City of Hudson Storm Water Update

November 27, 2012

City of Hudson Engineering Department

City of Hudson Storm Water Management Program

- In July, 2003, Hudson received over 17 inches of rain from three storm events within 24 hours and the City sustained damage within all three watersheds in Hudson. As a result, the City created a Long-Term Action Plan to identify new capital initiatives that would improve our ability to withstand future storm water flooding in the three watersheds (Mud Brook, Brandywine Creek and Tinker's Creek).

- In 2000, the City created a Storm Water Utility Fee to help fund future studies and capital storm water improvements. In 2004, the first drainage study was completed in the Upper Tinker's Creek Watershed. In 2005, the Storm Water Utility was replaced as part of the 1% income tax increase. In 2006, the Mud Brook Watershed Study was completed. Both the Tinker's Creek and Mud Brook studies analyzed the specific watersheds and created an action plan for improvements.

- Due to the severity of damage from the 2003 flood in the Brandywine Creek Watershed, numerous immediate projects were identified and completed in lieu of a comprehensive watershed study.

Topics of Presentation

- Review of three major watersheds including:
  - Mud Brook Watershed
  - Brandywine Creek Watershed
  - Tinker's Creek Watershed
- Project review for each watershed
- Public Works and Maintenance Programs
- National Pollutant Discharge Elimination System Phase II

Mud Brook Watershed

- The Mud Brook Watershed is in southwestern Hudson and totals 10.6 square miles.
- This area was called the “Great Hudson Swamp” on maps and was in existence when the first settlers came to Hudson.
- The Mud Brook Study was developed using the 2003 flood locations, existing land use data and topology.
- The analysis of Mud Brook and its tributaries was performed using the U.S. Army Corp. of Engineer’s “Hydraulic Engineering Center River Analysis System” (HEC-RAS) software.
- The model was then calibrated using adjustments from field observations, surveys and data reports.
- Proposed improvements were developed from the model including maintenance, various constructible improvements and regional storm water management ponds.
- Of the ten (10) significant improvements noted in the study, three (3) have been completed, four (4) on on-going and three (3) require further study.

Completed Mud Brook Watershed Projects

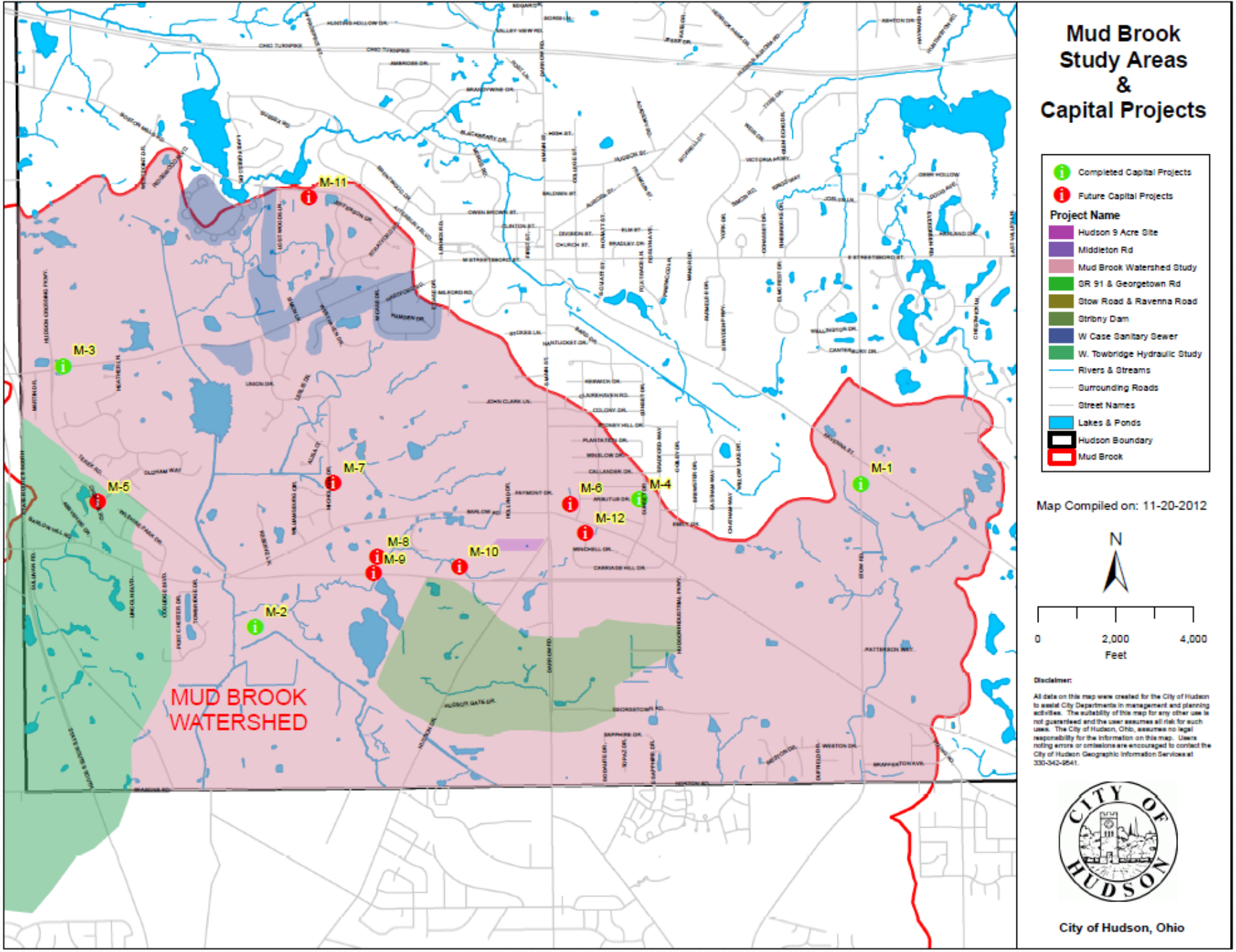
Project No.	Name	Completion Date	Cost
M-1	Stow Road and Valley View Road Storm Sewers	2005	$277,063
M-2	Mud Brook Mitigation Site	2009	$126,365
M-3	SR 303 / Terex Road Culvert Replacement	2011	$177,844
M-4	2011 Storm Sewer Lining	2011	$25,000

Total to Date: $606,272

Future Mud Brook Watershed Projects

Five Year Plan

Project No.	Name	Cost
M-5	Nottingham Gate Development Storm Water Outlet Replacement Project *Maintenance Project to alleviate clogging at pond outlet structure.*	$150,000
M-6	Argyle Drive / CVS Drainage Study *Area identified in '06 Mud Brook Watershed Study aimed at alleviating rear yard flooding in neighborhood.*	$75,000
M-7	Ellsworth Meadows Study @ Nicholson Outfall *Area identified in '06 Mud Brook Watershed Study aimed at alleviating property flooding.*	$40,000
M-8	Mud Brook Tributary Ditch Improvements Ph. 1 *Area identified in '06 Mud Brook Watershed Study. Culvert upsizing project aimed at alleviating driveway overtopping.*	$75,000
M-9	Mud Brook Tributary Ditch Improvements Ph. 2 *Area identified in '06 Mud Brook Watershed Study. Culvert upsizing project aimed at alleviating driveway overtopping.*	$90,000
M-10	Willows Pond Project (Koberna Property) *Area identified in '06 Mud Brook Watershed Study. Regional detention pond to control downstream flooding to homes.*	$1,400,000
M-12	Gibson Court Storm Lining *Maintenance project on 42" dia. metal pipe that is deteriorating and needs serviced.*	$70,000.00
		Total: $1,900,000



Mud Brook Study Areas & Capital Projects

- Completed Capital Projects
- Future Capital Projects

Project Name

- Hudson 9 Acre Site
- Middleton Rd
- Mud Brook Watershed Study
- SR 91 & Georgetown Rd
- Stow Road & Ravenna Road
- Stribny Dam
- W Case Sanitary Sewer
- W. Towbridge Hydraulic Study
- Rivers & Streams
- Surrounding Roads
- Street Names
- Lakes & Ponds
- Hudson Boundary
- Mud Brook

Map Compiled on: 11-20-2012

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Brandywine Creek Watershed

- The Brandywine Creek Watershed experienced the most flood damage in 2003. Immediate action was taken, including stream cleaning, major culvert improvements, bridge improvements and regional pond improvements.

- The Brandywine Watershed is in the central and northwestern portion of Hudson. It includes approximately 7 .9 square miles of the City.

- The Engineering Department is developing FEMA Letters of Map Revision (LOMR) for both Brandywine Creek and Brandywine Creek Tributaries ,due to significant improvements in flood management. The LOMRs use HEC-RAS software, similar to software used in Mud Brook Watershed, was used to analyze existing stream channel and flood conditions.

- The future improvements will continue to alleviate flooding and improve the water quality within the watershed.

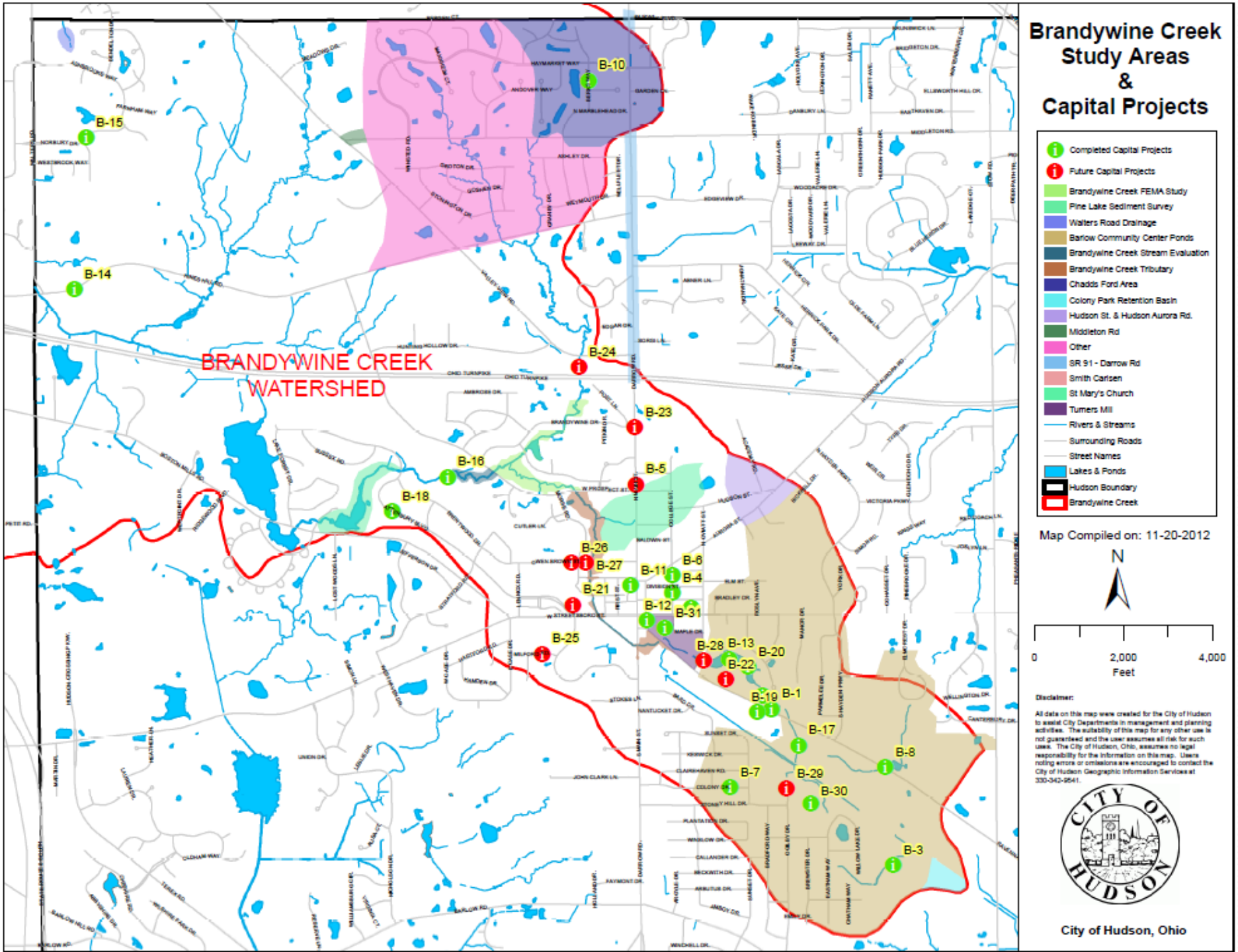
Completed Brandywine Creek Projects

Project No.	Name	Completion Date	Cost
B-1	S.E. Brandywine Creek Tributary Ditch Cleaning & Maintenance (Ravenna St.)	2003	$199,400
B-2	Brandywine Creek Phase II Improvement	2004	$99,689
B-3	Chatham / Carver Ditch Maintanence & Cleaning	2005	$34,844
B-4	2006 Storm Sewer Lining (Church, Division & Easement to Aurora St., Weymouth)	2006	$135,103
B-5	Colony Park Detention Basins	2007	$437,097
B-6	2007 Catch Basin Replacement (Historic Area)	2007	$58,045
B-7	Turner's Mill Culvert Replacement	2008	$167,742
B-8	Ravenna Street Culvert Replacement	2008	$57,835
B-9	2008 Catch Basin Replacement (Historic Area)	2008	$52,447
B-10	2008 Storm Sewer Lining (Haymarket, Berk's Way, Lasacala etc.)	2008	$280,006
B-11	Clinton St. Alley Sanitary & Storm Imp. Project	2009	$141,229
B-12	2009 Storm Sewer Lining (Turner's Mill Area)	2009	$74,608
B-13	Barlow Community Center Culvert Improvement	2010	$243,822
B-14	Hines Hill Culvert Replacement	2010	$45,575
B-15	2010 Storm Sewer Lining (Goshen, Norburry)	2010	$154,004
B-16	Brandywine Creek FEMA LOMR	2011	$30,000
B-17	Brandywine Creek Tributary FEMA LOMR	2011	$50,000
B-18	Atterbury Boulevard Improvement Project	2012	$91,400
B-19	Brandywine Creek Stream Bank Stabilization	2012	$78,528
B-20	Barlow Community Center East Pond Imp.	2012	$190,375
			Total to Date: $2,621,749

Future Brandywine Creek Projects

Five Year Plan

Project No.	Name	Cost
B-21	Norfolk & Southern RR Culvert. *Culvert to be upsized to alleviate flooding at Versailles Condominiums.*	$350,000
B-22	Barlow Community Center Pond Improvements *Project to remove existing trees/brush at dam(s), and install new grass, per ODNR Dam Inspection. Also need to repair storm sewer at outlet due to separation from headwall.*	$30,000
B-23	Brandywine Drive Additional Catch Basins at SR 91 *Project to alleviate roadway icing via installation of new storm sewer and catch basins.*	$35,000
B-24	Brandywine Creek/Turnpike Storm Management Study *Area storm water study to review potential for regional storm water pond on north side of I-80 on Brandywine Creek.*	$40,000
B-25	Milford Road Storm Sewer Replacement *Existing catch basin and storm sewer crossing in need of replacement.*	$25,000
B-26	Owen Brown HPP Salt Barn Secondary Containment (NPDES-OEPA) *Containment of spillage of brine tanks required per Ohio EPA NPDES Regulations. Project will include installation of new concrete berm and storm sewers as applicable.*	$25,000
B-27	HPP Bio Swale at Brandywine Creek *Project to re-route contaminated storm sewer runoff into proposed bio-swale before entering Brandywine Creek.*	$25,000
B-28	Barlow Pond Outlet Structure *Rehabilitation of upper pond outlet structure and overflow required due to ODNR Dam Inspection.*	$50,000
B-29	Colony Park Improvements (Parking Lot) *48" metal pipe under parking lot is deteriorating and is in need of repair via replacement or lining.*	$50,000
B-30	Brandywine Creek Bridges at Brandywine Drive and Blackberry Drive *Bridges in need of repair and hydraulic improvements. $600,000 funding via Municipal Bridge Grant.*	$260,000
B-31	Heather Lane Drainage @ Inverness Court *Project to improve upon existing City provided storm sewerage and alleviate multiple rear yard flooding.*	$45,000
B-32	Boston Mills Road Storm Water Improvement - Design *Study completed in 2012. Storm sewer installation project to alleviate flooded properties and driveways.*	$30,000
		Total: $915,000



Brandywine Creek Study Areas & Capital Projects

- Completed Capital Projects
- Future Capital Projects
- Brandywine Creek FEMA Study
- Pine Lake Sediment Survey
- Walters Road Drainage
- Barlow Community Center Ponds
- Brandywine Creek Stream Evaluation
- Brandywine Creek Tributary
- Chadds Ford Area
- Colony Park Retention Basin
- Hudson St. & Hudson Aurora Rd.
- Middleton Rd
- Other
- SR 91 - Darrow Rd
- Smith Carlsen
- St Mary's Church
- Turners Mill
- Rivers & Streams
- Surrounding Roads
- Street Names
- Lakes & Ponds
- Hudson Boundary
- Brandywine Creek

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Tinker's Creek Watershed

- The Tinker's Creek Watershed is primarily in the northeastern section of Hudson and encompasses 7.2 square miles.
- The Tinker's Creek Study was developed using known flooding locations, existing land use data and topology from Summit County GIS system and known storm sewer system components.
- Analysis was made using EPA's "Storm Water Management Model" (SWMM), hydraulic modeling software. This software models both open and closed conduits.
- The study provided an overview of flooding and erosion issues in known problem areas.
- The model was calibrated using adjustments from field observations and reports.
- The proposed improvements were developed from the model including flood plain preservation, sewer/culvert improvements and regional storm water management ponds.
- A more detailed study for the entire watershed will be required to further identify the most beneficial improvements possible.

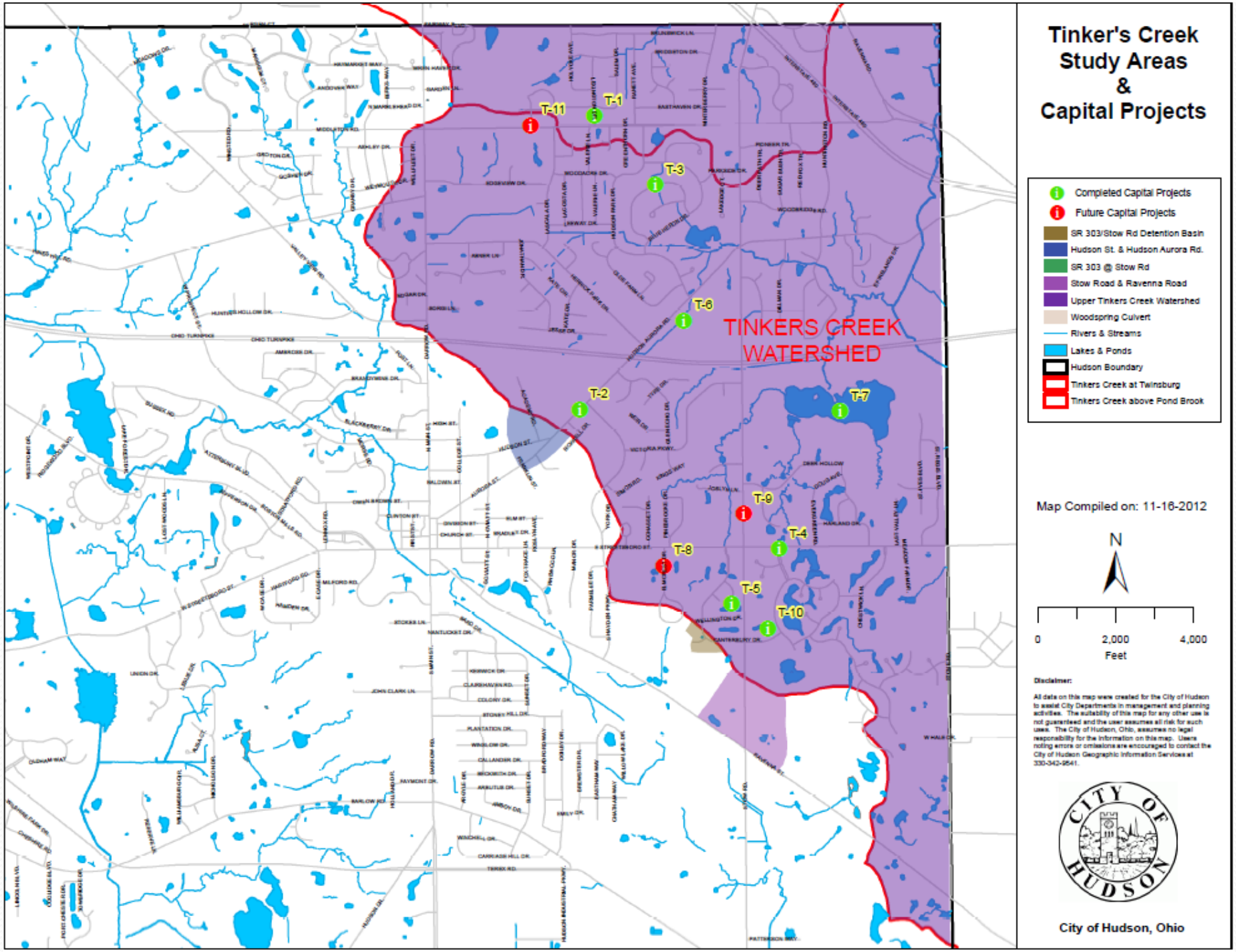
Completed Tinkers Creek Projects

Project No.	Name	Completion Date	Cost
T-1	Middleton at Lexington Storm Sewer Improvement	2003	$63,950
T-2	Aurora Street Drainage Improvement	2007	$44,593
T-3	Woodspring Culvert Replacement	2007	$75,200
T-4	E. Streetsboro at Hollis Blvd. Storm Sewer	2009	$11,982
T-5	Dunbarton Dr. & Exline Cir. Retention Pond Structure Modifications	2010	$48,400
T-6	Hudson High School Land Lab	2012	$250,000
			Total to Date: $494,125

Future Tinkers Creek Projects

Five Year Plan

Project No.	Name	Cost
T-6	Middleton Road/Wake Robin Storm Sewer Improvements *Culvert replacement and ditch enclosure project at intersection to move ahead of Akron Water Line replacement project.*	$60,000
T-7	Tinkers Creek Watershed Study *Detailed Study of entire watershed to more accurately define our plan for improvements.*	$150,000
T-8	Elmcrest Storm Sewer Lining *Approximately 1,000 feet of storm sewer needs lined to alleviate numerous sink holes adjacent to street.*	$50,000
T-9	SR303 and Stow Road Ditch Improvements *Roadside ditches and culverts backup during rain events and need evaluated for capacity.*	$40,000
		Total: $246,000


Tinker's Creek
Study Areas
&
Capital Projects
Completed Capital Projects
Future Capital Projects
SR 303/Stow Rd Detention Basin
Hudson St. & Hudson Aurora Rd.
SR 303 @ Stow Rd
Stow Road & Ravenna Road
Upper Tinkers Creek Watershed
Woodspring Culvert
Rivers & Streams
Lakes & Ponds
Hudson Boundary
Tinkers Creek at Twinsburg
Tinkers Creek above Pond Brook
TINKERS CREEK
WATERSHED
T-1
T-2
T-3
T-4
T-5
T-6
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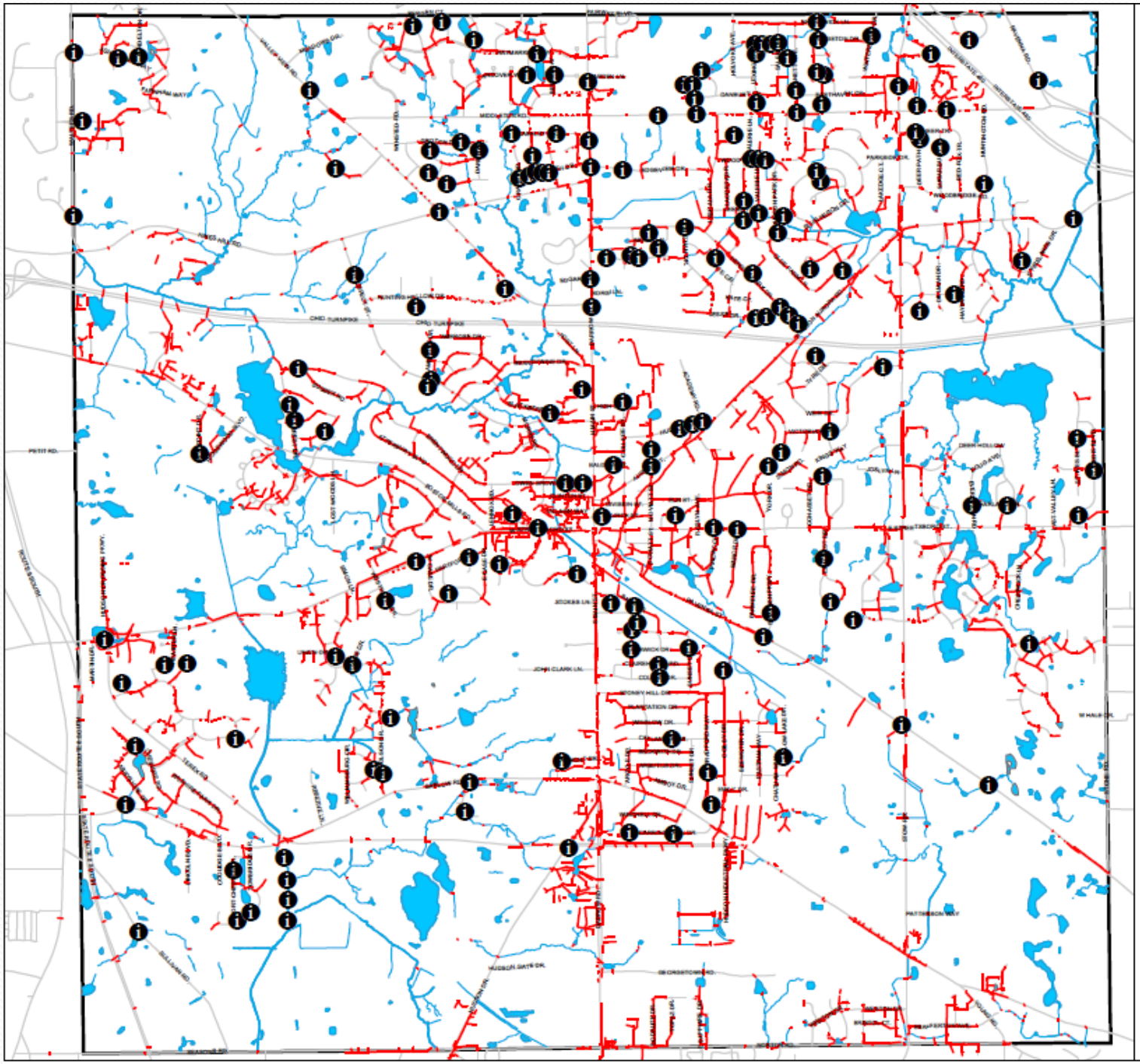
Maintenance

Public Works provides day-to-day operations and maintenance including:

- ❖ Inspection of stream, ponds and structures
- ❖ Video of storm sewer system components
- ❖ Cleaning of City-owned infrastructure
- ❖ Repair/Replacement of aged or inferior sewers and structures

Public Works inspects, cleans or maintains…

- 119 miles of storm sewers and culverts
- 5,079 catch basins
- 1,035 manholes
- 205 neighborhood/regional storm water management ponds
- 93 miles of streams, ditches and creeks



Service Department Storm Projects & Infrastructure

- Service Dept. Storm Projects
- Storm Lines
- Rivers & Streams
- Lakes & Ponds
- Hudson Boundary

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EPA's NPDES Phase II

- In 2003, the Ohio EPA mandated the National Pollutant Elimination System (NPDES), Phase II to smaller communities with populations less than 100,000, like Hudson.

- The NPDES Program aims to improve water quality by regulating point sources that discharge pollutants into rivers, lakes and streams.

- The City submits an annual report to the Ohio EPA to ensure compliance.

- The program requires implementation of Six Minimum Control Measures:
  - Public Education and Outreach
  - Public Participation and Involvement
  - Illicit Discharge Detection and Elimination
  - Construction Site Runoff Control
  - Post-Construction Site Runoff Control
  - Pollution Prevention and Good Housekeeping

- Coordinated efforts between Public Works and Engineering Departments.

Summary & Future Goals

- Move forward with known projects, totaling $3,061,000.
- Perform a detailed study of the Tinker's Creek Watershed
- Continue with efforts in the Mud Brook Watershed over the next five years.
- Work with Northeast Ohio Regional Sewer District (NEORSD) within Brandywine Creek Watershed on upcoming storm water projects including bridge replacement and regional pond development. Proposed funding from NEORSD is approximately $108,000.
- Update the City's Long-Term Storm Water Action Plan.
- Continue to maintain and inspect bridges, which are currently in good condition.
- Continue to maintain the existing, aging, storm water system, including annual inspections of major culverts.
- Continue to alleviate flooding issues throughout City, focusing on regional and neighborhood drainage solutions.
- Improve water quality and environmental protection through best management practices, City initiatives and the EPA's NPDES Phase II program.

Discussion