



To: Members of Dublin City Council

From: Dana L. McDaniel, City Manager

Date: June 7, 2022

Initiated By: Matthew C. Earman, Acting Deputy City Manager/Chief Operating Officer
Paul A. Hammersmith, PE, Director of Engineering/City Engineer
C. Aaron Stanford, PE, Deputy Director of Engineering – Utilities

Re: Waterways Maintenance Program – Public Services Committee Review and Recommendation

Summary

The City of Dublin values the environment and recognizes Dublin's waterways are of great importance and contribute to the health, safety, and general welfare of the public. The preservation, maintenance, and improvement of the waterways and the connected habitat are crucial to the protection of these natural resources.

The Waterway Maintenance Program (Program) is a new initiative that was approved with the adoption of the 2022-2026 Capital Improvements Program. The mission of the Waterways Maintenance Program is to preserve and maintain the forty eight (48) miles of open watercourses within the City, preserving their storm water carrying capacity, addressing any critical items of maintenance, and protecting the environmental health of the waterways. This program will specifically focus on:

- Ensuring Dublin's waterways are kept clear of unnatural debris and other blockages.
- Maintaining the conveyance capacity of open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reducing and eliminating illicit discharges into City waterways.
- Protecting and improving the riparian habitat that is a part of the stream ecosystem.
- Protecting and improving water quality within the waterways.
- Providing a comprehensive program to address the issues identified during waterways inspections performed over the past several years.

This Program was referred by City Council (Council) on April 25, 2022 to the Public Services Committee (PSC) for review and recommendation.

Public Services Committee Meeting – May 16, 2022

At the May 16, 2022 PSC meeting, staff's presentation and the subsequent Committee discussions focused on a review of the Program's goals and objectives, the selection of the design consultant, the development of the Program, private property stream maintenance and a recommended budget and implementation schedule.

Consultant Selection and Scope

EMH&T was selected as the design consultant to assist the City with reviewing the current state of the waterways, providing analysis of the areas of concern, and developing a work program that can be used to meet the goals of the program.

The scope of EMH&T's work for the program includes:

- The review and analysis of approximately 535 waterway inspection reports completed by Franklin Soil and Water Conservation District (FSWCD) over the past four years.
- The review of reports and site visits to 25 sample locations to verify the accuracy of the reports and ensure site conditions have not changed since the time of original inspection.
- Creation of an Excel database compiling the data of the individual inspection reports.
- Analysis of the existing data to determine waterways on private properties, categorization of the types of private properties (residential, commercial, etc.), and providing the ownership information for the private properties through which waterways run.
- Identification and mapping of City-owned land/waterway easements and recommendation of channel maintenance activities.
- An interactive GIS map that includes property lines, public utilities, streams, FSWCD surface drainage features, mapped Stream Corridor Protection Zones (SCPZs), and spatial data developed by FSWCD related to their inspection reports. The GIS map includes links to the FSWCD inspection reports, as well as channel maintenance locations within City-owned parcels and easements dedicated to the City.
- Inspections located on City property and City-owned easements have been evaluated and the appropriate maintenance activity has been determined along with a preliminary Engineers Estimate of Probable Construction Cost (EOPCC) for the necessary maintenance activity.
- The developed scoring system is based on FSWCD's condition score, degree of channel instability, water quality/habitat impairments, threat to public/private property, constructability and access. The inspection points have been organized and grouped into project areas based on location and then prioritized using the developed scoring criteria. The maintenance schedule has been developed so that all necessary maintenance on City owned property, or areas where the City has maintenance responsibility through a drainage or other easements, will be completed over a 5-year timeframe.

The Phase 2 scope for the program is currently underway and will be completed in June 2022. The remaining work will include:

- Environmental review of riparian habitat/permitting.
- Recommendations of integrating and improving the riparian habitat along each waterway.
- Development of an assessment toolbox to these locations that will lead to the implementation of the enhancement recommendations.
- Guidance on the development of educational materials for property owners and the larger community to encourage good stewardship of stream channels and riparian corridors.

Initial Proposed Program Budget and Implementation Schedule

EMH&T provided an April 6, 2022 summary memo, "Dublin Waterways Maintenance Program – Phase 1", for the Program which is included in the materials provided via BoardPaq. This memo, along with detailed project cost analysis, provided an initial program budget for City owned/responsible areas of \$3,040,000. This total cost was the summation of the estimated project costs of the fifty-nine (59) separate Project Areas for City owned or responsible areas which included 150 inspection locations.

After detailed review by Staff of all project areas and associated inspection data, areas were identified where smaller stream blockages, or items such as blocked storm outfalls, could be more quickly addressed by City Staff or through separate contracts with debris removal contractors. Of the seventy-six (76) total debris blockages, twenty-five (25) were identified as blockages to be addressed

by City Staff.

Additionally, there were areas of erosion identified that, through review, were determined to be minor and showed no potential for damage to existing infrastructure. The inspection score assigned to each point was invaluable, as the team was able to review the points of channel erosion that could require bank stabilization. As the program was refined, there were areas of erosion that had a low inspection score, identified as being lower than a score of 36. This score, due to the criteria created, indicated that these areas are not rated as severe, nor were they determined to be a danger to public infrastructure, which was reflected in the criticality score. Through review of each of those points, it was determined that these inspection points did not need to be addressed immediately and could be placed on a list of areas to monitor. Of the seventy-four (74) total erosion inspection points, thirty (30) points were identified as areas to be monitored.

These changes enabled the team to reduce the overall program budget to approximately \$1,750,000. This amount allocates \$460,000 for debris removal and \$1,290,000 for bank stabilization due to erosion. This overall budget was then allocated over a 5-year time period, which resulted in an annual budget of \$350,000 per year.

Private Property Stream Maintenance

A considerable amount of the waterways in the City of Dublin are located on private property, with no maintenance responsibility designated to the City through an existing easement. Of the original 535 points of inspection, 349 (65%), are located on private property. The proposed program does not include projects to address issues on private property, nor does it include any private property issues in the proposed budget. Additionally, the Law Director has provided an opinion of the City's responsibilities regarding maintenance work necessary within waterways located on private property.

The Law Director's memo concludes that the City does not have a legal obligation to provide stream maintenance (including blockage removal) on private properties within the City. The City does have the ability, under certain circumstances, to require a private property owner within the City to conduct stream maintenance or, if the property owner refuses, to complete the necessary maintenance and assess the costs of such work back to the property owner. In addition, if the City decided that it wanted to undertake the costs of such work, it could execute a right of entry with the property owner so that the City could legally enter the property to perform the necessary work.

Public Services Committee Discussion

After presentations by both City staff and the consultant (EMH&T), there was significant discussion by both the Committee and interested residents that were in attendance.

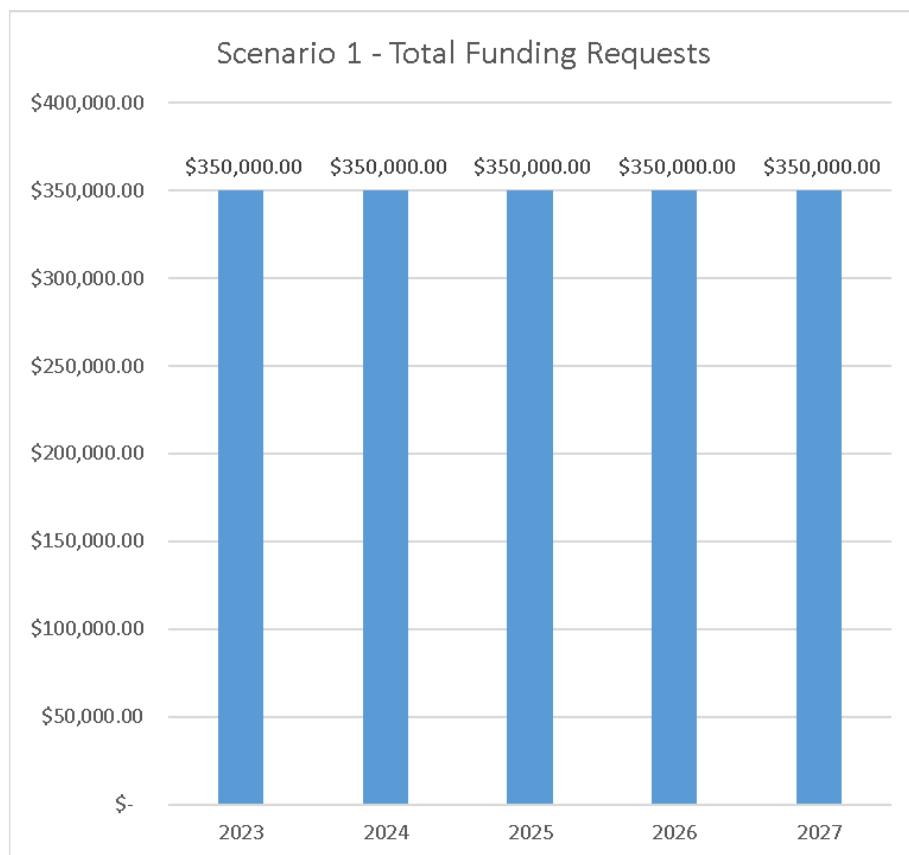
Staff shared with the Committee that the current Waterway Maintenance funding within 2022-2026 Capital Improvements Program allocates \$100,000 in both 2024 and 2026. The funding allocated in 2021 and 2022 of \$200,000 (\$100,000 for each year) has been utilized to fund the work performed by the consultant and to fund tree/debris removal in 2022.

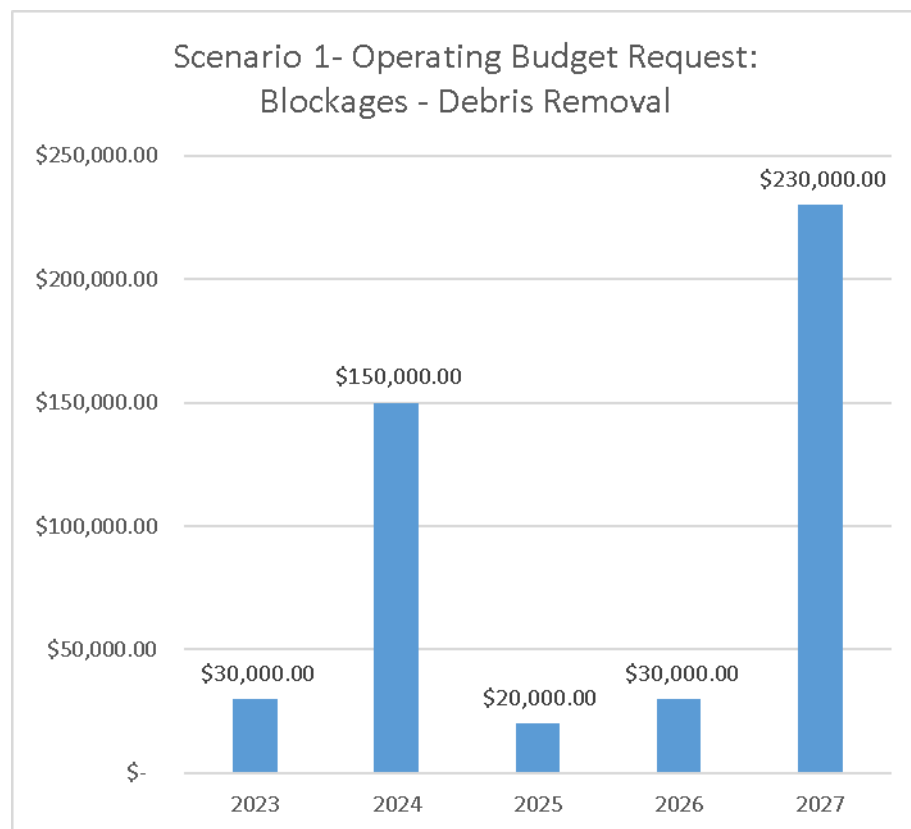
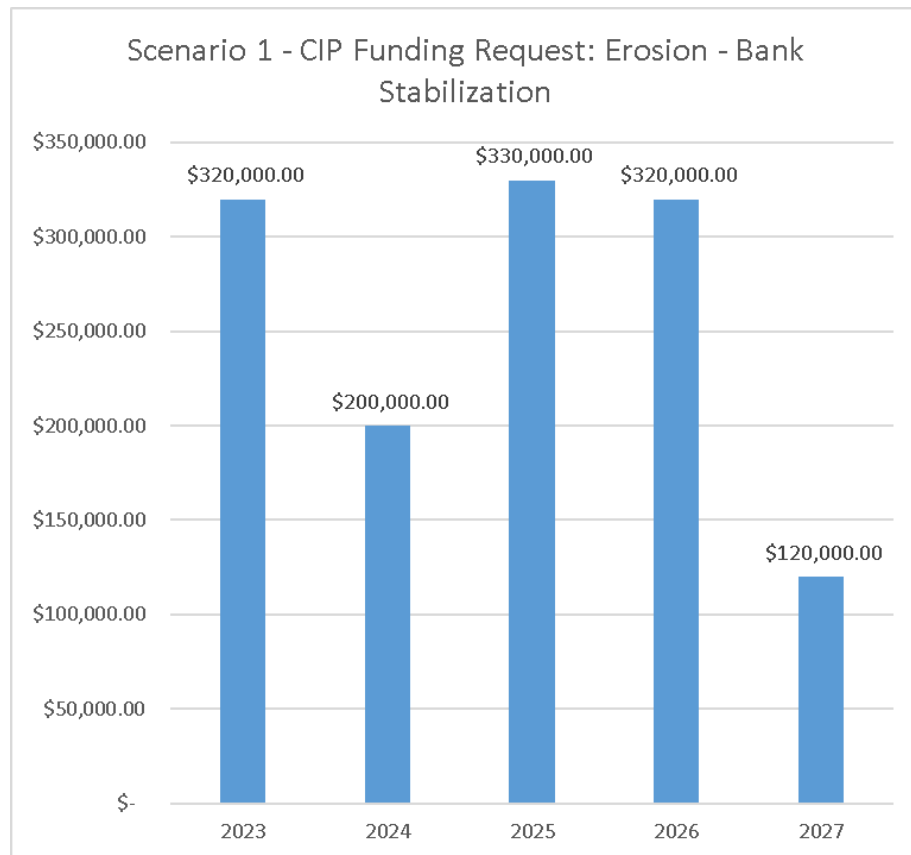
The Committee was in favor of the Program and the implementation of the recommended project areas. Alternative funding and schedule scenarios were requested to be developed and brought to Council for review and consideration.

The following details the three proposed funding and schedule scenarios:

Scenario 1:

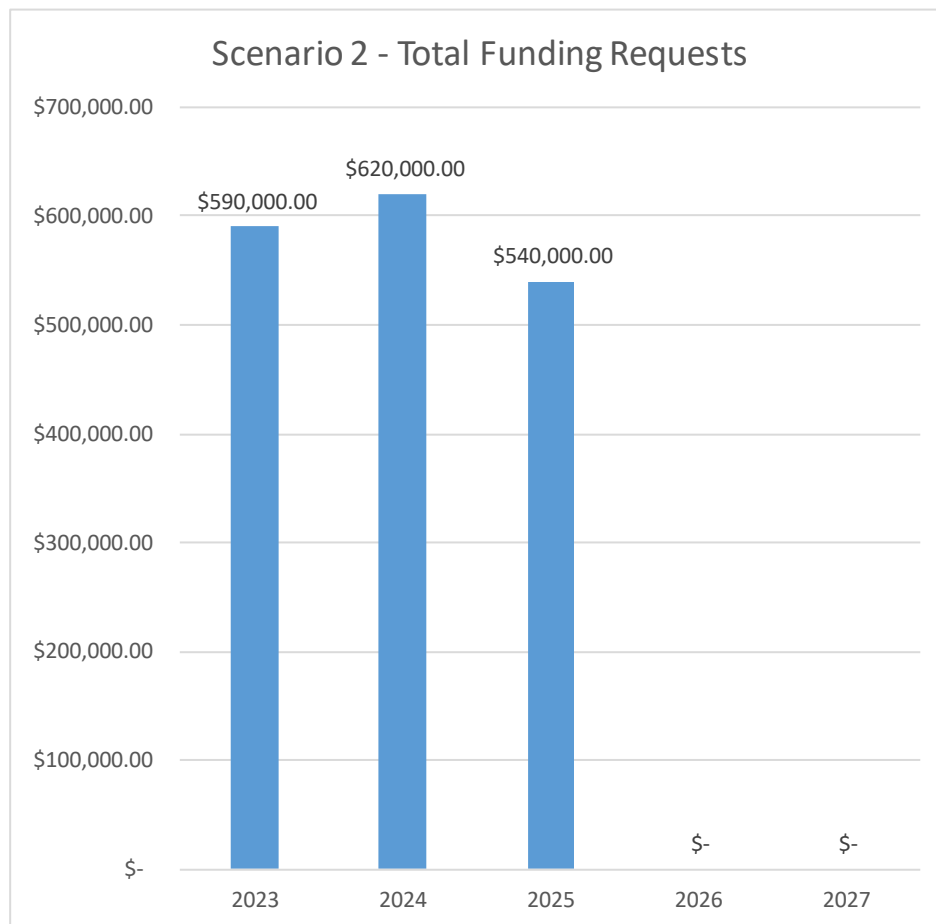
The funding and schedule proposed with Scenario 1 is the original recommended budget and schedule for the Program as presented to the Public Services Committee. This Scenario proposes level funding for the Program over a five-year time period. This Scenario will require a total of approximately \$350,000 per year for the five-year period for a Program total of \$1,750,000. The work that would result from the Program projects would be separated into Erosion – Bank Stabilization and Blockages – Debris Removal categories. Any work that would be performed in the Erosion – Bank Stabilization will be funded through the Capital Improvements Program (CIP). Any work that is performed in the Blockages – Debris Removal category will be funded through the annual Operating Budget. The following charts detail the proposed funding requests over the next five years for the total funding requests, the CIP requests, and the annual Operating Budget requests.

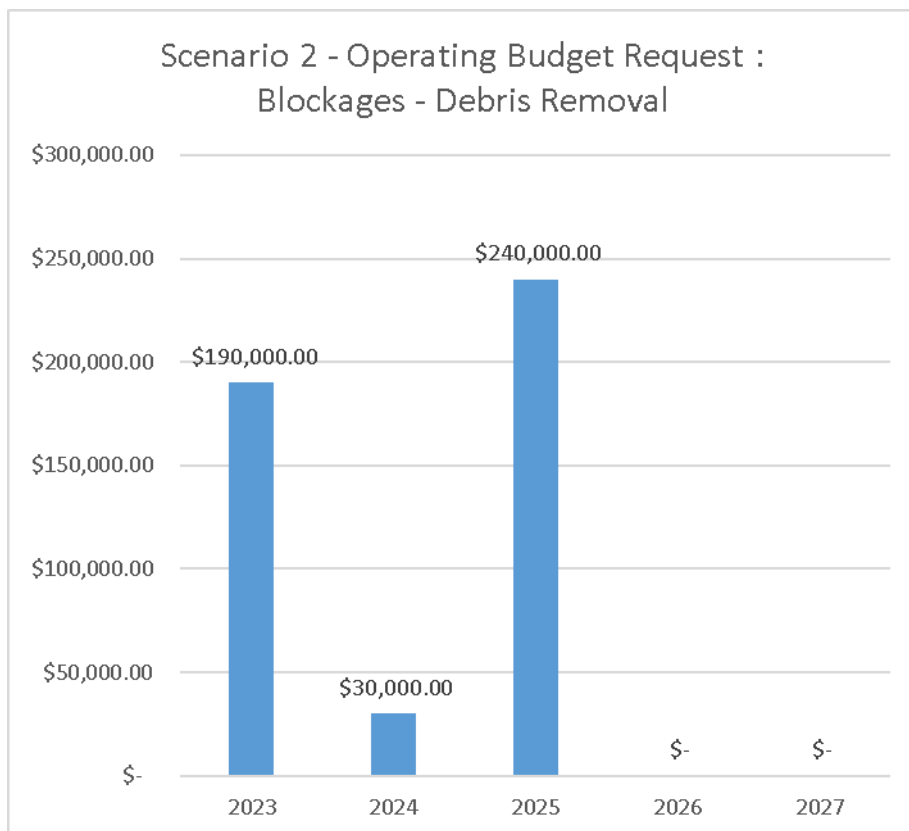
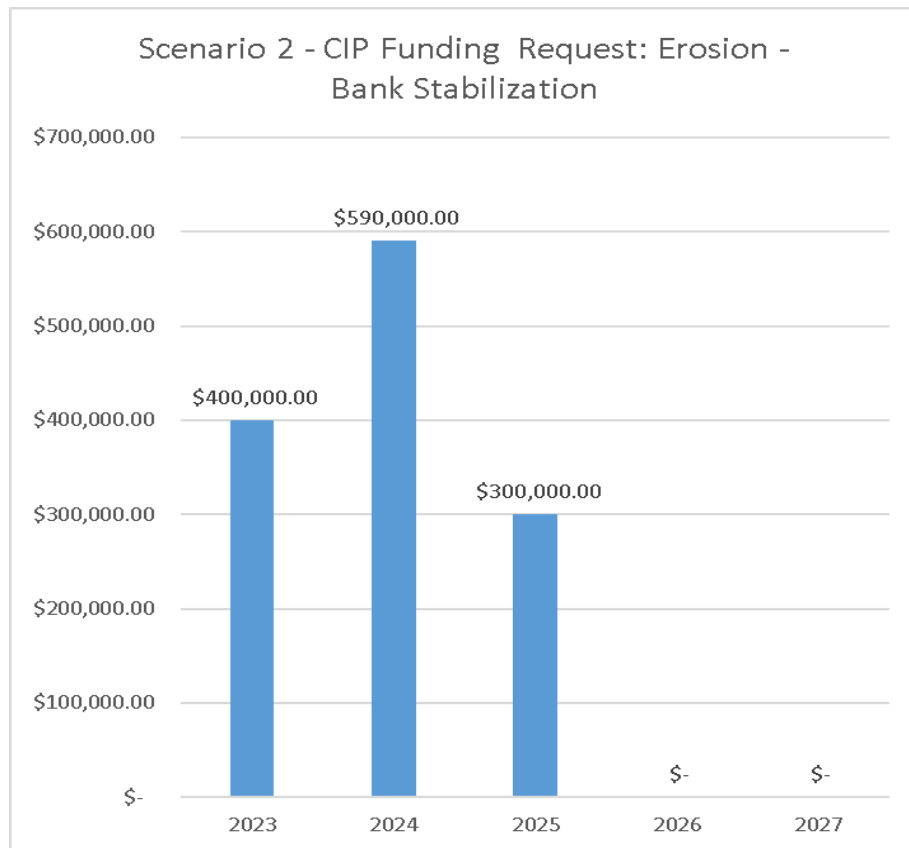




Scenario 2:

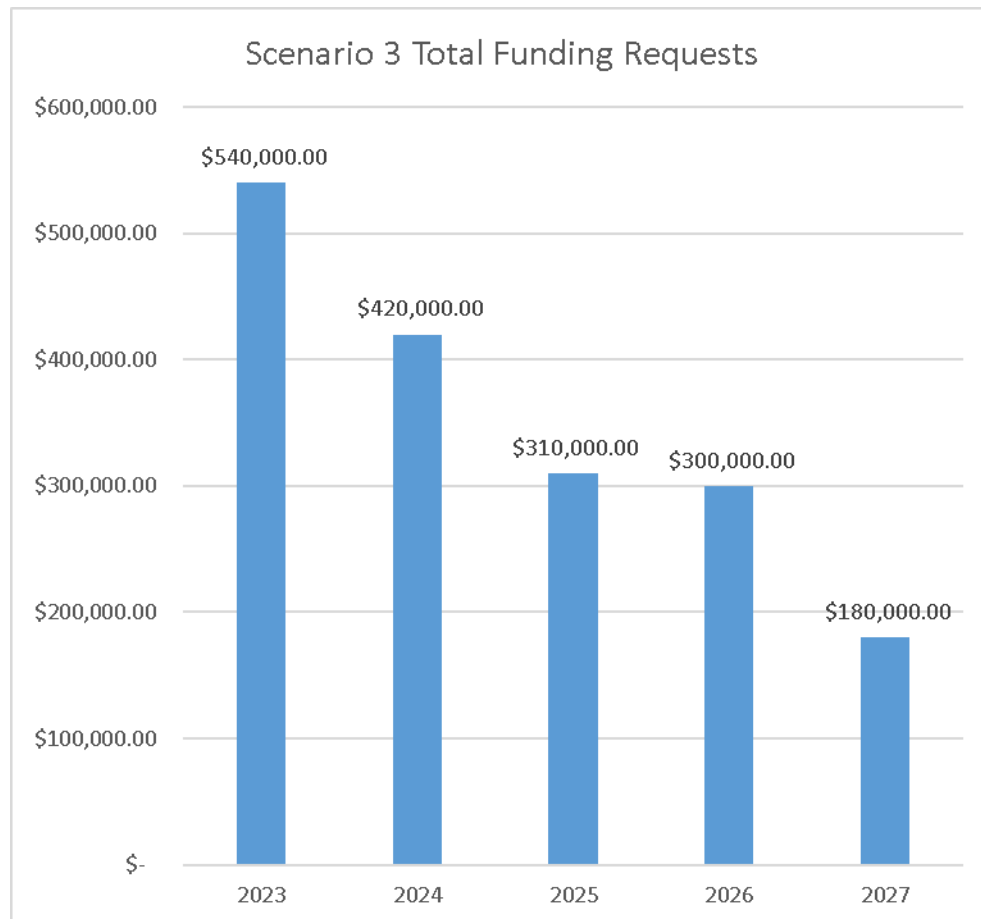
The funding and schedule proposed with Scenario 2 is an alternative that schedules all work identified in the report within a three-year time period. This Scenario proposes near level funding for the projects over the three-year time frame, averaging slightly over \$583,333 per year. The work that would result from the Program projects would be separated into Erosion – Bank Stabilization and Blockages – Debris Removal categories. As in Scenario 1, any work that would be performed in the Erosion – Bank Stabilization will be funding through Capital Improvements Program (CIP) and work performed in the Blockages – Debris Removal category would be funding through the annual Operating Budget. The following charts detail the proposed funding requests over the next five years for the total funding requested, the CIP requests, and the annual Operating Budget requests.

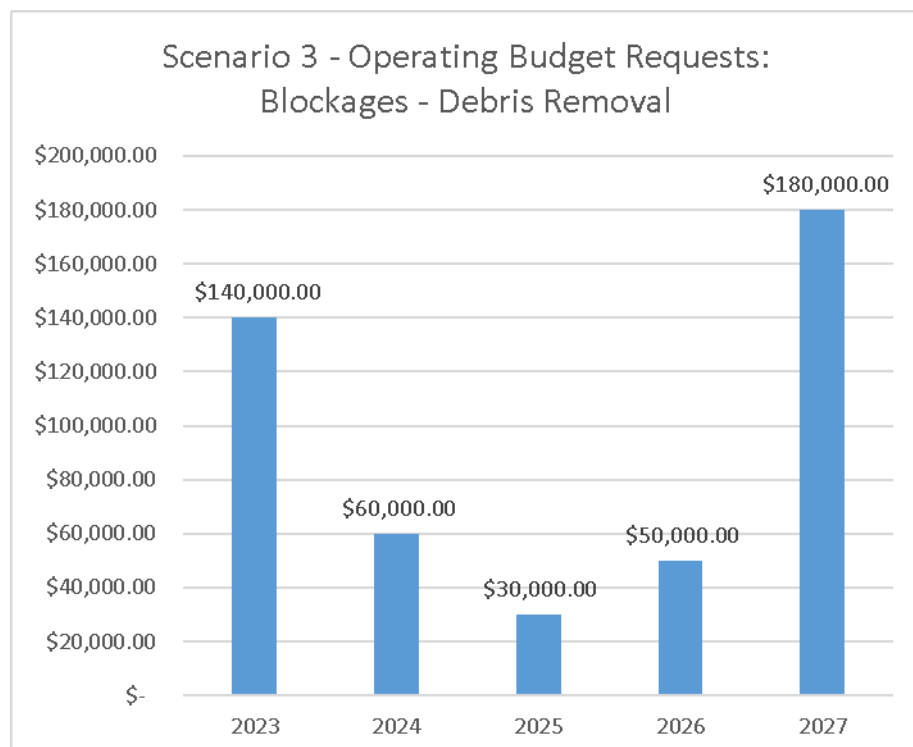
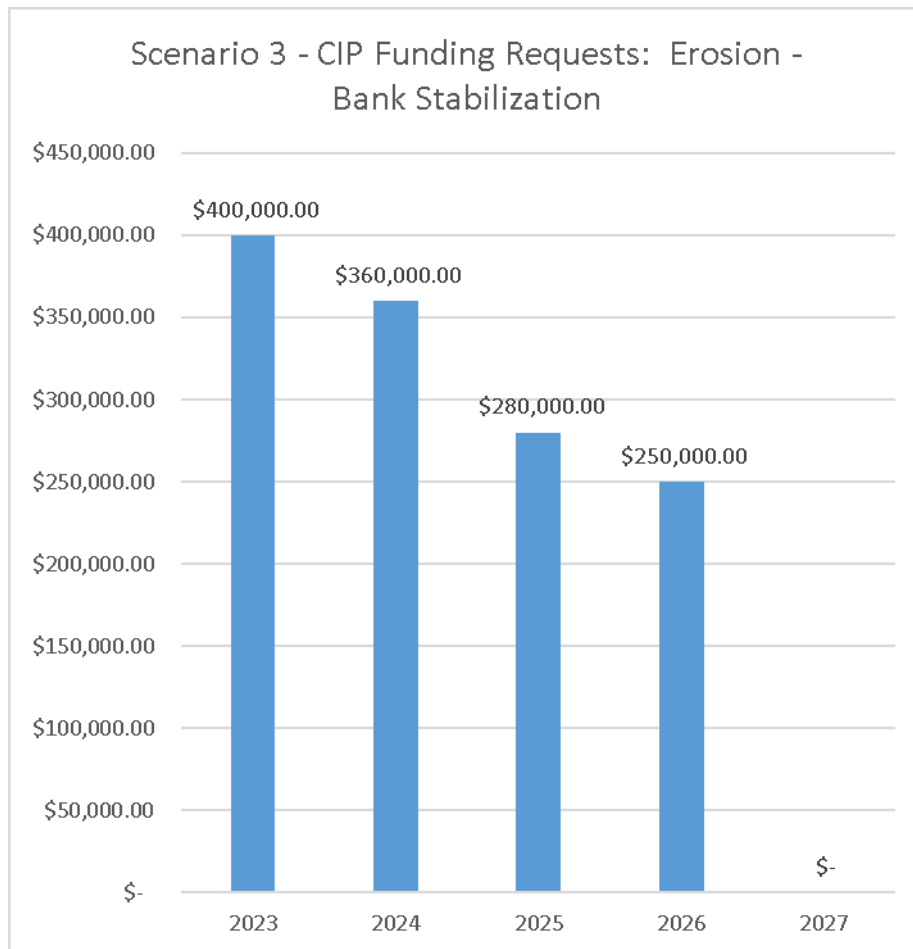




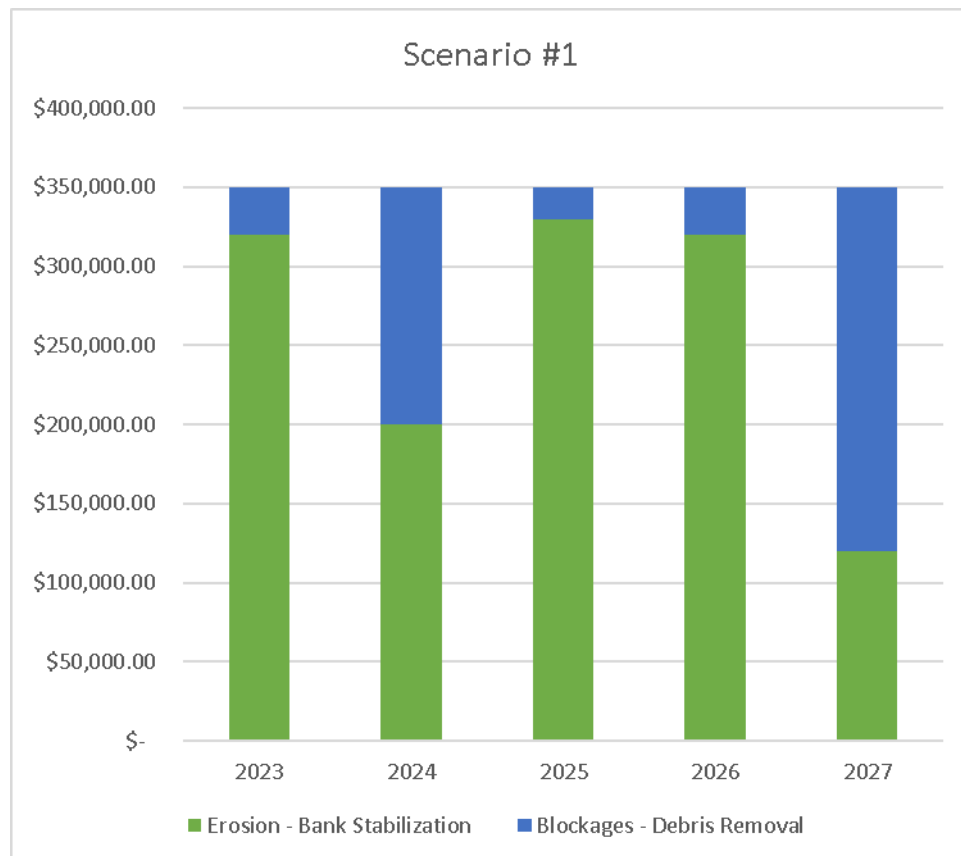
Scenario 3:

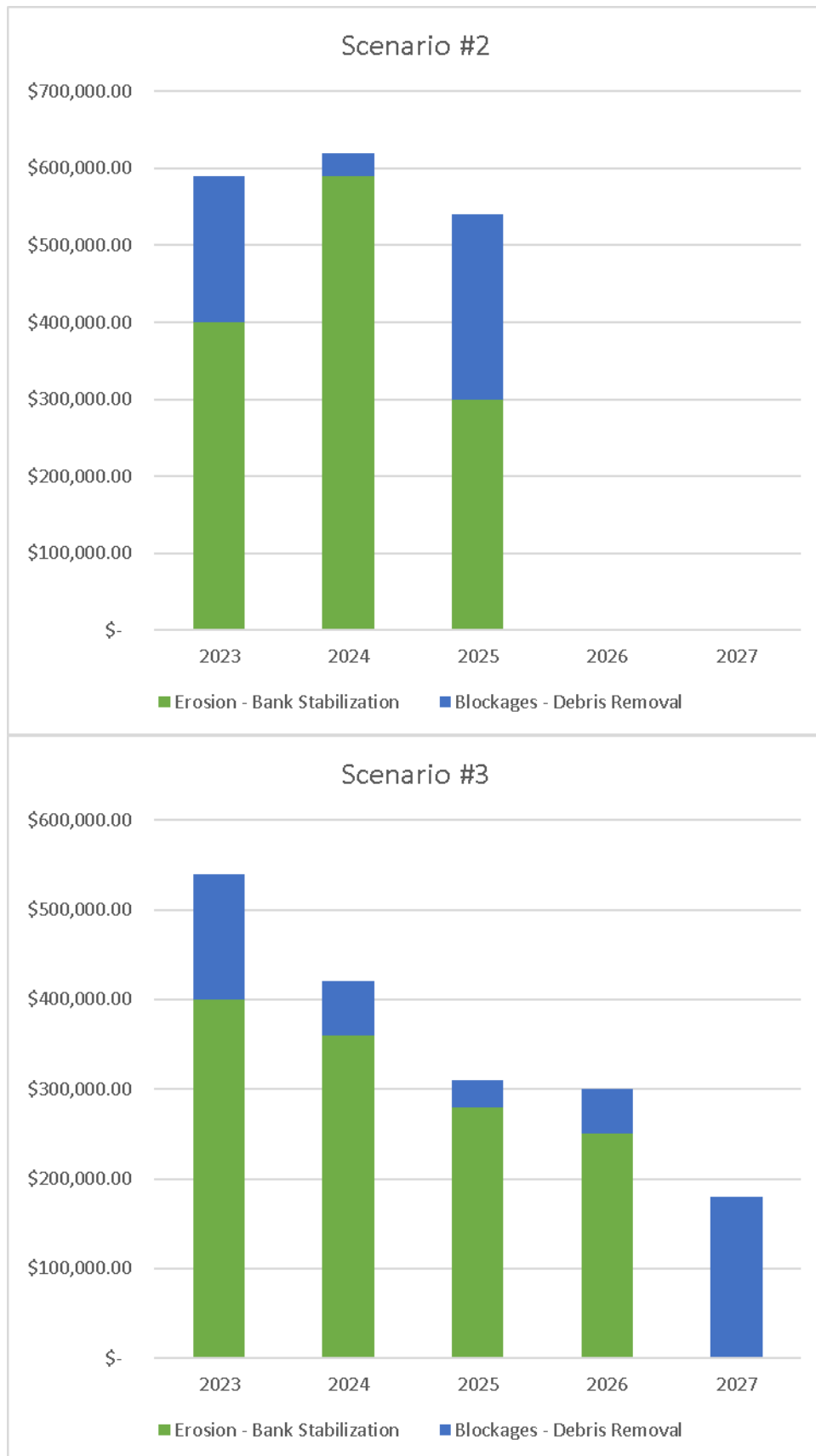
The funding and schedule proposed with Scenario 3 proposes increasing the work and budget for the Program in the first two years of implementation and then programs the remaining work in the following three years. This Scenario will require a total of approximately \$540,000 in the first year, \$420,000 in the second year, \$310,000 in the third year, \$300,000 in the fourth year, and \$180,000 in the fifth year. The work that would result from the Program projects would be separated into Erosion – Bank Stabilization and Blockages – Debris Removal categories. Once again, as in Scenario 1, any work that would be performed in the Erosion – Bank Stabilization will be funded through Capital Improvements Program (CIP) and work performed in the Blockages – Debris Removal category will be funded through the annual Operating Budget. The following charts detail the proposed funding requests over the next five years for the total funding requested, the CIP requests, and the annual Operating Budget requests.





The following charts show the total funding requests by category per year for all three funding and schedule Scenarios. The allocation for each work category is color coded to visually represent the proportional share between the Erosion – Bank Stabilization work (shown in green) and the Blockages – Debris Removal work (shown in blue). Certainly, any variation of these scenarios is possible to implement the Program.





Recommendation

The information provided regarding the Waterways Maintenance Program review by the Public Services Committee is to assist the Council in their review of the proposed Program and to make a recommendation for Program implementation. Staff recommends the Program be implemented in accordance with the Council selected funding and schedule scenario.

Further, staff recommends continuing the current practice regarding waterways located on private property, with the maintenance of such waterways remaining the responsibility of the associated property owner(s). Staff is available for any questions or further discussion regarding the information presented herein, and any other topic related to the Program.



Waterways Maintenance Program

City Council Meeting
June 13, 2022



Introduction



Waterways Maintenance Program

Introduction

The City of Dublin values the environment and recognizes that our water quality is of great importance and contributes to the health, safety and welfare of the public. Furthermore, the waterways have important stormwater conveyance functions that reduce the probability of flooding to the community.

The City is developing a Waterways Maintenance Program that will:

- Ensure that waterways are kept clear of unnatural debris and other blockages.
- Maintain the conveyance capacity of the open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reduce and eliminate illicit discharges into City waterways.
- Improve the natural riparian habitat that is a part of the stream ecosystem.
- Improve and protect the water quality of the streams.
- Repair and restore areas of significant erosion along channels.



Waterways Maintenance Program

Why is this important?

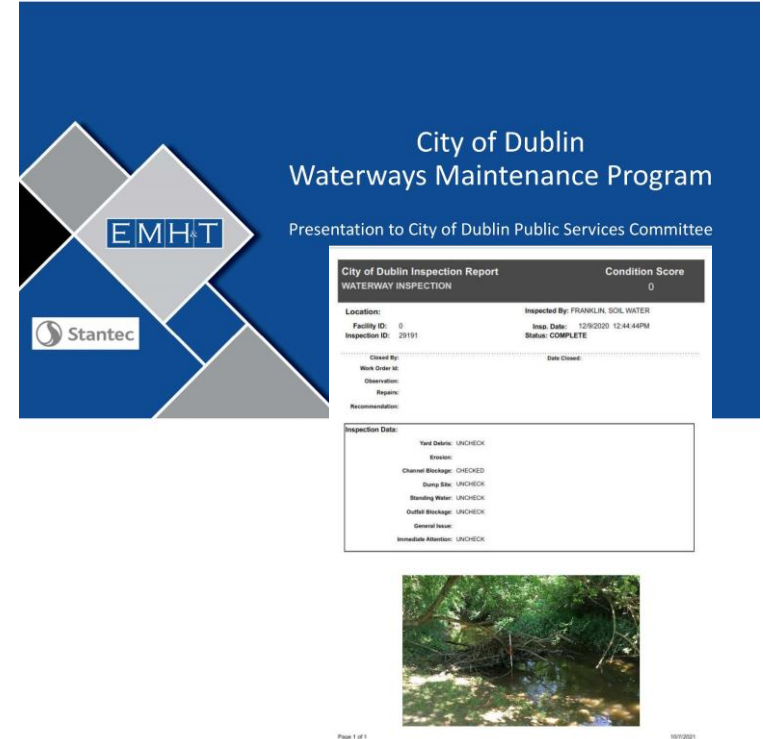
- Water is an important natural resource
- Adds value to properties and the community
- Protects public safety through flood protection and water quality preservation
- Riparian and aquatic habitats
- Protection of existing public infrastructure



Waterways Maintenance Program

Consultant Services

- EMH&T selected consultant
- Started work in late 2021
- Built upon waterway inspections that have been performed by Franklin Soil and Water Conservation District



City of Dublin
Waterways Maintenance Program

Presentation to City of Dublin Public Services Committee

City of Dublin Inspection Report
WATERWAY INSPECTION

Condition Score
0

Location:
Facility ID: 0
Inspection ID: 20191

Inspected By: FRANKLIN, SOL WATER
Inspect Date: 12/9/2020 12:44:46PM
Status: COMPLETE

Client By:
Work Order #:
Observation:
Repair:
Recommendation:

Inspection Data:

Yard Debris: UNCHECKED
Erosion: CHECKED
Channel Blockage: CHECKED
Dump Site: UNCHECKED
Standing Water: UNCHECKED
Sediment Blockage: UNCHECKED
General Status: UNCHECKED
Immediate Attention: UNCHECKED

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10/1/2021

Waterway Inspections – Channel Erosion



Waterways Maintenance Program

Waterway Inspections – Channel/Outfall Blockage



Waterways Maintenance Program

GIS Mapping Tool

- GIS-based Work Map
- Problem Type
- Inspection Locations
 - Private Property (349 Locations)
 - City-owned Property (161 Locations)
 - Private Property with a Drainage Easement (25 Locations)

- Channel Blockage
- ▲ Dump Site
- Erosion
- ▲ Outfall Blockage
- Yard Debris

- City Owned Properties
- Dublin_Inspections - Easements

EMH&T

Stantec



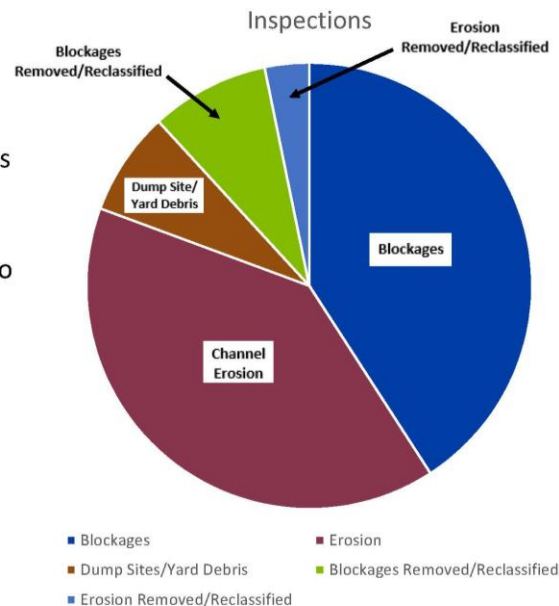
Inspection Located on City Property/Drainage Easements

186 Inspection Locations Reviewed

- Approximately 100 sites field verified
- 22 sites removed or reclassified based on field visits
 - 16 Blockages
 - 6 Erosion
- 14 dump site/yard debris locations removed (City to resolve with property owners)

150 Inspection Locations Analyzed

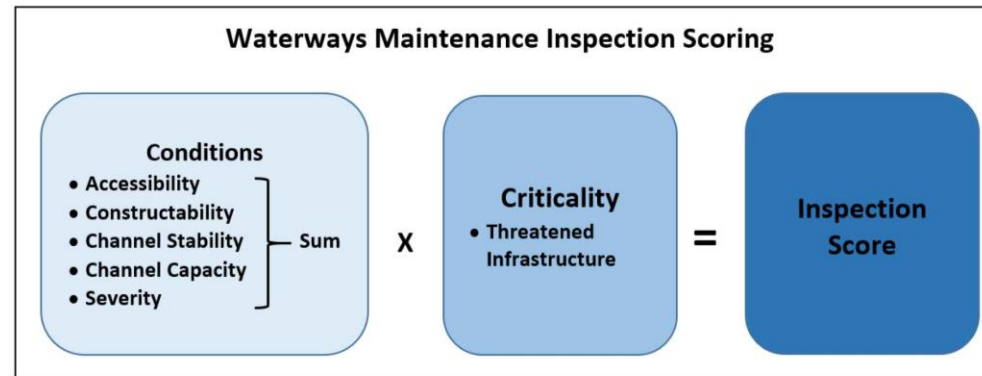
- Channel Blockages – 76 (51%)
- Channel Erosion – 74 (49%)



Inspection Scoring

Inspection Scoring Range

- Scores range between 6 and 95
- Higher scores indicate an increased threat to infrastructure due to erosion or flooding
- Scores used to assist with prioritization of maintenance activities



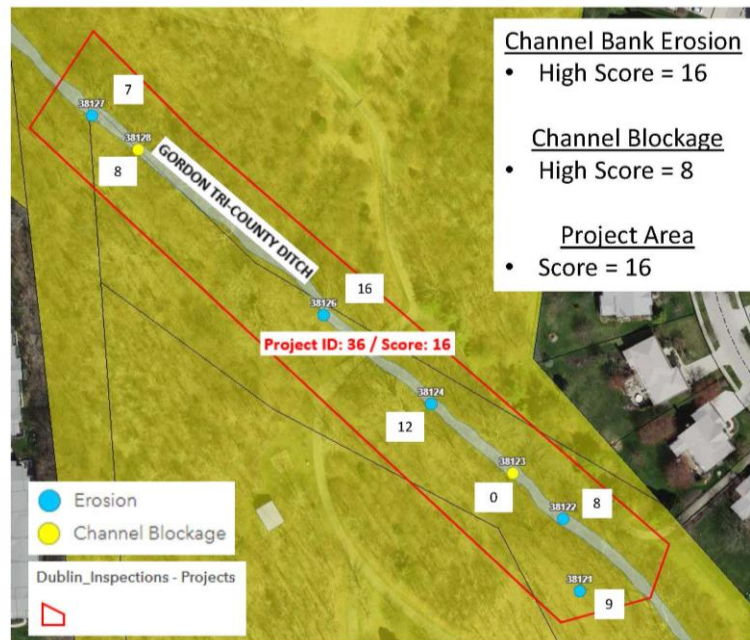
Project Areas

59 Project Areas

- Grouping the 150 inspection locations based on proximity
- Reduces costs for engineering, permitting, and construction
- Each project area is separated into debris removal and channel stabilization activities

Project Area Scoring

- Provided High for each project area.



Construction Cost Estimates



95 Inspection Locations
39 Project Areas
Total Estimated Project Costs =
\$1,750,000



Debris Removal
51 Inspections
\$460,000

Bank Stabilization
44 Inspections
\$1,290,000

Waterways Maintenance Program

Waterways Maintenance Program - Summary

City Projects

- 95 Inspection Locations in 39 Project Areas
- 51 Debris Removal Projects
- 44 Bank Stabilization Projects
- Program Estimated Budget - \$1,750,000

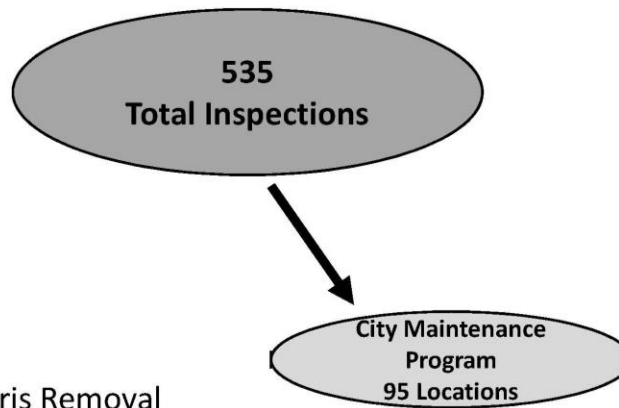
Channel Maintenance Activities

Bank Stabilization

- Infrastructure Protection
- Water Quality Improvements
- Reduces Channel Blockage Source Material

Debris Removal

- Infrastructure Protection
- Maintain Channel Capacity
- Reduces Flooding Risk



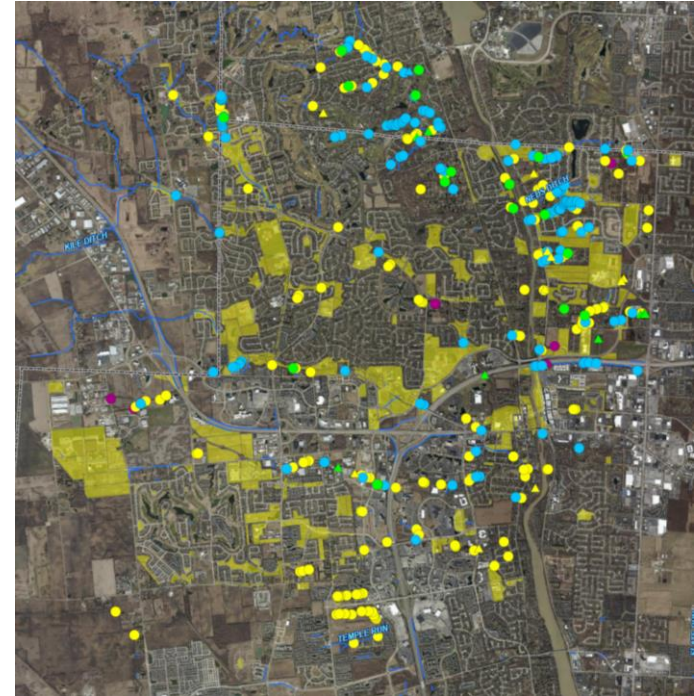


Waterway Maintenance for Private Property



Waterway Maintenance on Private Property

- 349 inspection points are located on **privately** owned property
- Waterways Maintenance work plan and program budget includes only points located on **public** property or within **public** easements
- The City does not have a legal obligation or responsibility to maintain these portions of waterways



Waterway Maintenance on Private Property

- Land owner has primary authority and responsibility to clear blockages on **private** property
- City Code does not require the City to clear blockages on **private** property
- The City has the ability, under certain circumstances, to require the owner to perform stream maintenance, and can also assess the cost of work back to the property owner if they would refuse to perform the maintenance and the City has the work performed



Recommendations



Waterway Maintenance Recommendations - Public

- Council selection of a funding and implementation schedule scenario

Scenario	Budget Request	2023	2024	2025	2026	2027	TOTAL
Scenario #1	CIP Budget Request	\$ 320,000.00	\$ 200,000.00	\$ 330,000.00	\$ 320,000.00	\$ 120,000.00	\$ 1,290,000.00
	Operating Budget Request	\$ 30,000.00	\$ 150,000.00	\$ 20,000.00	\$ 30,000.00	\$ 230,000.00	\$ 460,000.00
	<i>Total Budget Request</i>	<i>\$ 350,000.00</i>	<i>\$ 350,000.00</i>	<i>\$ 350,000.00</i>	<i>\$ 350,000.00</i>	<i>\$ 350,000.00</i>	<i>\$ 1,750,000.00</i>
Scenario #2	CIP Budget Request	\$ 400,000.00	\$ 590,000.00	\$ 300,000.00	\$ -	\$ -	\$ 1,290,000.00
	Operating Budget Request	\$ 190,000.00	\$ 30,000.00	\$ 240,000.00	\$ -	\$ -	\$ 460,000.00
	<i>Total Budget Request</i>	<i>\$ 590,000.00</i>	<i>\$ 620,000.00</i>	<i>\$ 540,000.00</i>	<i>\$ -</i>	<i>\$ -</i>	<i>\$ 1,750,000.00</i>
Scenario #3	CIP Budget Request	\$ 400,000.00	\$ 360,000.00	\$ 280,000.00	\$ 250,000.00	\$ -	\$ 1,290,000.00
	Operating Budget Request	\$ 140,000.00	\$ 60,000.00	\$ 30,000.00	\$ 50,000.00	\$ 180,000.00	\$ 460,000.00
	<i>Total Budget Request</i>	<i>\$ 540,000.00</i>	<i>\$ 420,000.00</i>	<i>\$ 310,000.00</i>	<i>\$ 300,000.00</i>	<i>\$ 180,000.00</i>	<i>\$ 1,750,000.00</i>

**Current Program funding for 2024 and 2026 is \$100,000 per year*



Waterway Maintenance Recommendations - Private

- Estimated cost approximately \$4,000,000
- Recommend EMH&T conduct similar level of analysis for private property points
- Return to PSC to discuss policy options as related to private property maintenance



Scenario #2 - Level Spending with 3-Year Timeframe

Dublin Waterways Maintenance Program 5/18/2022 Summary of Project Costs & Scores - Debris Removal

Maintenance Activity	Total Estimated Cost	3-Year Program
Debris Removal	\$ 460,000	
Bank Sabalization	\$ 1,290,000	
Total	\$ 1,750,000	\$ 583,333 per year

Project Area (PA)	Blockages - Debris Removal			Erosion - Bank Stabilization			Total Project Cost				Program Year
	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	PA Ranking	
2	2	\$ 20,000	84	0	\$ -	0	2	\$ 20,000	84	1	1
4	0	\$ -	0	1	\$ 60,000	80	1	\$ 60,000	80	2	1
5	0	\$ -	0	6	\$ 200,000	80	6	\$ 200,000	80	2	1
7	0	\$ -	0	3	\$ 60,000	76	3	\$ 60,000	76	3	1
12	2	\$ 10,000	64	0	\$ -	0	2	\$ 10,000	64	5	1
3	3	\$ 60,000	68	1	\$ 40,000	68	4	\$ 100,000	68	4	1
10	2	\$ 20,000	64	0	\$ -	0	2	\$ 20,000	64	5	1
13	1	\$ 30,000	63	1	\$ 40,000	60	2	\$ 70,000	63	6	1
19	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	1
20	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	1
17	3	\$ 20,000	60	0	\$ -	0	3	\$ 20,000	60	7	1
23	1	\$ 10,000	56	0	\$ -	0	1	\$ 10,000	56	8	1
18	0	\$ -	0	1	\$ 120,000	60	1	\$ 120,000	60	7	2
22	1	\$ 10,000	51	1	\$ 60,000	56	2	\$ 70,000	56	8	2
28	0	\$ -	0	7	\$ 180,000	54	7	\$ 180,000	54	9	2
16	0	\$ -	0	1	\$ 50,000	52	1	\$ 50,000	52	10	2
24	0	\$ -	0	1	\$ 40,000	48	1	\$ 40,000	48	12	2
32	2	\$ 20,000	51	0	\$ -	0	2	\$ 20,000	51	11	2
44	0	\$ -	0	3	\$ 60,000	48	3	\$ 60,000	48	12	2
25	0	\$ -	0	1	\$ 80,000	36	1	\$ 80,000	36	13	2
27	1	\$ 10,000	12	6	\$ 130,000	48	7	\$ 140,000	48	12	3
29	0	\$ -	0	10	\$ 130,000	48	10	\$ 130,000	48	12	3
39	0	\$ -	0	1	\$ 40,000	36	1	\$ 40,000	36	13	3
42	2	\$ 20,000	34	0	\$ -	0	2	\$ 20,000	34	14	3
43	2	\$ 10,000	27	0	\$ -	0	2	\$ 10,000	27	15	3
30	1	\$ 20,000	21	0	\$ -	0	1	\$ 20,000	21	16	3
8	5	\$ 40,000	16	0	\$ -	0	5	\$ 40,000	16	17	3
21	2	\$ 10,000	12	0	\$ -	0	2	\$ 10,000	12	18	3
49	1	\$ 10,000	11	0	\$ -	0	1	\$ 10,000	11	19	3
48	2	\$ 10,000	11	0	\$ -	0	2	\$ 10,000	11	19	3
31	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	3
51	1	\$ 10,000	10	0	\$ -	0	1	\$ 10,000	10	20	3
53	2	\$ 10,000	10	0	\$ -	0	2	\$ 10,000	10	20	3
52	2	\$ 20,000	10	0	\$ -	0	2	\$ 20,000	10	20	3
38	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	3
54	1	\$ 10,000	9	0	\$ -	0	1	\$ 10,000	9	21	3
55	1	\$ 10,000	8	0	\$ -	0	1	\$ 10,000	8	22	3
59	1	\$ 10,000	7	0	\$ -	0	1	\$ 10,000	7	23	3
51		\$ 460,000		44	\$ 1,290,000		95	\$ 1,750,000			

\$ 590,000 \$ 190,000.00 CIP Oper

\$ 620,000 \$ 30,000.00 CIP Oper

\$ 540,000 \$ 240,000.00 CIP Oper

Scenario #3 - 5-Year Program with Accelerated First Two Years

Dublin Waterways Maintenance Program 5/18/2022
Summary of Project Costs & Scores - Debris Removal

Maintenance Activity	Total Estimated Cost	5-Year Program with accelerated first two years
Debris Removal	\$ 460,000	
Bank Sabalization	\$ 1,290,000	
Total	\$ 1,750,000	

Project Area (PA)	Blockages - Debris Removal			Erosion - Bank Stabilization			Total Project Cost				Program Year
	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	PA Ranking	
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4	0	\$ -	0	1	\$ 60,000	80	1	\$ 60,000	80	2	1
5	0	\$ -	0	6	\$ 200,000	80	6	\$ 200,000	80	2	1
7	0	\$ -	0	3	\$ 60,000	76	3	\$ 60,000	76	3	1
12	2	\$ 10,000	64	0	\$ -	0	2	\$ 10,000	64	5	1
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10	2	\$ 20,000	64	0	\$ -	0	2	\$ 20,000	64	5	1
13	1	\$ 30,000	63	1	\$ 40,000	60	2	\$ 70,000	63	6	1
19	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
20	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
17	3	\$ 20,000	60	0	\$ -	0	3	\$ 20,000	60	7	2
18	0	\$ -	0	1	\$ 120,000	60	1	\$ 120,000	60	7	2
23	1	\$ 10,000	56	0	\$ -	0	1	\$ 10,000	56	8	2
22	1	\$ 10,000	51	1	\$ 60,000	56	2	\$ 70,000	56	8	2
28	0	\$ -	0	7	\$ 180,000	54	7	\$ 180,000	54	9	2
16	0	\$ -	0	1	\$ 50,000	52	1	\$ 50,000	52	10	3
24	0	\$ -	0	1	\$ 40,000	48	1	\$ 40,000	48	12	3
32	2	\$ 20,000	51	0	\$ -	0	2	\$ 20,000	51	11	3
44	0	\$ -	0	3	\$ 60,000	48	3	\$ 60,000	48	12	3
27	1	\$ 10,000	12	6	\$ 130,000	48	7	\$ 140,000	48	12	3
29	0	\$ -	0	10	\$ 130,000	48	10	\$ 130,000	48	12	4
25	0	\$ -	0	1	\$ 80,000	36	1	\$ 80,000	36	13	4
39	0	\$ -	0	1	\$ 40,000	36	1	\$ 40,000	36	13	4
42	2	\$ 20,000	34	0	\$ -	0	2	\$ 20,000	34	14	4
43	2	\$ 10,000	27	0	\$ -	0	2	\$ 10,000	27	15	4
30	1	\$ 20,000	21	0	\$ -	0	1	\$ 20,000	21	16	4
8	5	\$ 40,000	16	0	\$ -	0	5	\$ 40,000	16	17	5
21	2	\$ 10,000	12	0	\$ -	0	2	\$ 10,000	12	18	5
49	1	\$ 10,000	11	0	\$ -	0	1	\$ 10,000	11	19	5
48	2	\$ 10,000	11	0	\$ -	0	2	\$ 10,000	11	19	5
31	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
51	1	\$ 10,000	10	0	\$ -	0	1	\$ 10,000	10	20	5
53	2	\$ 10,000	10	0	\$ -	0	2	\$ 10,000	10	20	5
52	2	\$ 20,000	10	0	\$ -	0	2	\$ 20,000	10	20	5
38	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
54	1	\$ 10,000	9	0	\$ -	0	1	\$ 10,000	9	21	5
55	1	\$ 10,000	8	0	\$ -	0	1	\$ 10,000	8	22	5
59	1	\$ 10,000	7	0	\$ -	0	1	\$ 10,000	7	23	5
51		\$ 460,000		44	\$ 1,290,000		95	\$ 1,750,000			

\$ 540,000 \$ 400,000.00 CIP
\$ 140,000.00 Oper

\$ 420,000 \$ 360,000.00 CIP
\$ 60,000.00 Oper

\$ 310,000 \$ 280,000.00 CIP
\$ 30,000.00 Oper

\$ 300,000 \$ 250,000.00
\$ 50,000.00

\$ 180,000 \$ - CIP
\$ 180,000.00 Operating

To: Members of Dublin City Council
From: Dana L. McDaniel, City Manager
Date: May 4, 2022
Initiated By: Robert E. Ranc, Jr., Deputy City Manager/Chief Operating Officer
Paul A. Hammersmith, PE, Director of Engineering/City Engineer
C. Aaron Stanford, PE, Deputy Director of Engineering – Utilities
Re: Waterways Maintenance Program Update

Summary

The City of Dublin values the environment and recognizes Dublin's waterways are of great importance and contribute to the health, safety, and general welfare of the public. The preservation, maintenance, and improvement of the waterways and the connected habitat are crucial to the protection of these natural resources.

The Waterway Maintenance Program is a new initiative that was approved with the adoption of the 2022-2026 Capital Improvements Program. The mission of the Waterways Maintenance Program is to preserve and maintain the forty eight (48) miles of open watercourses within the City, preserving their storm water carrying capacity, addressing any critical items of maintenance, and protecting the environmental health of the waterways. This program will specifically focus on:

- Ensuring Dublin's waterways are kept clear of unnatural debris and other blockages.
- Maintaining the conveyance capacity of open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reducing and eliminating illicit discharges into City waterways.
- Protecting and improving the riparian habitat that is a part of the stream ecosystem.
- Protecting and improving water quality within the waterways.
- Providing a comprehensive program to address the issues identified during waterways inspections performed over the past several years.

EMH&T was selected as the design consultant to assist the City with reviewing the current state of the waterways, providing analysis of the areas of concern, and developing a work program that can be used to meet the goals of the program.

The scope of EMH&T's work for the program includes:

- The review and analysis of approximately 535 waterway inspection reports completed by Franklin Soil and Water Conservation District (FSWCD) over the past four years.
- The review of reports and site visits to 25 sample locations to verify the accuracy of the reports and ensure site conditions have not changed since the time of original inspection.
- Creation of an Excel database compiling the data of the individual inspection reports.
- Analysis of the existing data to determine waterways on private properties, categorization of the types of private properties (residential, commercial, etc.), and providing the ownership information for the private properties through which waterways run.

- Identification and mapping of City-owned land/waterway easements and recommendation of channel maintenance activities.
- An interactive GIS map that includes property lines, public utilities, streams, FSWCD surface drainage features, mapped Stream Corridor Protection Zones (SCPZs), and spatial data developed by FSWCD related to their inspection reports. The GIS map includes links to the FSWCD inspection reports, as well as channel maintenance locations within City-owned parcels and easements dedicated to the City.
- Inspections located on City property and City-owned easements have been evaluated and the appropriate maintenance activity has been determined along with a preliminary Engineers Estimate of Probable Construction Cost (EOPCC) for the necessary maintenance activity.
- The developed scoring system is based on FSWCD's condition score, degree of channel instability, water quality/habitat impairments, threat to public/private property, constructability and access. The inspection points have been organized and grouped into project areas based on location and then prioritized using the developed scoring criteria. The maintenance schedule has been developed so that all necessary maintenance on City owned property, or areas where the City has maintenance responsibility through a drainage or other easements, will be completed over a 5-year timeframe.

The Phase 2 scope for the program is currently underway and will be completed by the end of May 2022. The remaining work will include:

- Environmental review of riparian habitat/permitting.
- Recommendations of integrating and improving the riparian habitat along each waterway.
- Development of an assessment toolbox to these locations that will lead to the implementation of the enhancement recommendations.
- Guidance on the development of educational materials for property owners and the larger community to encourage good stewardship of stream channels and riparian corridors.

Proposed Program Budget and Implementation Schedule

EMH&T provided an April 6, 2022 summary memo, "Dublin Waterways Maintenance Program – Phase1", for the Program which is included in the materials provided via BoardPaq. This memo, along with detailed project cost analysis, provided an initial program budget for City owned/responsible areas of \$3,040,000. This total cost was the summation of the estimated project costs of the 59 separate Project Areas for City owned or responsible areas which included 150 inspection locations.

After detailed review by Staff of all project areas and associated inspection data, areas were identified where smaller stream blockages, or items such as blocked storm outfalls, could be more quickly addressed by City Staff or through separate contracts with debris removal contractors or City Staff. Of the 76 total debris blockages, 25 were identified as blockages to be addressed by City Staff.

Additionally, there were areas of erosion identified that, through review, were determined to be minor and showed no potential for damage to existing infrastructure. The inspection score assigned to each point was invaluable, as the team was able to review the points of channel erosion that could require bank stabilization. As the program was refined, there were areas of erosion that had a low inspection score, identified as being lower than a score of 36. This score, due to the criteria created, indicated that these areas are not rated as severe, nor were they determined to be a danger to public infrastructure, which was reflected in the criticality score. Through review of each of those points, it

was determined that these inspection points did not need to be addressed immediately and could be placed on a list of areas to monitor. Of the 74 total erosion inspection points, 30 points were identified as areas to be monitored.

These changes enabled the team to reduce the overall program budget to approximately \$1,750,000. This amount allocates \$460,000 for debris removal and \$1,290,000 for bank stabilization due to erosion. This overall budget was then allocated over a 5-year time period, which results in an annual budget of \$350,000 per year.

Private Property Stream Maintenance

A considerable amount of the waterways in the City of Dublin are located on private property, with no maintenance responsibility designated to the City through an existing easement. Of the original 535 points of inspection, 349 (65%), are located on private property. The proposed program does not include projects to address issues on private property, nor does it include any private property issues in the proposed budget. Additionally, the Law Director has provided an opinion of the City's responsibilities regarding maintenance work necessary within waterways located on private property.

The Law Director's memo concludes that the City does not have a legal obligation to provide stream maintenance (including blockage removal) on private properties within the City. The City does have the ability, under certain circumstances, to require a private property owner within the City to conduct stream maintenance or, if the property owner refuses, to complete the necessary maintenance and assess the costs of such work back to the property owner. In addition, if the City decided that it wanted to undertake the costs of such work, it could execute a right of entry with the property owner so that the City could legally enter the property to perform the necessary work.

Recommendation

The information provided regarding the Waterways Maintenance Program is to assist the Committee in reviewing the proposed Waterways Maintenance Program and make a recommendation to City Council for Program implementation. Staff recommends the Waterways Maintenance Program be implemented over a 5-year time period as detailed in the proposed summary of project costs and scores. This implementation schedule will require annual funding of \$350,000. Staff recommends beginning the Program implementation this year (2022). There are sufficient funds in the CIP to begin this work and staff will bring forward a request in the Q3 supplemental for additional necessary funds.

Further, staff recommends continuing the current practice regarding waterways on private property, with the maintenance of such waterways remaining the responsibility of the associated property owner(s). Staff is available for any questions or further discussion regarding the information presented herein, and any other topic related to the Waterways Maintenance Program.



Waterways Maintenance Program

Public Services Committee
May 11, 2022



Introduction



Waterways Maintenance Program

Introduction

The City of Dublin values the environment and recognizes that our water quality is of great importance and contributes to the health, safety and welfare of the public. Furthermore, the waterways have important stormwater conveyance functions that reduce the probability of flooding to the community.

The City is developing a Waterways Maintenance Program that will:

- Ensure that waterways are kept clear of unnatural debris and other blockages.
- Maintain the conveyance capacity of the open watercourses, especially in areas that have FEMA designated floodway and floodplain.
- Reduce and eliminate illicit discharges into City waterways.
- Improve the natural riparian habitat that is a part of the stream ecosystem.
- Improve and protect the water quality of the streams.



Waterways Maintenance Program

Why is this important

- Water is an important natural resource
- Adds value to properties and the community
- Protects public safety through flood protection and water quality preservation
- Riparian and aquatic habitats





City of Dublin Waterways Maintenance Program

Presentation to City of Dublin Public Services Committee
May 11, 2022

EMH&T





Presentation Agenda

1. Project Overview
2. Waterway Inspections & Data Analysis
3. Maintenance Program Development Approach
4. GIS Mapping Tool
5. Inspection Scoring
6. Program Cost Estimates
7. Work Map Demonstration
8. Program Summary
9. Questions



Project Overview

Waterways contribute to the health, safety, and general welfare of the public.

Program Goals:

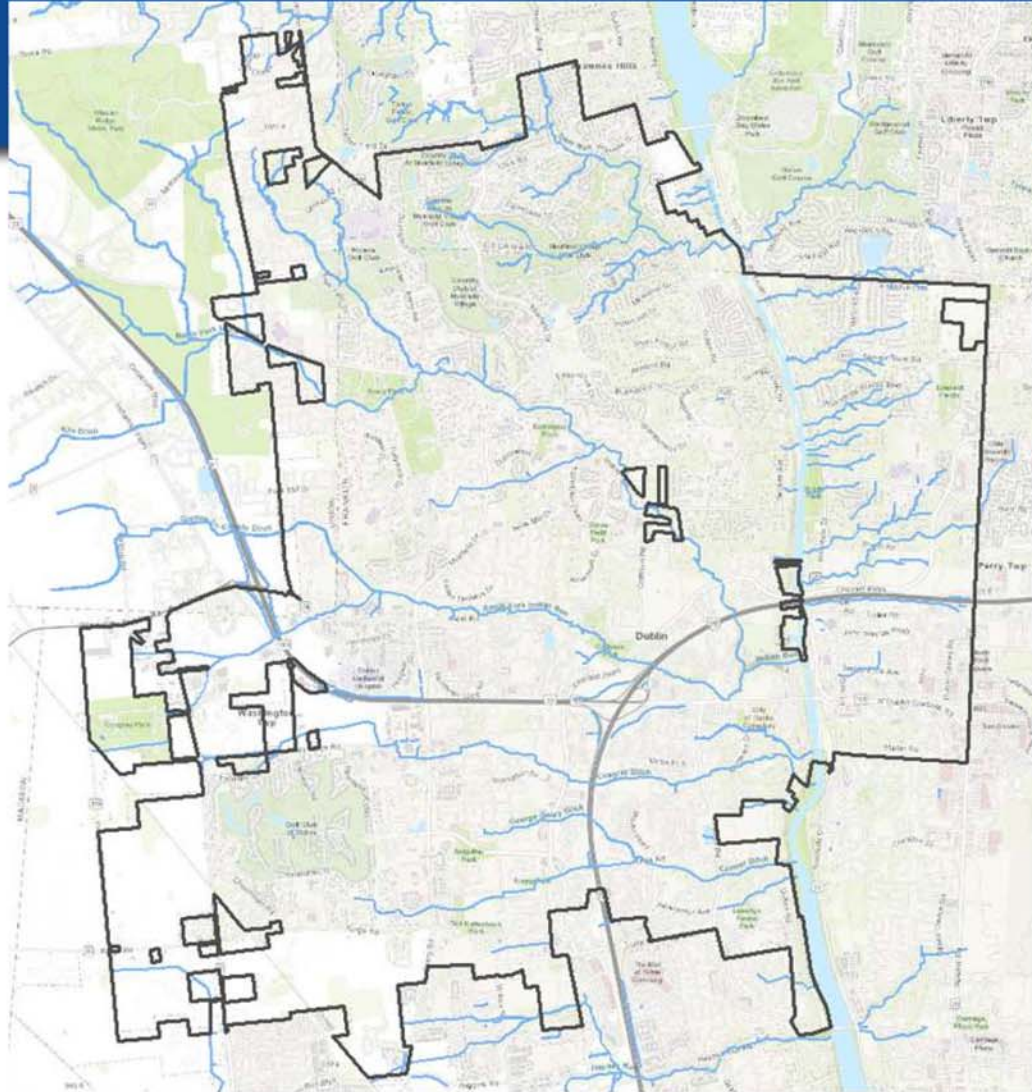
- Preserve and improve the stability and flood carrying capacity of the City's waterways.
- Protect riparian corridors and infrastructure.

Scope of Services:

- Analyze existing inspection data
- Determine waterway maintenance responsibility (City vs. private)
- Identify maintenance needs
- Assist with prioritizing maintenance needs
- Maintenance cost estimates
- Recommended riparian vegetation enhancements

Project Overview

Approximately 48 miles of
waterways within the City



Waterway Inspections

Franklin Soil and Water Conservation District (FSWCD)

- 535 Inspection conducted between 2018-2021
- Spatial and descriptive information
 - Channel blockages
 - Channel erosion
 - Outfall blockages
 - Yard debris/dump sites
- Inspection data archived by the City using CityWorks.

City of Dublin Inspection Report WATERWAY INSPECTION

Condition Score
0

Location:

Inspected By: FRANKLIN, SOIL WATER

Facility ID: 0

Insp. Date: 12/9/2020 12:44:44PM

Inspection ID: 29191

Status: COMPLETE

Closed By:

Date Closed:

Work Order Id:

Observation:

Repairs:

Recommendation:

Inspection Data:

Yard Debris: UNCHECK

Erosion:

Channel Blockage: CHECKED

Dump Site: UNCHECK

Standing Water: UNCHECK

Outfall Blockage: UNCHECK

General Issue:

Immediate Attention: UNCHECK



Waterway Inspections – Channel/Outfall Blockage



Waterway Inspections – Channel Erosion



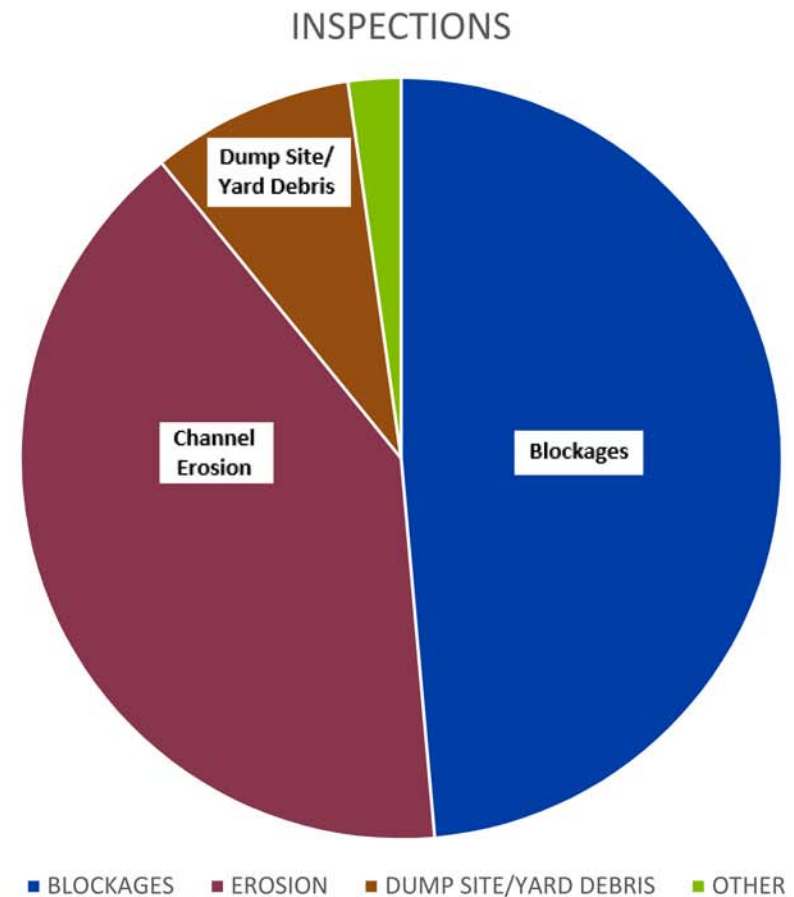
Waterway Inspections – Yard Debris/Dump Site



Data Analysis

Approximately 48 Miles of Waterways

- 535 FSWCD Inspection Reports
 - 260 – Channel Blockages (49%)
 - 217 – Channel Erosion (41%)
 - 46 – Dump Site/Yard Debris (9%)
 - 12 – Other Concerns (1%)





Program Development Approach

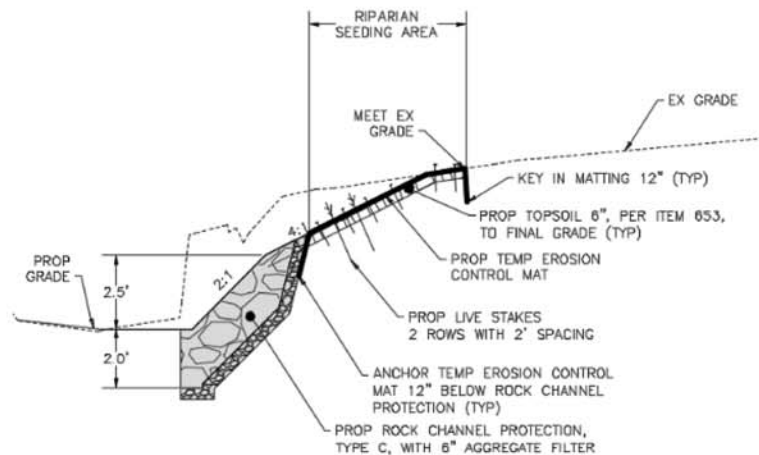
Inspection Report Analysis

- Field investigations to confirm inspection report information and to formulate an opinion on how future inspections can be improved.
- Spatial location of inspections relative to City-owned land/easements.
- Organization of inspection data into a Scoring and Project Cost Tool.

Program Development Approach

Identify Required Channel Maintenance Activities

- Establish a typical channel erosion stabilization method
- Determine project costs based on estimating material quantities/project duration.



GIS Mapping Tool

- GIS-based Work Map
- Problem Type
- Inspection Locations
 - Private Property (349 Locations)
 - City-owned Property (161 Locations)
 - Private Property with a Drainage Easement (25 Locations)

- Channel Blockage
- ▲ Dump Site
- Erosion
- ▲ Outfall Blockage
- Yard Debris

City Owned Properties



Dublin_Inspections - Easements



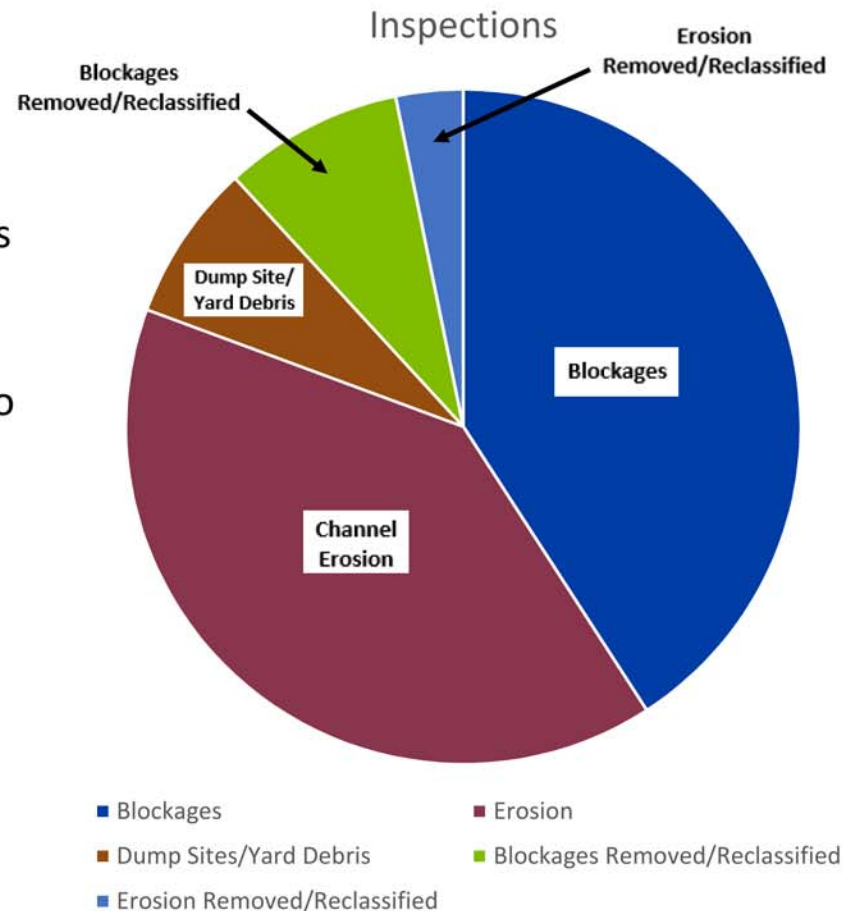
Inspection Located on City Property/Drainage Easements

186 Inspection Locations Reviewed

- Approximately 100 sites field verified
- 22 sites removed or reclassified based on field visits
 - 16 Blockages
 - 6 Erosion
- 14 dump site/yard debris locations removed (City to resolve with property owners)

150 Inspection Locations Analyzed

- Channel Blockages – 76 (51%)
- Channel Erosion – 74 (49%)



Inspection Location Removal

Inspection 37995 - Blockage

2019



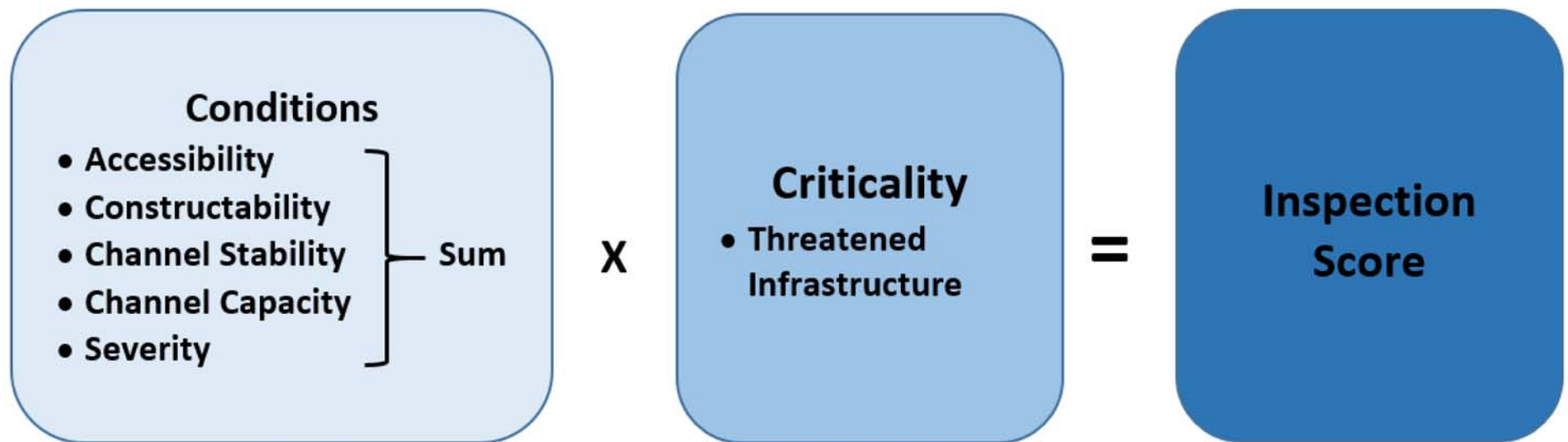
2022



Eliminated Erosion Inspections – Noted as blockages or determined to be stable

Inspection Scoring

Waterways Maintenance Inspection Scoring



Inspection Scoring

Conditional Scores

Access (1-3)

Score	Access Determination
1	Requires work agreement from multiple property owners
2	Requires work agreement from a single property owner
3	Located entirely on City-owned property/drainage easement

Constructability (1-3)

Score	Constructability Determination
1	Requires extensive land disturbance/vegetation clearing
2	Requires moderate land disturbance/vegetation clearing
3	Requires minimal land disturbance/vegetation clearing

Channel Stability/Capacity - Relative Potential Improvement (1-3)

Score	Determination	
	Bank Erosion Area	Blockage
1	< 200 Ft ²	< 25%
3	200 Ft ² - 500 Ft ²	25% - 55%
5	> 500 Ft ²	> 55%

Severity Score (1-10)

Score	Determination	
	Bank Erosion	Blockage
1	No threat anticipated	No adverse impacts to flooding
5	Threat anticipated within 2-5 years	Potential future flooding concerns
10	Threat anticipated within 0-2 years	Increased flooding threat to infrastructure

Inspection Scoring

Criticality

Threatened Infrastructure Criticality (1-5)

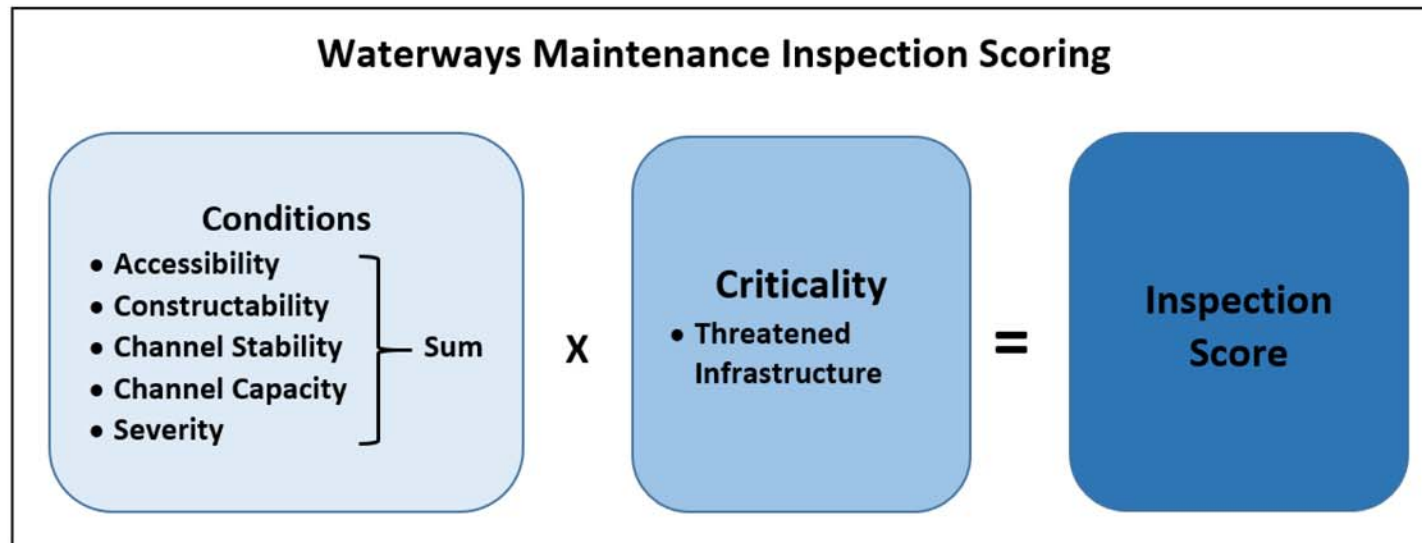
Assign a score based on Asset Type

Threatened Infrastructure Structure Type	Asset Type	Criticality
Railroad	Transportation	5
Highway	Transportation	5
1-4 Lane Road	Transportation	4
Parking Lots	Transportation	3
Driveway	Transportation	3
Multi-Use Pathways (trails, golf course path, sidewalk, footbridge, etc.)	Transportation	2
Multiple Occupancy Building (hospital, apartment building, office building/business, strip mall, etc.)	Buildings	5
Residential Single-Family Home	Buildings	4
Other Non-Occupied	Buildings	2
Utility	Utility	3
Open Space	Open Space	1

Inspection Scoring

Inspection Scoring Range

- Scores range between 6 and 95
- Higher scores indicate an increased threat to infrastructure due to erosion or flooding
- Scores used to assist with prioritization of maintenance activities



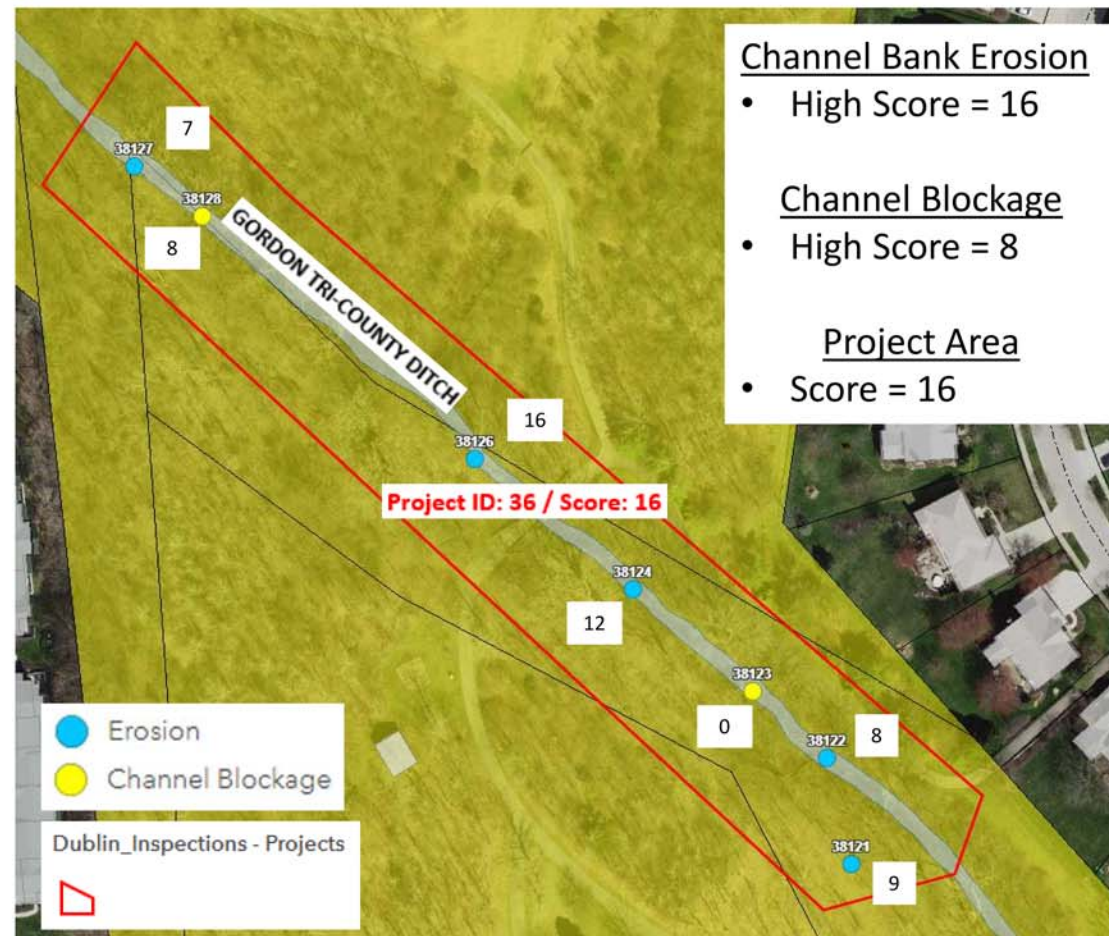
Project Areas

59 Project Areas

- Grouping the 150 inspection locations based on proximity
- Reduces costs for engineering, permitting, and construction
- Each project area is separated into debris removal and channel stabilization activities

Project Area Scoring

- Provided High for each project area.



Project Cost Estimates – Bank Stabilization

- Based on typical section for channel bank stabilization
- Unit Costs reflect project scale (small, medium, large)
- Estimated quantities based on field observations and desktop evaluation
- Engineering costs
- Permitting costs
- Construction administration

Bank Stabilization OPCC

PROJECT AREA: OPINION OF PROBABLE PROJECT COST					
CITY OF DUBLIN					
PROJECT AREA NAME: 27					
EROSION MAX SCORE: 48		EROSION AVG SCORE: 19.5		NO. OF INSPECTION POINTS INCLUDED: 6	
BANK STABILIZATION					
Date Estimated:					April 14, 2022
Item No.	Description	Quantity	Units	Unit Cost	Item Cost
201	Clearing and Grubbing	1	LS	\$3,000	\$3,000
203	Excavation	140	CY	\$25	\$3,500
203	Embankment	50	CY	\$25	\$1,250
601	Rock Channel Protection, Type C, With Filter	140	CY	\$150	\$21,000
623	Construction Layout Stakes	1	LS	\$4,000	\$4,000
624	Mobilization	1	LS	\$5,000	\$5,000
653	Topsoil Furnished and Placed	35	CY	\$45	\$1,575
671	Erosion Control Mat, Type C	210	SY	\$9	\$1,890
SPEC	Dewatering Allowance and Erosion and Sediment Control	1	LS	\$6,000	\$6,000
SPEC	Seeding and Mulching	270	SY	\$3	\$810
SPEC	Planting, incl. Vegetated Bank Stabilization	1	LS	\$6,000	\$6,000
SPEC	Site Restoration	1	LS	\$3,000	\$3,000
SPEC	Maintenance of Traffic	1	LS	N/A	N/A
SUBTOTAL =					\$57,025
CONCEPTUAL LEVEL CONTINGENCY (30%) =					\$17,100
OPINION OF PROBABLE CONSTRUCTION COST =					\$80,000
SURVEY, ENGINEERING (25% OF ESTIMATED CONSTRUCTION COST) =					\$20,000
SECTION 404 NATIONWIDE PERMIT 13 =					\$8,000
FLOODPLAIN PERMIT (INC. NO-RISE DETERMINATION) =					\$5,000
CONSTRUCTION ADMINISTRATION (10% OF ESTIMATED CONSTRUCTION COST) =					\$8,000
OPINION OF PROBABLE PROJECT COST =					\$130,000

Project Cost Estimates – Debris Removal

- Utilizes cost data provided by the Northeast Ohio Regional Sewer District for their regional channel maintenance program - \$3,600/day
- Unit Costs based on project scale (small, medium, large)
- No engineering/permitting costs

Debris Removal OPCC

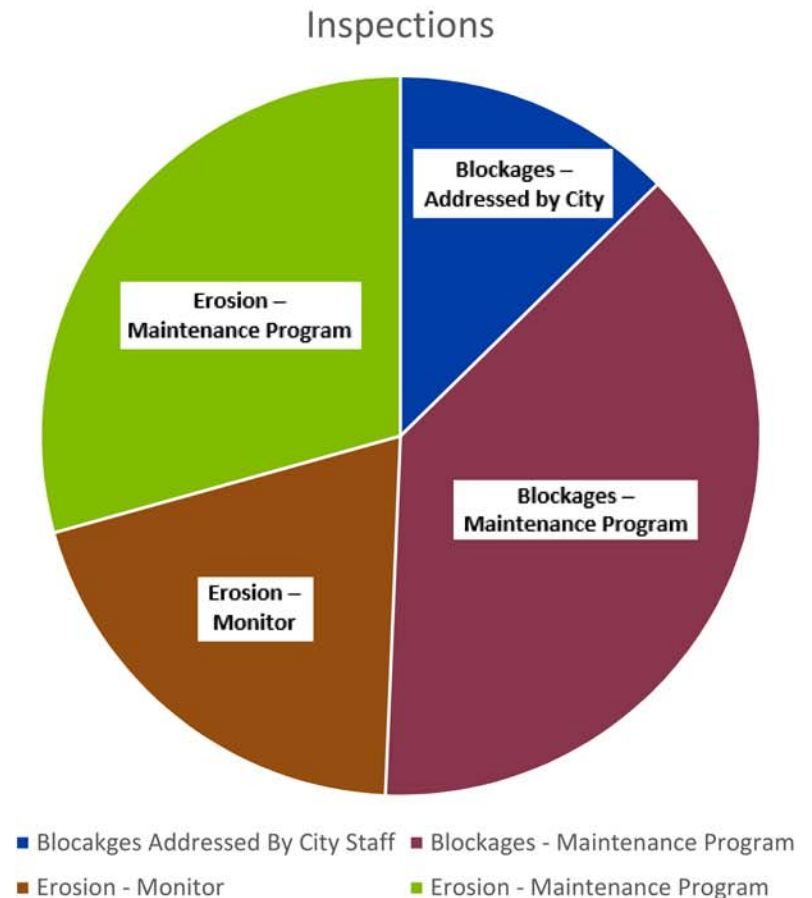
PROJECT AREA: OPINION OF PROBABLE PROJECT COST					
CITY OF DUBLIN					
PROJECT AREA NAME: 27					
SEDIMENT/DEBRIS MAX SCORE: 12		SEDIMENT/DEBRIS AVERAGE SCORE: 12		NO. OF INSPECTION POINTS INCLUDED: 1	
SEDIMENT/DEBRIS REMOVAL					
				Date Estimated:	April 14, 2022
Item No.	Description	Quantity	Units	Unit Cost	Item Cost
201	Clearing and Grubbing	1	LS	\$500	\$500
624	Mobilization	1	LS	\$1,000	\$1,000
SPEC	Sediment/Debris Removal	1	DAY	\$2,800	\$2,800
SPEC	Seeding and Mulching	10	SY	\$3	\$30
SPEC	Site Restoration	1	LS	\$1,000	\$1,000
SPEC	Maintenance of Traffic	1	LS	N/A	N/A
				SUBTOTAL =	\$5,330
				CONCEPTUAL LEVEL CONTINGENCY (30%) =	\$1,600
				OPINION OF PROBABLE CONSTRUCTION COST =	\$10,000

City Maintenance Staff vs. Program

150 Inspection Locations Analyzed

- Channel Blockages Total – 76
 - Blockages to be addressed by City Staff = 25
 - Blockages to be incorporated within Program = 51
- Channel Erosion Total – 74
 - Erosion areas to be monitored – 30
 - Erosion areas to be incorporated within Program = 44

Maintenance Program Budget – 95 Inspections



Construction Cost Estimates



95 Inspection Locations
39 Project Areas
Total Estimated Project Costs =
\$1,750,000



Debris Removal
51 Inspections
\$460,000

Bank Stabilization
44 Inspections
\$1,290,000

Program Budget – 5 Years

Maintenance Activity	Total Estimated Cost	5-Year Program	
Debris Removal	\$ 460,000		
Bank Sabalization	\$ 1,290,000		
Total	\$ 1,750,000	\$ 350,000	per year

Project Area (PA)	Blockages - Debris Removal			Erosion - Bank Stabilization			Total Project Cost				Program Year
	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	PA Ranking	
2	2	\$ 20,000	84	0	\$ -	0	2	\$ 20,000	84	1	1
4	0	\$ -	0	1	\$ 60,000	80	1	\$ 60,000	80	2	1
5	0	\$ -	0	6	\$ 200,000	80	6	\$ 200,000	80	2	1
7	0	\$ -	0	3	\$ 60,000	76	3	\$ 60,000	76	3	1
12	2	\$ 10,000	64	0	\$ -	0	2	\$ 10,000	64	5	1
3	3	\$ 60,000	68	1	\$ 40,000	68	4	\$ 100,000	68	4	2
10	2	\$ 20,000	64	0	\$ -	0	2	\$ 20,000	64	5	2
13	1	\$ 30,000	63	1	\$ 40,000	60	2	\$ 70,000	63	6	2
19	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
20	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
17	3	\$ 20,000	60	0	\$ -	0	3	\$ 20,000	60	7	2
18	0	\$ -	0	1	\$ 120,000	60	1	\$ 120,000	60	7	2
23	1	\$ 10,000	56	0	\$ -	0	1	\$ 10,000	56	8	3
22	1	\$ 10,000	51	1	\$ 60,000	56	2	\$ 70,000	56	8	3
28	0	\$ -	0	7	\$ 180,000	54	7	\$ 180,000	54	9	3
16	0	\$ -	0	1	\$ 50,000	52	1	\$ 50,000	52	10	3
24	0	\$ -	0	1	\$ 40,000	48	1	\$ 40,000	48	12	3
32	2	\$ 20,000	51	0	\$ -	0	2	\$ 20,000	51	11	4
44	0	\$ -	0	3	\$ 60,000	48	3	\$ 60,000	48	12	4
27	1	\$ 10,000	12	6	\$ 130,000	48	7	\$ 140,000	48	12	4
29	0	\$ -	0	10	\$ 130,000	48	10	\$ 130,000	48	12	4
25	0	\$ -	0	1	\$ 80,000	36	1	\$ 80,000	36	13	5
39	0	\$ -	0	1	\$ 40,000	36	1	\$ 40,000	36	13	5
42	2	\$ 20,000	34	0	\$ -	0	2	\$ 20,000	34	14	5
43	2	\$ 10,000	27	0	\$ -	0	2	\$ 10,000	27	15	5
30	1	\$ 20,000	21	0	\$ -	0	1	\$ 20,000	21	16	5
8	5	\$ 40,000	16	0	\$ -	0	5	\$ 40,000	16	17	5
21	2	\$ 10,000	12	0	\$ -	0	2	\$ 10,000	12	18	5
49	1	\$ 10,000	11	0	\$ -	0	1	\$ 10,000	11	19	5
48	2	\$ 10,000	11	0	\$ -	0	2	\$ 10,000	11	19	5
31	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
51	1	\$ 10,000	10	0	\$ -	0	1	\$ 10,000	10	20	5
53	2	\$ 10,000	10	0	\$ -	0	2	\$ 10,000	10	20	5
52	2	\$ 20,000	10	0	\$ -	0	2	\$ 20,000	10	20	5
38	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
54	1	\$ 10,000	9	0	\$ -	0	1	\$ 10,000	9	21	5
55	1	\$ 10,000	8	0	\$ -	0	1	\$ 10,000	8	22	5
59	1	\$ 10,000	7	0	\$ -	0	1	\$ 10,000	7	23	5
	51	\$ 460,000		44	\$ 1,290,000		95	\$ 1,750,000			

Work Map and Project Costing Tool Demonstration

Project Area #5

- Inspection Locations – 7 Total
 - Channel Erosion – 6
 - Stabilize – 2
 - Monitor - 4
 - Erosion/Channel Blockage - 1
- City-owned Land
- Floodway/Floodplain
- Project Cost Estimate
 - \$170,000



Waterways Maintenance Program - Summary

City Projects

- 95 Inspection Locations in 39 Project Areas
- 51 Debris Removal Projects
- 44 Bank Stabilization Projects
- Program Estimated Budget - \$1,750,000

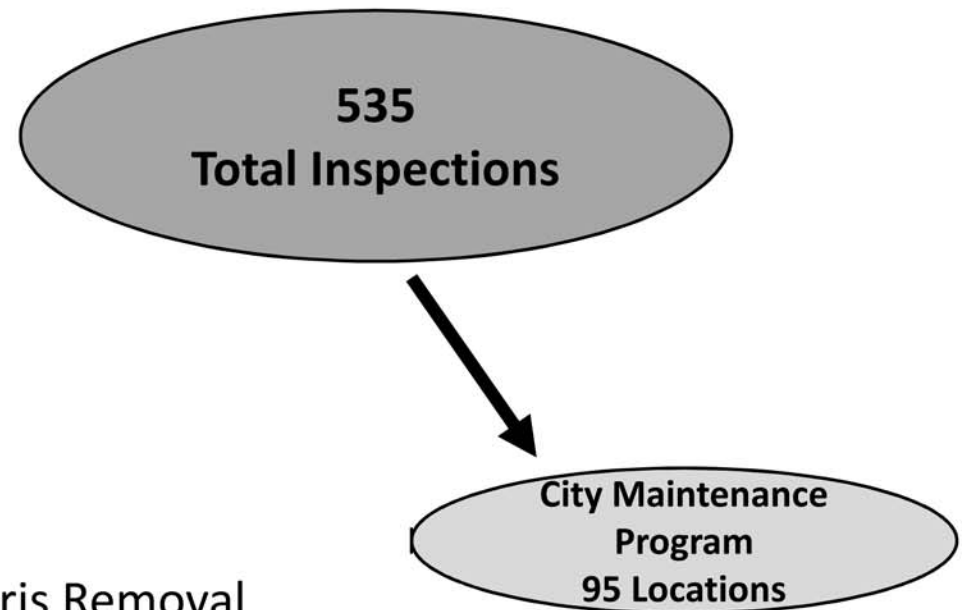
Channel Maintenance Activities

Bank Stabilization

- Infrastructure Protection
- Water Quality Improvements
- Reduces Channel Blockage Source Material

Debris Removal

- Infrastructure Protection
- Maintain Channel Capacity
- Reduces Flooding Risk





Waterways Maintenance Program - Summary

Private Property Owner Responsibilities

- Work Map and Database Identifies Public vs. Private Maintenance Responsibilities
- Education/Notification Opportunities – Yard Debris/Dump Sites

Tools Developed to Assist with Analyzing Future Inspections

- GIS Based Work Map
- Inspection and Project Area Scoring Spreadsheets
- Project Area Construction Cost Estimating Spreadsheet

Additional Services

Waterways Maintenance Program – Phase 2

Stream Riparian Corridor Enhancement Opportunities

- Channel Stabilization
- Erosion Reduction
- Improved Habitat Potential
- Focus on City park property



Questions

City Program Manager

C. Aaron Stanford, PE

Division of Engineering

EMH&T Project Manager

James Akins, CPESC

(614) 775-4389

jakins@emht.com



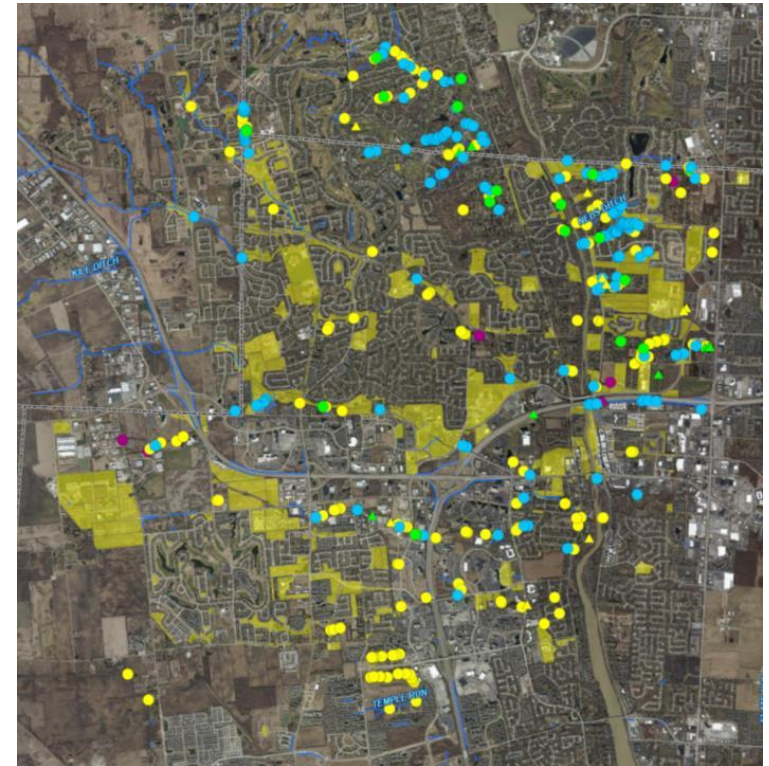


Waterway Maintenance for Private Property



Waterway Maintenance on Private Property

- 349 inspection points are located on privately owned property
- Waterways Maintenance work plan and program budget includes points located on public property or within public easements
- The City does not have a legal obligation or responsibility to maintain these portions of waterways.



Waterway Maintenance on Private Property

- Land owner has primary authority and responsibility to clear blockages on private property
- City Code does not require the City to clear blockages on private property
- The City has the ability, under certain circumstances, to require the owner to perform stream maintenance, and can also assess the cost of work back to the property owner if they would refuse to perform the maintenance and the City has the work performed.



Recommendations



Waterway Maintenance Recommendations

- Begin Program implementation in 2022
- Continue current City practice regarding waterways on private property – maintenance remains the responsibility of the property owner



MEMO

Date: April 6, 2022

To: Aaron Stanford, PE, CSSBB, Paul Hammersmith, PE, City of Dublin

From: James Akins, CPESC

Subject: Dublin Waterways Maintenance Program – Phase 1

Copies: Miles Hebert, PE, CFM, EMH&T, Dave Gleason, PE, ENVSP, Stantec

This memo summarizes Waterways Maintenance Program Phase 1 services provided by EMH&T and Stantec in assisting the City with identifying waterway maintenance needs and programmatic-level budgetary support documentation. Our findings and recommendations are a result of the review of inspection reports prepared by the Franklin Soil and Water Conservation District (FSWCD), inspection verification of a limited number of inspection locations, data analysis, and project communication with City staff.

Inspection Report Analysis

There are approximately 48 miles of waterways within the City of Dublin. FSWCD provided inspection services across these waterways on behalf of the City from 2018-2021. Inspection data and photos generated by FSWCD were provided to us by the City for analysis resulting from 535 inspection locations. Data provided within the inspection reports consisted of an Inspection ID number, inspection concern, location, and photos. Observation notes were provided for approximately half of the inspection locations. The field inspections identified locations of stream channel erosion, channel blockage, yard debris, and dump sites. Channel erosion severity was additionally classified as being minor, moderate, and major. The provided FSWCD inspection information was combined with our limited field visits and various mapping resources to formulate the documentation being provided to the City in support of developing the Waterways Maintenance Program. Provided below is a breakdown of the observations provided in the FCSWD field inspection data.

Total Field Inspection Locations = 535

- Channel Erosion = 217
- Channel/Outlet Blockage = 260
- Yard Debris = 27
- Dump Sites = 19
- Other = 12

Mapping

We worked with the City in obtaining data associated with the inspection reports and developing a GIS base map. The map identifies the inspection locations and number as indicated on the Franklin SWCD reports, and symbology based upon the reported observation. The data within the inspection reports were linked to the inspection locations along with provided photographs.

To determine the number of inspection locations the City will further evaluate and consider addressing as part of the overall Waterway Maintenance Program, we identified the inspection locations on City owned

property and on private property within a recorded drainage easement. Site improvement plans and recorded plats were provided by the City to assist with determining the location of drainage easements along waterways within, which were digitized to create a drainage easement layer within the GIS base map. It was determined that 186 of the FSWCD field inspections are located on City property or within drainage easements. Provided below is a breakdown of the FCSWD field inspection data with respect to City owned property and recorded easements.

Total Field Inspection Locations = 535

- Locations on City Property = 161
- Locations on Private Property with Drainage Easements = 25
- Locations on Private Property without Identified Drainage Easements = 349

Per the direction of the City, the 186 identified inspection locations were further evaluated to assist with the development of the Waterways Maintenance Program. The inspections were analyzed to determine maintenance needs, the 'severity' of the existing channel condition, and a preliminary estimate of the associated project cost. Provided below is a breakdown of the quantities associated with the observed channel conditions.

Waterways Maintenance Program Inspections = 186

- Erosion = 83
 - Approximately 5,590 feet of channel erosion identified resulting from field investigations and desktop review of the inspection photos and aerial imagery.
- Blockage = 89
 - Approximately 600 cubic yards of debris identified resulting from field investigations and desktop review of the inspection photos and aerial imagery.
- Dump Sites/Yard Debris = 14

The photographs associated with the inspection locations noting dump sites and yard debris were reviewed to determine if the noted observations were a result of the property owner attempting to address channel erosion. If no channel erosion condition was apparent, then these inspection locations were removed from further consideration. The City will further evaluate these locations to determine the appropriate actions, such as property owner notification and distribution of education materials to discourage this activity.

Information provided in the FSWCD reports associated with stream channel blockages did not estimate the amount of debris required to be removed, channel capacity reduction, or potential impacts to infrastructure or property resulting from flooding. Information provided within the channel erosion related inspections indicated an estimated eroded bank height but did not provide eroded bank length or an indication of potential impacts to adjacent property and infrastructure. To improve future inspection reporting, quantifiable data associated with the noted channel concerns should be collected, as well as identifying potential threats to infrastructure and property and identifying accessibility challenges by the City to address the concerns.

Inspection Report Database

Resulting from the collection of the inspection reports and GIS mapping, an overall Inspection Report Database was prepared. The database includes each inspection number, observation, and location. It also identifies whether the location is on City property, private property, or within a drainage easement. Site plan names and City assigned project numbers associated with the drainage easement mapping layer development are also identified in the database.

Inspection Location Field Investigations

To assist with evaluation of the FSWCD inspection reports and to determine the sufficiency of the provided information within the reports, some of the inspection locations were visited by representatives of the consultant team to compare to the report findings and collect additional information to assist with program development. Field investigations were conducted at 25 locations throughout the City. These locations were comprised of 20 sites on City owned property and 5 sites on private property within drainage easements. These 25 sites encompass approximately 100 of the 186 inspection locations under evaluation.

Resulting from the conducted field services, it was determined that a number of identified channel blockages were no longer present or their locations have changed. This is mainly the result of the timing of the originally performed inspections (2018 - 2021) in comparison to the field services conducted in 2022. The field visits performed by the consultant team supported the determination of the total channel bank eroded areas, estimated volume of material required to stabilize the channel bank, and the potential for impacts to infrastructure and property.

Desktop Reviews

For the 86 inspection locations not visited by the consultant team, a desktop evaluation of the inspection reports, photos, and GIS mapping was completed to estimate eroded channel area and debris accumulation associated with channel blockage concerns. Resulting from the field services and inspection desktop evaluations, quantities associated with eroded channel areas and debris material removal volumes were determined and used to assist with scoring the field inspection locations.

Individual Inspection Location Scoring

A scoring system was developed to evaluate the severity and opportunity for addressing of each of the 186 inspection locations, and each location has been assigned a score. Inspection concerns that were determined not to be currently present as a result of the field services were not included within the scoring exercise.

The scoring process and individual inspection scores are identified within the Inspection Scoring Spreadsheet. The inspection scores ranged from as low as 6 to a high score of 95. The resulting scores can be used by the City as a tool when determining priority maintenance needs. Higher scores indicate a higher potential risk to infrastructure and are either located entirely on City property or only requires establishing working agreements for access to the area of concern with a single property owner.

Project Areas

In evaluating the 186 inspection locations, Project Areas were created that include multiple contiguous field inspection locations. A total of 59 Project Areas were identified, identification numbers assigned, and locations mapped in the GIS base map. Proximity and accessibility were taken into consideration when developing the Project Areas.

Project Area Scoring

Scores were assigned to each of the 59 Project Areas, based upon the highest scored individual inspection within the grouping. Higher scores indicate an inspection location with a higher potential risk to infrastructure and are either located entirely on City property or only requires a work agreement for access to the project area from a single property owner. Scores for each Project Area are identified on the Project Area Scoring Spreadsheet. For each Project Area, adjacent inspections located on private property without a drainage easement were identified within the spreadsheet. These inspections are identified for the City's consideration.

when developing actual waterway maintenance improvement projects, but are not accounted for in the provided project costs, described below.

Project Area Opinion of Probable Construction Cost (OPCC)

To assist the City with determining a Waterways Maintenance Program budget, a preliminary Opinion of Probable Construction Costs (OPPC) was prepared for each of the 59 Project Areas. Total Project Costs were prepared that include construction, engineering, permitting and construction administration costs. A Project Cost spreadsheet was prepared and included as part of the project deliverables. The spreadsheet identifies a description of the material items along with unit costs associated with stabilizing eroded channel banks and the removal of channel blockages within the Project Areas. Assumptions made for each unit cost are identified within the various tabs included in the cost spreadsheet. In addition, a typical stream channel stabilization detail is included and was used in determining the items required to incorporate within the list of unit costs in addressing channel erosion concerns.

A total of 59 Project Costs were generated encapsulating the 186 inspection locations. The individual Project Cost spreadsheets are included in the deliverable package for evaluation by the City. The total combined Project Costs of the 59 Project Areas is \$3,040,000. The City can use this estimate to assist with developing an overall Waterways Maintenance Program annual budget.

Waterways Maintenance Program - Phase 1 Deliverables

The following documents are considered as an attachment to this memo:

- Waterways Inspection Database
- Inspection Scoring Spreadsheet (186 Inspections)
- Project Area OPCC Spreadsheet (Project Area OPCC development)
- Project Area Scoring Spreadsheet (59 Project Areas consisting of 186 evaluated inspections)
- Project Area OPCC's (59 Project Areas)
- Waterways Maintenance Program Mapping

Dublin Waterways Maintenance Program

Summary of Project Costs & Scores

Maintenance Activity	Total Estimated Cost	5-Year Program
Debris Removal	\$ 460,000	
Bank Sabalization	\$ 1,290,000	
Total	\$ 1,750,000	\$ 350,000 per year

Project Area (PA)	Blockages - Debris Removal			Erosion - Bank Stabilization			Total Project Cost				Program Year
	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	Number of Inspections	Project Cost	Highest Score	PA Ranking	
2	2	\$ 20,000	84	0	\$ -	0	2	\$ 20,000	84	1	1
4	0	\$ -	0	1	\$ 60,000	80	1	\$ 60,000	80	2	1
5	0	\$ -	0	6	\$ 200,000	80	6	\$ 200,000	80	2	1
7	0	\$ -	0	3	\$ 60,000	76	3	\$ 60,000	76	3	1
12	2	\$ 10,000	64	0	\$ -	0	2	\$ 10,000	64	5	1
											\$ 350,000
3	3	\$ 60,000	68	1	\$ 40,000	68	4	\$ 100,000	68	4	2
10	2	\$ 20,000	64	0	\$ -	0	2	\$ 20,000	64	5	2
13	1	\$ 30,000	63	1	\$ 40,000	60	2	\$ 70,000	63	6	2
19	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
20	1	\$ 10,000	60	0	\$ -	0	1	\$ 10,000	60	7	2
17	3	\$ 20,000	60	0	\$ -	0	3	\$ 20,000	60	7	2
18	0	\$ -	0	1	\$ 120,000	60	1	\$ 120,000	60	7	2
											\$ 350,000
23	1	\$ 10,000	56	0	\$ -	0	1	\$ 10,000	56	8	3
22	1	\$ 10,000	51	1	\$ 60,000	56	2	\$ 70,000	56	8	3
28	0	\$ -	0	7	\$ 180,000	54	7	\$ 180,000	54	9	3
16	0	\$ -	0	1	\$ 50,000	52	1	\$ 50,000	52	10	3
24	0	\$ -	0	1	\$ 40,000	48	1	\$ 40,000	48	12	3
											\$ 350,000
32	2	\$ 20,000	51	0	\$ -	0	2	\$ 20,000	51	11	4
44	0	\$ -	0	3	\$ 60,000	48	3	\$ 60,000	48	12	4
27	1	\$ 10,000	12	6	\$ 130,000	48	7	\$ 140,000	48	12	4
29	0	\$ -	0	10	\$ 130,000	48	10	\$ 130,000	48	12	4
											\$ 350,000
25	0	\$ -	0	1	\$ 80,000	36	1	\$ 80,000	36	13	5
39	0	\$ -	0	1	\$ 40,000	36	1	\$ 40,000	36	13	5
42	2	\$ 20,000	34	0	\$ -	0	2	\$ 20,000	34	14	5
43	2	\$ 10,000	27	0	\$ -	0	2	\$ 10,000	27	15	5
30	1	\$ 20,000	21	0	\$ -	0	1	\$ 20,000	21	16	5
8	5	\$ 40,000	16	0	\$ -	0	5	\$ 40,000	16	17	5
21	2	\$ 10,000	12	0	\$ -	0	2	\$ 10,000	12	18	5
49	1	\$ 10,000	11	0	\$ -	0	1	\$ 10,000	11	19	5
48	2	\$ 10,000	11	0	\$ -	0	2	\$ 10,000	11	19	5
31	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
51	1	\$ 10,000	10	0	\$ -	0	1	\$ 10,000	10	20	5
53	2	\$ 10,000	10	0	\$ -	0	2	\$ 10,000	10	20	5
52	2	\$ 20,000	10	0	\$ -	0	2	\$ 20,000	10	20	5
38	4	\$ 20,000	10	0	\$ -	0	4	\$ 20,000	10	20	5
54	1	\$ 10,000	9	0	\$ -	0	1	\$ 10,000	9	21	5
55	1	\$ 10,000	8	0	\$ -	0	1	\$ 10,000	8	22	5
59	1	\$ 10,000	7	0	\$ -	0	1	\$ 10,000	7	23	5
											\$ 350,000
	51	\$ 460,000		44	\$ 1,290,000		95	\$ 1,750,000			

MEMORANDUM

TO: Dana L. McDaniel, City Manager

FROM: Jennifer D. Readler, Law Director
Jesse J. Shamp

DATE: April 8, 2022

RE: Stream Clearing and Maintenance Obligations

I. BACKGROUND

The City of Dublin partnered with the Franklin County Soil and Water Conservation District and EMH&T to conduct a large, 400 inspection point, waterway analysis within the City (the “Analysis”). The Analysis was conducted to review blockages, bank stabilization, and other potential waterway concerns within the City. The Analysis revealed multiple points of concern which included 157 issues on City-owned property while the remainder fell on privately owned property. The cost of remediation for these erosion issues will likely be significant.

Relatedly, last fall, a large sycamore tree fell across a stream between two properties located near Coffman Road and Brand Road in Washington Township (“Township”). Neither of these properties or the stream between the properties is located within the corporate limits of the City (although they do fall within a pocket of the Township that is surrounded by the City). The two property owners cleared the tree from their respective yards, but the tree removal company advised them that the Township was required to clear the portion of the large tree crossing the stream. The remains of the tree within the stream, combined with recent rainfall, is now causing flooding into the rear yards of the affected and adjacent properties.

The Township’s legal counsel advised that the Township has neither a duty nor the authority to remove the tree from the stream. Under Ohio common law, the land beneath and next to a stream is the property of the adjacent landowners while the water flowing through the stream is a “public good” and not ownable by any party. Eric Richter, the Township Administrator, reached out to the City regarding its position on the blockage within the Township.

The Law Department was asked to provide an overview of a strategy for implementing necessary stream maintenance within the City and an opinion as to the Township attorney’s position on the Township blockage.

II. QUESTIONS PRESENTED AND BRIEF ANSWERS

A. Part One – The City

Whose legal duty is it to conduct stream maintenance within the City? What is the best approach for implementing the stream maintenance that needs to be undertaken based on the Analysis?

A landowner has the primary authority and responsibility to clear stream blockages on private property. The City Code does not require the City to clear such blockages. However, if the City so desires, there are circumstances in which the City can undertake the duty of clearing stream blockages. Generally, the City would need to execute right of entry agreements with private property owners to permit City employees or contractors to enter private property to perform stream maintenance work if the City decided to undertake such a responsibility.

B. Part Two – The Township

Who is responsible, or permitted, to clear stream blockages within the Township?

The Township attorney's legal opinion regarding the Township's obligations and authority to clear streams is generally correct, with one caveat. It did not address Ohio R.C. 505.82 which grants authority to township trustees to clear stream blockages and charge the costs for such removal to the property owner. The City has no responsibility to clear stream blockages outside of its corporate limits.

III. ANALYSIS

A. Part One – The City

The Ohio Department of Natural Resources (ODNR) publishes helpful guides about common issues that face landowners and government entities with respect to streams, forests, and other natural features. Two guides relevant to this discussion are attached to this memorandum for further background information. In the Stream Debris and Obstruction Removal Guidance, the ODNR makes clear that the Ohio Revised Code does not impose a duty upon municipalities to remove obstructions from streams, but that a municipality does have the authority to undertake that duty if it so desires.

Ohio R.C. 715.47 provides that “[a] municipal corporation may fill or drain any lot or land within its limits on which water at any time becomes stagnant, remove all putrid substances from any lot, and remove all obstructions from culverts, covered drains, or private property, laid in any natural watercourse, creek, brook, or branch, which obstruct the water naturally flowing therein, causing it to flow back or become stagnant, in a way prejudicial to the health, comfort, or convenience of any of the citizens of the neighborhood.” The permissive language of this section makes clear that a city is not barred from enacting legislation that permits entrance to private property to remove obstructions of waterways.

Dublin Zoning Code, Section 94.04 states that “[n]o person shall fail to comply with the following requirements within the lawful time after service or publication of the notice or

resolution is made as required by law: ... [to] remove all obstructions from culverts, covered drains or natural watercourses as provided in R.C. 715.47.” Moreover, Section 95.08(E) of the Dublin Zoning Code states that “[n]o owner, occupant, or person in charge of any lot or parcel of ground shall cause or permit water to accumulate thereon and become stagnant, permit culverts, drains, or other natural watercourses thereon to become obstructed, or cause or permit any putrid or unsanitary substance to accumulate thereon.” If the property owner fails to remedy an obstruction, the City can perform or contract for the work and then place a lien against the property owner for the costs. But again, the City is not obligated to take this action.

Westerville codified a similar example clarifying its authority to enter private property to remove waterway obstructions. Its zoning code defines such obstructions as public nuisances and in W.C.O. 1175.04, the City prohibits the maintenance of any public nuisance and includes, as one example, “[a]ny improper or inadequate drainage on property which causes flooding, interferes with the use of, or endangers in any way the streets, sidewalks, parks or other City-owned property of any kind; *or any unauthorized condition which blocks, hinders, or obstructs in any way, the natural flow of branches, streams, creeks, surface waters, ditches or drains.*” After notice and an opportunity to correct, it then permits the City Zoning Officer to abate the nuisance and assess costs to the owner.

The City Code does contain two other chapters (Chapter 53–Stormwater Management and Stream Protection; Chapter 151–Flood Control) that could impose stream maintenance obligations on private property owners within the City in the future. However, the areas in which these chapters can be enforced are somewhat limited.

Chapter 53 only applies to developments within the City. Developments are required to have a stormwater management system designed for flood protection, erosion control, and pollution abatement. Chapter 53 also outlines stream corridor protection zones (“SCPZ”) and the regulations specific to those zones such as a prohibition on drilling or using motorized vehicles within an SCPZ.

Chapter 151 applies to “all areas of special flood hazards within the jurisdiction of the city.” The special flood hazard areas are designated by the “Flood Insurance Stud[ies]” for Franklin, Delaware, and Union counties. Section 151.05 indicates that no structure or land can be altered without the applicant being in full compliance with the provisions of such chapter. Chapter 151 outlines the regulations imposed to reduce the chances of a flooding. For example, the regulations in Chapter 151 relate to fill activities, the floodway, anchoring, and utilities. As review of these chapters concluded, it became clear that while these chapters could have application to stream maintenance matters under certain circumstances, they will generally not be the most relevant on this issue given their limited application.

The Law Department consulted with the Engineering Department and concluded that the City did not make any commitments regarding stream blockages or maintenance in the City’s new Community Plan. Thus, no City policies appear to create an obligation for the City to undertake any stream maintenance on private properties. As outlined above, if a private property owner fails to remove blockages from streams, the City can use the Zoning Code as an enforcement mechanism. Alternatively, if the City does not want to wait for the property owner to perform the

work, it could execute a right of entry with said property owner and then perform the work at its own cost.

B. Part Two – The Township

As to the tree that fell within Washington Township, the opinion of the Township’s legal authority is generally correct and accurately recites the common law provisions regarding stream maintenance. There is one provision that could permit the Township Trustees to act to remove the obstruction. Under Ohio R.C. 505.82, township trustees can adopt a resolution declaring an emergency that threatens life or property and that requires the owner of “an undedicated road or stream bank in unincorporated territory” to remove “snow, ice, debris, or other obstructions from the road or bank.” If the owner declines, the township can remove the obstruction and charge the costs back to the landowner. The application of this code section would require including the stream bed within the “stream bank” and, at this time, there has not been any case law on this provision.

The Dublin City Code does not obligate the City to clear trees or other debris that has fallen across streams on private property outside of its corporate limits. The City Code does have a Stormwater Management and Stream Protection chapter, but that chapter expressly applies to areas within the development jurisdiction of the City as explained above.

Based on the updated information provided by the Township Administrator, the Township is likely going to take action to remove the obstruction in this case. If the City did decide to become involved in the Township tree matter the potential future implications should be considered. Meaning, if the City decides to assist a Township resident in funding the removal of an obstruction residents of the City will likely expect the City to remedy all stream blockages within in the City moving forward.

IV. CONCLUSION

The City does not have a legal obligation to provide stream maintenance (including blockage removal) on private properties within the City. The City does have the ability, under certain circumstances, to require a private property owner within the City to conduct stream maintenance or, if the property owner refuses, to complete the necessary maintenance and assess the costs of such work back to the property owner. Also, if the City decided that it wanted to undertake the costs of such work, it could execute a right of entry with the property owner so that the City could legally enter the property to perform the necessary work.

As to any issues outside of the corporate limits, the City has no obligation to perform stream maintenance.

Waterways Maintenance Program

GIS Workmap Link

Below is a link to a web map that shows the locations of the inspections completed as part of the Waterways Maintenance Program. Clicking on each inspection point provides additional information, including ownership data, type of issue, and any pictures of an observed issue. Some inspection points have multiple pages of data to scroll through in each dialogue box. Scrolling in on the map also shows outlines of the projects referenced in the staff memo and associated presentation. Further, there is a legend on the lower left of the map that expands when clicked which defines the different shapes and colors of the inspection points. If there are any questions regarding the map please refer them to Paul Hammersmith or Aaron Stanford and they will be happy to help.

<https://dublinohio.maps.arcgis.com/apps/instant/interactivelegend/index.html?appid=822030ca7d0847b591f12a1aa0f15a95>