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Date: February 7, 2019

To: City Council and Mayor

C: Jane Howington, City Manager
Thomas J. Sheridan, P.E., P.S., CFM, Assistant City Manager – Professional Services

From: Bradley Kosco PE., PS., City Engineer *BN*

Re: **Summary of Brandywine Creek Watershed Study**

City Council and Mayor,

Within the North East Ohio Regional Sewer District's (NEORSD) Stormwater Management Program, NEORSD is responsible for the regional stormwater system (storm water systems with a drainage area of 300 acres or more) in Hudson's Brandywine Creek watershed. In 2017, NEORSD began the Cuyahoga River South Stormwater Master Plan to help identify regional storm water problems and recommend solutions, including a prioritized list of construction and maintenance projects. The plan was to also develop NEORSD's inspection/maintenance schedules, policy recommendations, and the rationale for the recommendations.

The City of Hudson contracted with NEORSD's engineering consultant, CDM Smith, Inc. to expand the NEORSD Master Plan and hydraulic model to include study and evaluation of Hudson-specific areas of concern within Brandywine Creek watershed.

Below is a summary of the Hudson local study including goals, findings and recommendations.

Study Goals and Development

CDM Smith first began building the new study and hydrologic/hydraulic (H&H) model by meeting with the City to identify problem areas of concern, collecting available records (GIS, plans, existing aerial survey, previous studies, City/NEORSD field inspections, surface and soil types, etc.) and inputting the data into EPA's SWMM modeling software along with historical rainfall data for the region. Model results were compared to stream/rainfall gauge data and recorded field observations. The model was then calibrated used for proposed improvement analysis.

The consultant subdivided the Brandywine Creek watershed into 18 sub-areas or Project Areas (Brandywine Project Areas or BRPA). 14 of the BRPA's are within the City of Hudson (see map p. 4 of report and attached). Each chapter of the study reviewed the Project Area's storm water assets including the main creek branch, transportation crossings, storage features and nearby buildings that could be affected by the storm water system. Solutions to identified problems were separated into two categories: (a) Baseline Solutions - practices/projects that preserve/restore the storm water system like riparian area protection, debris/sediment removal or maintenance and (b) System Enhancements – practices/projects that increase the function of the storm water system like flood plain creation, property acquisition, increased storage and new storm conveyance systems.

The analysis also included 22 specific areas of concern identified by City staff (see list p.5 of report).

Within each Project Area, system enhancement projects were identified, grouped together if they are interdependent to each other (i.e. increase size of Owen Brown Bridge to alleviate flood impacts at road and increase storage downstream of bridge) and ranked using the following criteria:

- Economics (construction/life cycle costs, flood damage mitigation, structural damage)
- Environmental/Stream Function (stream stability, biology, pollutant loading)
- Operations and Maintenance (frequency, simplicity)
- Implementation (ease of construction and impacts, property acquisition, regulatory issues)

Scores ranging from -2 to +2 were assigned to each category and an overall Project Benefit Score was defined along with sequencing of projects and a preliminary project cost estimate.

Study Results

A summary of the project priority ranking, score and estimated cost is provided on p. 67 of the report and copied below. Individual project cost estimates are provided in Appendix B of the study.

Appendix C provides Project Definition Statements which are a summary of each project area and includes a map, identified assets, found problems, recommended solutions and cost estimates.

Staff Recommendations

Of the 25 proposed project, two projects; the Ingleside Drive bridge project (BRPA09) and Ohio Turnpike/Valley View Detention Pond project (BRPA18), are under design and are already budgeted in the Hudson Five Year Plan 2019-2023. Two other projects, Owen Brown Street bridge replacement (BRPA14, project estimated cost = \$1.5-1.8 million) and the Barlow Community Center Improvements (BRPA13, project estimated cost = \$1.75-\$2.0 million) are scheduled to be partially funded via an upcoming grant from NEORSD and constructed within the next 2-3 years (if funded).

Staff recommends that priority be given to maintenance items, like the Ravenna Street culvert replacement project (BRPA14). These projects preserve existing infrastructure and should be coordinated with Hudson Public Works and other applicable agencies.

Flood mitigation projects using City-owned property like the expansion of Colony Park Ponds (BRPA16) , introduction of new detention storage on City property southwest of the existing Fire Station at #40 S. Oviatt Street and the Rosewood Grille at #36 E. Streetsboro Street (BRPA14, BRPA17); a new storm sewer at the Norfolk-Southern RxR and along Morse Road (BRPA15) should be further studied, developed and included in upcoming budgets.

Priority	Project Area ID	Project Benefit Score	Recommended Project(s) and Suggested Sequencing	Estimated 2018 Construction Cost
1	BRPA12	85	1. Acquire three residential properties and restore floodplain. <i>(7429 Wetherburn Way, 1655 Groton Dr. 1695 Goshen Dr.)</i>	\$1,865,000
2	BRPA18	83	1. Expand floodplain and naturalize channel/riparian area. <i>(current project)</i>	\$2,691,000
3	BRPA15	81	1. Install storm sewer along Morse Road <i>(from RxR tracks)</i> , integrated with planned development, from railroad crossing to floodplain north of Owen Brown Street	\$457,000
4	BRPA09	75	1. Replace Ingleside Dr. crossing <i>(current project)</i> 2. Restore stream within footprint of Pine Lake and install in-stream weir in existing embankment to maximize storage <i>(private property)</i>	\$3,643,000
5	BRPA10	73	1. Install offline detention facility in vacant parcel northeast of RR. <i>(City property)</i>	\$2,177,000
6	BRPA07	60	1. Stabilize E. Hines Hill Rd. crossing abutment <i>(near YDC property)</i> 2. Stabilize channel upstream of Norfolk Southern Railroad crossing <i>(outside agency)</i> 3. Replace failing crossing, install orifice plate/in-stream weir to increase floodplain/wetland detention, 4. Restore storage in existing detention basin <i>(YDC property)</i> 5. Add 2-stage channel with sinuosity.	\$6,387,000
7	BRPA17	56	1. Install basins at Hudson Middle School and Rosewood Grill <i>(36 E. Streetsboro St.)</i> .	\$1,628,000
8	BRPA16	17	1. Increase detention storage in two Colony Park basins 2. Build new basin upstream of Barlow upper lake <i>(City property)</i> .	\$3,827,000
9	BRPA11	10	1. Relocate driveway/remove existing crossing <i>(6956 Post Lane)</i> 2. Convert existing basin to WQ basin and stabilize streambanks <i>(private property pond for Winston Manor Subd.)</i>	\$1,146,000
10	BRPA13	2	1. Increase floodplain storage downstream of Owen Brown St <i>(City property)</i> . 2. Replace Owen Brown St. crossing <i>(potential NEORS Grant project)</i> 3. Add bank stabilization and microhabitat features to enhance habitat and stability while not diminishing conveyance capacity <i>(City property)</i>	\$2,655,000
11	BRPA14	-2	1. Stabilize streambanks to protect BTUs 2. Replace Ravenna St. crossing <i>(near 46 Ravenna St.)</i> 3. Increase storage of Barlow upper lake and install operational control to regulate lake levels <i>(potential NEORS Grant project)</i> 4. Install storm sewer to redirect flow south of railroad to wetland in Veterans Park 5. Install detention west of Hudson Fire Department <i>(40 S. Oviatt St)</i>	\$1,823,000
Total Estimated Construction Cost				\$28,299,000
Per January 25, 2019 CDM Smith Report				

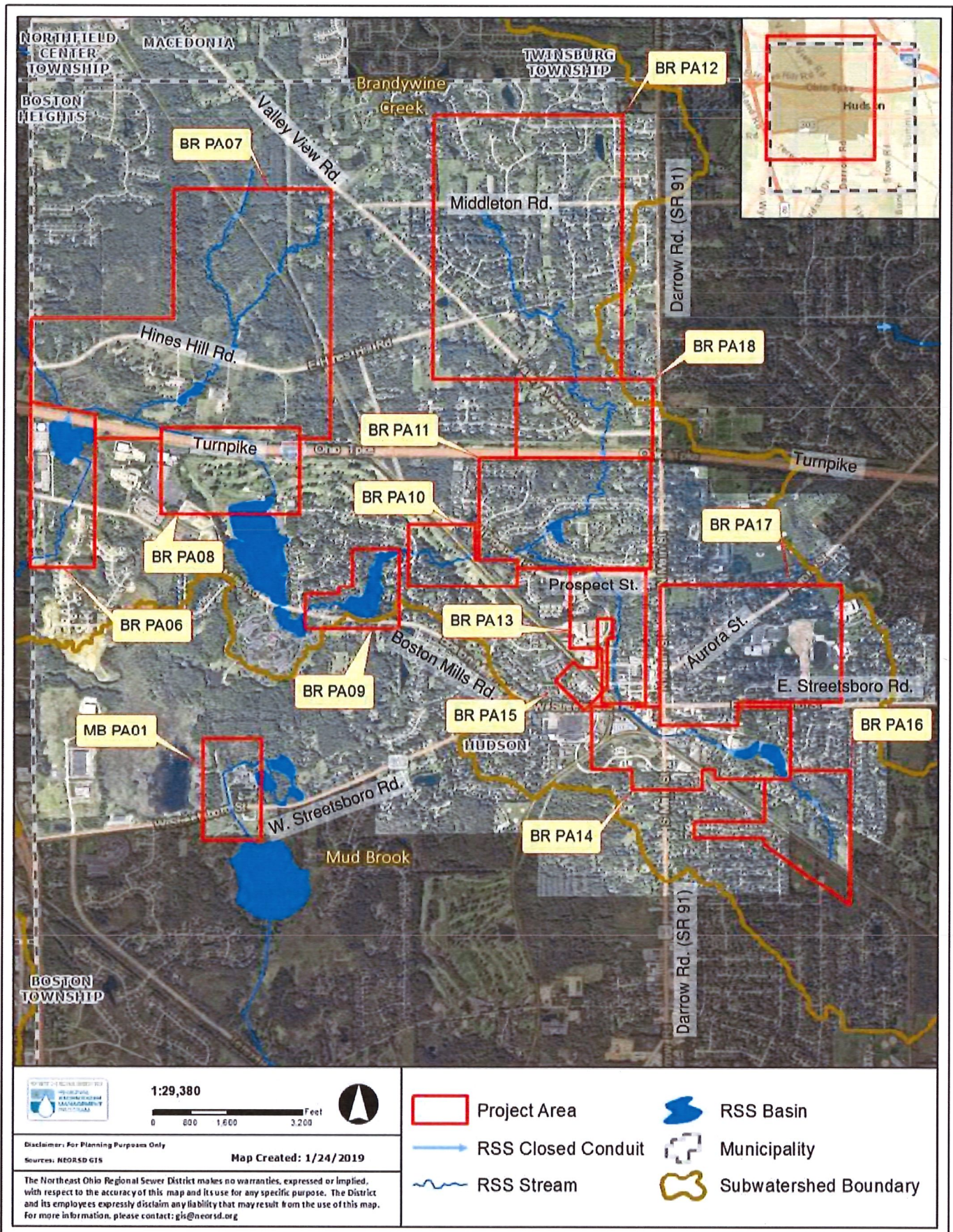


Figure 1
Stormwater Project Areas within the City of Hudson