration has already caused a safety/health hazard to the public, or, EPA orders in the form of a consent decree, findings and orders or court order.
Critical:	Inadequate capacity with actual or a high probability of property damage. Improvements ordered by the Environmental Protection Agency (EPA) in the form of NPDES Orders.
Major:	EPA recommendations, or, reduces a probable health and/or safety problem.
Moderate:	Rehabilitate to increase capacity to meet current needs.
Minimal:	New/Expansion to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

WATER PUMP STATIONS

Extremely Critical:	Structurally deficient. Deterioration has already caused a safety hazard to the public, or, EPA orders in the form of a consent decree, findings and orders or court order.
Critical:	Inadequate capacity with the inability to maintain pressure required for fire flows.
Major:	Replace due to inadequate capacity or EPA recommendations.
Moderate:	Rehabilitate to increase capacity to meet current needs.
Minimal:	New/Expansion to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

WATER LINES/WATER TOWERS

Extremely Critical:	Solve low water pressure or excessive incidents of main breaks in project area.
Critical:	Replace, due to deficiency such as excessive corrosion, etc.
Major:	Replace undersized water lines as upgrading process.
Moderate:	Increase capacity to meet current needs.
Minimal:	New/Expansion project to meet a specific development proposal.
No Impact:	New/Expansion to meet future or projected needs.

OTHER

Extremely Critical:	There is a present health and/or safety threat.

Critical:	The project will provide immediate health and/or safety benefit.
Major:	The project will reduce a probable health and/or safety problem.
Moderate:	The project will delay a health and/or safety problem.
Minimal:	A possible future health and/or safety problem mitigation.
No Impact:	No health and/or safety effect.

NOTE: *Combined projects that can be rated in more than one subset may be rated in the other category at the discretion of the District 5 Executive Committee. In general, the majority of the cost or scope of the project shall determine the category under which the project will be scored.*

(Submittals without supporting documentation will receive 0 Points for this question.)

Extremely Critical ___, Critical X, Major ___, Moderate ___, Minimal ___, No Impact ___. Explain your answer.

(Additional narrative, charts and/or pictures should be attached to questionnaire)

4. Identify the amount of local funds that will be used on the project as a percentage of the total project cost. **ORC Reference164.06(B)(6); ORC164.06(B)(3)**

A.) Amount of Local Funds = $ 59,950.00

B.) Total Project Cost = $ 545,000.00

RATIO OF LOCAL FUNDS DIVIDED by TOTAL PROJECT COSTS (A□B)= 11 %

Note: Local funds should be considered funds derived from the applicant budget or loans funds to be paid back through local budget, assessments, rates or tax revenues collected by the applicant.

5. Identify the amount of other funding sources to be used on the project, excluding SCIP or LTIP Funds, as a percentage of the total project cost. **ORC Reference(s):164.06(B)(7);164.14(E)(4)**

Grants 0 % Gifts 0 %, Contributions 0 %

Other 0 % (explain)_____ , Total 0 %

Note: Grant funds and other revenues not contributed or collected through taxes by the applicant should be considered other funds. The Scope of Work for each Funding Source must be the same.

6. Total Amount of SCIP and Loan Funding Requested- An Applicant can request a grant per the categories below for points as indicated on the Priority Rating Sheet. If the Applicant is including a loan request equal to, but not exceeding 50% of the OPWC funding amounts listed below, there will be no point penalty. If loan funds requested are more than 50%, points as listed in the Priority Rating Sheet will apply. **ORC Reference(s):164.14(E)(10);164.06(B)(5)**

_____	$500,001 or More
__X__	$400,001-$500,000
_____	$325,001-$400,000
_____	$275,001-$325,000
_____	$175,001-$275,000
_____	$175,000 or Less

There are times when the District spends all of the grant money and has loan money remaining. When this happens, the district makes a loan offer in the amount of the requested grant to the communities that were not funded. The offers are made in the order of scoring. We need to know if you are not successful in obtaining grant dollars for your project if you would be interested in loan money:

YES __X__ NO_____
(This will only be considered if you are not funded with grant money and there is remaining loan money.) **Please note: if you answer "no" you will not be contacted, only if you answer "yes" will an offer be made in the event that there is loan money remaining.**

7. If the proposed project is funded, will its completion directly result in the creation of permanent full-time equivalent (FTE) jobs (FTE jobs shall be defined as 35 hours/week) ? Yes ___ No __X__. If yes, how many jobs within eighteen months? __ Will the completed project retain jobs that would otherwise be permanently lost? Yes ___ No __X__. If yes, how many jobs ____ **will be created/retrained** within 18 months **following the completion of the improvements**?

ORC Reference(s): 164.14(E)(3);164.14(E)(10)

(Supporting documentation in the form of letter from affected industrial or commercial enterprises that specify full time equivlent jobs that will be retained or created directly by the installation or improvement of Public infrastructure. Additional items such as; 1) newspaper articles or other media news accounts, 2) public meeting minutes, and/or 3) a letter from the County Economic Development Director or State of Ohio Economic Development Professional that alludes to the requirement for the infrastructure improvement to support the business. Submittals without supporting documentation will receive 0 points for this question.)

8. What is the total number of existing users that will directly benefit from the proposed project if completed? __160__ (Use households served, traffic counts, etc. and explain the basis by which you arrived at your number.) **_ORC Reference 164.14(E)(7); 164.06(B)(10)**

9. Economic Distress Criteria **ORC Reference 164.06(B)(8)**

What is the Local Median Household Income as a percentage of the District Median Household Income? __80.51%__ %. Please utilize the Economic Distress Scoring Criteria based on ACS 2013-2017 Data provided in Exhibit A.

10. Readiness to Proceed Criteria **ORC Reference 164.06(B)(9); ORC 164.14(E)(5)**

Please categorize the status of planning and design elements for the project.

___X___ Plans have not begun yet (0 Points)

_____ Preliminary Engineering Complete (1 Point)

_____ Final Design Complete (2 Points)

11. Base Score Total for Questions 1-10= _____70_____

12. County Subcommittee Priority Points= _____

(25-20-15 Points for each of the SCIP and LTIP Project Categories)

---

13. DISCRETIONARY POINTS (BY DISTRICT COMMITTEE ONLY)

13a. A **District Discretionary Point** may be awarded to projects that demonstrate significant Area-wide, County, or Community Impact. (Include documentation to support the claim of significance) (Maximum of 1 Point at the discretion of the District Executive Committee) _____ **ORC Reference 164.14(E)(7)**

13b. A **District Discretionary Point** may be awarded to projects that demonstrate that the entity has maximized local financial resources including assessments. Provide a Fund Status Report and/or the water and sanitary waste utility rate structures are at least 2.5% of area median household income for combined systems and 1.5% of the area median household income for water and sanitary only systems. Please provide rate ordinances for water and sanitary sewer to be considered for discretionary points. (Maximum of 1 Point at the discretion of the District 5 Executive Committee)_____ **ORC Reference 164.06(B)(3)**

14. **Grand Total of Points _____**

15. Is subdivision's population less than 5,000 Yes X No ___ If yes, continue. You may want to design your project per Small Government Project Evaluation Criteria, released for the current OPWC Round to assist in evaluating your project for potential Small Government Funding. The Small Government Criteria is available on the OPWC website at https://www.pwc.ohio.gov/Portals/0/Data/SmallGovernment%20Round%2035%20Methodology.pdf?ver=2019-08-07-071749-143

---

16. **OHIO PUBLIC WORKS COMMISSION SMALL GOVERNMENT PROGRAM GUIDELINES**

All projects that are sponsored by a subdivision with a population of 5,000 or less, and not earning enough points for District Funding from SCIP or LTIP Funds, are then rated using the Small

Government Program Rating Criteria for the corresponding funding round. In order to be rated the entity must submit the Small Government Suppliment and their required budgets with their application. **Only infrastructure that is village- or township- owned is eligible for assistance.** The following policies have been adopted by the Small Government Commission:

•District Integrating Committees may submit up to seven (7) applications for consideration by the Commission. All 7 must be ranked, however, only the top five (5) will be scored. The remaining two (2) will be held as contingency projects should an application be withdrawn.

•Grants are limited to $500,000. Any assistance above that amount must be in the form of a loan.

•Grants for new or expanded infrastructure cannot exceed 50% ofthe project estimate.

•The Commission may deny funding for water and sewer systems that are deemed to be more cost-effective if regionalized.

•If a water or sewer project is determined to be affordable, the project will be offered a loan rather than a grant. Pay special attention to the **Water & Wastewater Affordability Supplemental and the Small Government Water & Wastewater Affordability Calculation Worksheet. Both are available on the Small Government Program Tab at https://www.pwc.ohio.gov/Programs/Infrastructure-Programs/Small-Government**

•Should there be more projects that meet the "annual score" than there is funding, the tie breaker is those projects which scored highest under Health & Safety, with the second tie breaker being Condition. If multiple projects have equivalent Health & Safety and Condition scores they are arranged according to the amount of assistance from low to high. Once the funded projects are announced, "contingency protects" may be funded from project under-runs by continuing down the approved project list.

• Supplemental assistance is not provided to projects previously funded by the Commission.

•Applicants have 30 days from receipt of application by OPWC without exception to provide additional documentation to make the application more competitive under the Small Government criteria. Applications will be scored after the 30-day period has expired. The applicants for each District's two (2) contingency projects will have the same 30-day period to submit supplemental information but these applications will not be scored unless necessary to do so. **It is each applicant's responsibility for determining the need for supplemental material. The applicant will not be asked for or notified of missing information unless the Commission has changed the project type and it affects the documentation required. Important information may include, but is not limited to: age of infrastructure, traffic counts or utility users, median income information, user rates ordinances, and the Auditor's Certificate of Estimated Revenues or documentation from the Auditor of State that subdivision is in a state of fiscal emergency.**

If you desire to have your Round 35 project considered for Small Government Funding please download the Small Government Evaluation Criteria applicable to Round 35 by accessing the OPWC Website at

https://www.pwc.ohio.gov/Portals/0/Data/SmallGovernment%20Round%2035%20Methodology.pdf?ver=2019-08-07-071749-143

Please complete the Small Government Evaluation Criteria and attach all required supporting documentation and attach it to the District 5 Questionnaire for Round 35.
ATTACHED.

Date:	9/5/2020
Signature:	Joseph A Clem
Title:	Village Administrator
Address:	125 Schoolhouse Road, PO Box 39, Wayne, OH, 43466
Phone:	419-288-3075
FAX:	419-288-1020
Email:	villageofwayne@yahoo.com

District 5
Capital Improvement Project
Priority Rating Sheet, Round 35

COUNTY: WOOD
PROJECT: WAYNE STORM SEWER
EST. COST: $545,000
PROJECT NUMBER:

No.	"A" WEIGHT FACTOR	CRITERIA TO BE CONSIDERED	"B" PRIORITY FACTORS						"A" x "B"		PRIORITY FACTORS						pt
			0	2	4	6	8	10			0	2	4	6	8	10	
1	1	**(REPAIR OR REPLACE) vs. (NEW OR EXPANSION)**						X			0% + Repair or Replacement	20% + Repair or Replacement	40% + Repair or Replacement	60%+ Repair or Replacement	80%+ Repair or Replacemnt	100%+ Repair or Replacement	10
			0	2	4	6	8	10			0	2	4	6	8	10	
2A	1	**EXISTING PHYSICAL CONDITION** Please refer to Criteria #2 of the Round 35 Scoring Methodology. Must submit substantiating documentation. (100% New or Expansion = 0 Points)						X			Excellent	Good	Fair	Fading	Poor	Failing	10
			0	1	2	3	4	5		Type	0	1	2	3	4	5	
2B	1	**AGE**						X		Road	0-4 Yrs	5-8 Yrs	9-12 Yrs	13-16 Yrs	17-20 Yrs	20+ Yrs	5
										Wastewater	0-6 Yrs	7-12 Yrs	13-18 Yrs	19-24 Yrs	25-30 Yrs	30+ Yrs	
										Bridge/Culvert, Sanitary Sewer, Water Supply, Storm Water, Solid Waste	0-10 Yrs	11-20 Yrs	21-30 Yrs	31-40 Yrs	41-50 Yrs	50+ Yrs	
			0	2	4	6	8	10			0	2	4	6	8	10	
3	2	**PUBLIC HEALTH AND/OR SAFETY CONCERNS** Submittals without supporting documentation will receive 0 points for this question.									No Impact	Minimal	Moderate	Major	Critical	Extremely Critical	16
			0	2	4	6	8	10			0	2	4	6	8	10	
4	2	**LOCAL MATCHING FUNDS** Percentage of Local Share (Local funds are funds derived from the applicant budget or a loan to be paid back through the applicant budget, assessments, rates or tax revenues) *		X							0%	10%	20%	30%	40%	50%	10
			0	2	4	6	8	10			0	2	4	6	8	10	
5	1	**OTHER FUNDING** (Excluding Issue II Funds) (Grants and other revenues not contributed or collected through taxes by the applicant; including Gifts, Contributions, etc. – must submit copy of award or status letter.)	x								0%	10%	20%	30%	40%	50%	0
6		**OPWC GRANT AND LOAN FUNDS REQUESTED** Please refer to Criteria #6 of the Round 35 Methodology for clarification.															
	2	**Grant or Loan Only**	-9	-8	0	8	9	10			-9	-8	0	8	9	10	
											Grant or Loan Only						
											$500,001 or more	$400,001 to $500,000	$325,001 $400,000	$275,001 $325,000	$175,001 $275,000	$175,000 or less	
						X											
	2	**Grant /Loan Combination**	-9	-8	0	8	9	10			**Grant/Loan Combination**						
											$750,000 or more	$600,001 to $750,000	$487,501 to $600,000	$412,501 to $487,500	$262,501 to $412,500	$262,500 or less	16
		When scoring a project that is only grant or only loan. Please use the chart labeled "Grant or Loan Only". When scoring a grant/loan combination, score the project for the grant in the first chart, then use the second chart labeled "Grant/Loan Combination" to score the total (grant and loan combined). Use the lower of the two as the score.															
			0	2	4	6					0	2	4	6			
7	1	**JOB CREATION/RETENTION** Indicate full time equivalent jobs, include supporting documentaion in the form of a commiment letter from business or third party entity.	X								0-6 Jobs	7-14 Jobs	15-24 Jobs	25+ Jobs			0
			0	2	4	6	8	10			0	2	4	6	8	10	
8	1	**BENEFIT TO EXISTING USERS** (households or traffic counts) Equivalent dwelling unit direct connections. Traffic Counts within two years with certified documentation, etc.		2							0 -99 Users	100 - 349 Users	350 - 499 Users	500 - 749 Users	750 - 1000 Users	1000+ Users	2
			0	1	2						0	1	2				
9	1	**ECONOMIC DISTRESS** Local MHI as a percentage of the District Median MHI		X							100%+	80%-100%	Less Than 80%				1
			0	1	2						0	1	2				
10	1	**READINESS TO PROCEED**	X								Plans Not Begun Yet	Preliminary Engineering Complete	Final Design Complete				0
11		**SUBTOTAL RANKING POINTS (MAX. = 115)**	70								Other Info: Does this project have a significant impact on productive farmland? YES **NO** *Attach impact statement if yes.* Is the Applicant ready to proceed to bids after State Approval within 6 months? **YES** NO						
12		**COUNTY SUBCOMMITTEE PRIORITY POINTS (25-20-15)**															
13A		**DISCRETIONARY POINTS (BY DISTRICT ONLY) (MAX.=1)**									District Discretionary Point may be awarded to projects that demonstarte significant Area-wide, County, or Community Impact. Include documentaion to support the claim of significance.						
13B		**DISCRETIONARY POINTS (BY DISTRICT ONLY) (MAX.=1)**									District Discretionary Point may be awarded to projects that demonstarte that the entity has maximized financial resources including assessments and utility rate structure.						
14		GRAND TOTAL RANKING POINTS															

*** Applicants must certify local and other share contributions. Specify, all funding sources to be utilized as local share at the time of application submittal.**

Small Government Self-Score

(Input Score in box for each criterion; will total automatically)

Applicant: Village of Wayne, 2021 Storm Improvements

		SCORE
1	**Ability & Effort (Use A or B according to project type)**	
	A. Roads, Bridges/Culverts, Storm Water, Solid Waste Projects ONLY	
	0 2 4 6 8 10	8
	B. Water & Wastewater Projects ONLY	
	Calculated by Administrator	N/A
2	**Health & Safety (Use A or B according to project type)**	
	A. Road, Bridge, Culvert	
	0 2 4 6 8 10	
	B. Water, Wastewater, Storm Water, Solid Waste	
	0 2 4 6 8 10	8
3	**Age & Condition**	
	I. Age	
	0 1 2 3 4 5	5
	II. Condition	
	1 2 3 4 5	4
4	**Leveraging Ratio**	
	0 1 2 3 4 5 6 7 8 9 10	1
5	**Population Benefit**	
	0 1 2 3 4 5	3
6	**District Priority Ranking** - Completed by Administrator	N/A
7	**OPWC Funds Requested**	
	0 5 10	5
8	**Loan Request** (Default 0 points if no loan requsted)	
	1 5 10	10
9	**Useful Life**	
	1 2 3 4 5	5
10	**Median Household Income**	
	2 4 6 8 10	6
11	**Readiness to Proceed**	
	I. Status of Plans	
	0 2 5	0
	II. Status of Funding	
	0 3 5	5
	TOTAL	60

VILLAGE OF WAYNE
STORM SEWER IMPROVEMENTS
SEPTEMBER 23, 2020

There are seven houses within the Village of Wayne that are most affected by flood damage due to the failing storm sewer system, listed below. There are 14 other, open lots between Hutchins Street and Watson Street that are also impacted by the flooding.

The following are the accounts of residents within the Village of Wayne concerning the flooding that occurs within the Village due to the failing storm sewer system as well as potential damage costs calculated using FEMA information. The proposed project would greatly improve the property value of residents in Wayne, as well as create a safer, healthier environment, creating a better quality of life for these Wood County residents.

These costs do not reflect the loss of roadway use during a flood, nor the potential life-threatening health and safety costs of EMS/Fire not being able to reach these properties in an emergency during a flood. Loss of road is calculated at $38.15/vehicle/hour. **If the street, on average, sees 5 vehicles per hour, the lost usage for 24 hours of flooding for Watson Street equals $4,578.**

Resident/Address	Property Details	Estimated Damage Costs*	Resident Account
Ronald & Deborah Hummel **331 Watson Street** **Wayne, OH 43466**	1588 SF dwelling 0.44 acres	$16,228	"When it rains heavy, we have to move items from our basement that may get damaged up to another level of the house. We can't use two-thirds of our property for things like a shed, or pool, or outdoor storage of any kind. When the street floods the only safe vehicle we have to go anywhere is my truck. The real financial impact comes from the fact that we have been told by two different realtors that selling our house is difficult/impossible due to the flooding. I've basically been told my house is worth zero dollars until the flooding is fixed. I can't even plan a birthday or graduation party at my house because of possible flooding. One Christmas, we had to have our guests park up town and shuttle them back and forth because the road was unsafe for cars. Between not being able to use the property we pay for and pay taxes on, the devaluation of the property, and the inconvenience and anxiety when rain is in the forecast, it adds up to quite an impact on our quality of life here in Wayne." *[See attached detailed letter and photos]*
Jeffrey & Carol Nungester **341 Watson Street** **Wayne, OH 43466**	1704 SF dwelling 0.44 acres	$20,435	
Teresa & Bruce Corner, Jr. **351 Watson Street** **Wayne, OH 43466**	1597 SF dwelling 0.44 acres	$16,228	
James & Allison Tanner **361 S. Watson Street** **Wayne, OH 43466**	1676 SF dwelling 0.44 acres	$20,435	
Christopher & Amanda Camden **381 Watson Street** **Wayne, OH 43466**	2563 SF dwelling 0.44 acres	$26,807	
Owen And Brittney Ott **391 Watson Street** **Wayne, OH 43466**	1604 SF dwelling 0.44 acres	$20,435	
Christian & Diana Fouts **136 Hutchins Street** **Wayne, OH 43466**	1252 SF dwelling 0.6 acres	$10,819	
TOTAL POTENTIAL DAMAGES OF 1" OF WATER IN ALL HOMES		**$131,387.00**	

**Estimated using FEMA's "Cost of Flooding" Calculator set to 1" of storm water in the appropriately sized home for each impacted lot.*

September 23, 2020

To Whom It May Concern,

I am writing this letter to provide some documentation as an impact statement in hopes of assisting the Village of Wayne with securing grant funds to make a positive impact on the flooding that Watson Street endures.

We were excited to build our dream home. We moved in February of 2006 and that spring; we experienced our first "Watson Street Flood". The street, our yard, our basement, etc. were flooded.

We have spent ***thousands*** of dollars due to the insufficient drainage on Watson Street. We have made insurance claims paying deductibles of $1000 each time, only to be dropped by our insurance carrier. We have had items that could not be replaced, such as our wedding photos, ruined when our basement flooded. Each time our basement has flooded we have had to pay a company to disinfect to avoid having mold grow. This is at an expense of $600 each time. Our furnace has needed parts replaced at a faster than typical rate due to the flooding and increased moisture. We have had several companies come out to run cameras and give suggestion to make sure first, that the issue was not our property, and second to help us in any way possible. We have replaced over 10 sump pumps due to excessive use. We have had a home generator installed because, even during a typical rain event, the amount of water that comes into our sump crock is so excessive that if we were to lose power, the basement would flood quickly.

In addition to over $15,000 spent, our quality of life has been impacted tremendously. Anytime there is rain that is expected to be the slightest bit heavy, we put everything we can up on blocks in the basement as well as put other items in plastic bins in efforts to protect them. We do not sleep well, in fact, on more than one occasion we have taken turns staying up and sitting by the pump to monitor the water coming in. If the water comes in at a rate that is too fast for the two submerged pumps we have, we have additional pumps to set up. It is not uncommon for us to have 4-5 pumps running in a heavy rain event. It is very difficult to go away for a weekend, or even a day, having to worry about the pumps.

Our oldest child graduated high school in 2015 and his graduation party plans had to be revamped due to the street flooding as cars could not get down the street nor could they park on our lawn. We have had vehicle issues due to the need to drive down the flooded street – there have been times that the only vehicle we could use, without causing damage, was our truck. Our children have not been able to play in the yard or walk down the street when it is flooded.

There are many other instances, but I hope this brief summary of how the flooding has negatively impacted our lives, both financially and personally, will help the Village secure some grant funding to assist with the problem.

Sincerely,

Christopher & Amanda Camden – Homeowners at 381 S. Watson Street, Wayne.