

# Capital Project Appropriation Request

6/26/2023

## FY 22/23

**Project:** 001347 Toilsome Brook Flood Resilience Plan

**Agency:** 0230 **Operations:** Land Use

**Total Request: \$598,125.00**

### Part A - Description of Request



This project overlaps with the Engineering Bureau's Citywide Drainage Assessment. It focuses on one of the most chronically flood prone places in the City, which includes high-density residential areas where the drainage infrastructure is undersized. The goal is to do a hydrologic and hydraulic analysis as a basis for developing concept level plans, prioritizing nature-based solutions

### Part B - Appropriation Request Detail

Fund Source	FY 22/23	Capital Forecast						Total
	Amount	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	
State Grant	598,125.00	0	0	0	0	0	0	598,125.00
<b>Total</b>	<b>\$598,125.00</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$598,125.00</b>

### Part C - Project History

### Part D - Approvals

<b>Preparer</b> <i>OPM Dept</i>	<b>Date</b> 06/27/2023	<b>OPM Director/OPM Asst Director</b>  <small>Elda Sinani (Jun 28, 2023 16:47 EDT)</small>	<b>Date</b> Jun 28, 2023
<b>Department Head</b> <i>Louis Casolo</i>	<b>Date</b> Jun 27, 2023	<b>Director of Administration</b> <i>Bridget Fox</i> <small>Bridget Fox (Jun 29, 2023 10:05 EDT)</small>	<b>Date</b> Jun 29, 2023
<b>Director</b>  <small>Matt Quiñones (Jun 28, 2023 14:58 EDT)</small>	<b>Date</b> Jun 28, 2023	<b>Mayor</b> <i>Caroline Simmons</i> <small>Caroline Simmons (Jun 29, 2023 11:56 EDT)</small>	<b>Date</b> Jun 29, 2023



## DEEP Climate Resilience Fund

### TRACK 2: PROJECT DEVELOPMENT APPLICATION

#### **Toilsome Brook Flood Resilience Plan City of Stamford**

December 1, 2022

### **Section 1 – Applicant Details**

1.	Applicant name:	City of Stamford
2.	Mailing Address:	888 Washington Blvd. Stamford, CT 06901
3.	Primary Contact Name:	Erin McKenna, Associate Planner
	Primary Contact Email Address:	emckenna@stamfordct.gov
	Primary Contact Phone Number:	203-977-4715
4.	Fiscal Agent name:	Emmanuel Bouchotte, Grants Accounts Analyst
	Fiscal Agent contact email address:	ebouchotte@stamfordct.gov
	Fiscal Agent contact phone number:	203-977-5772
5.	Organization EIN:	066001897
6.	Requested Amount:	\$598,125

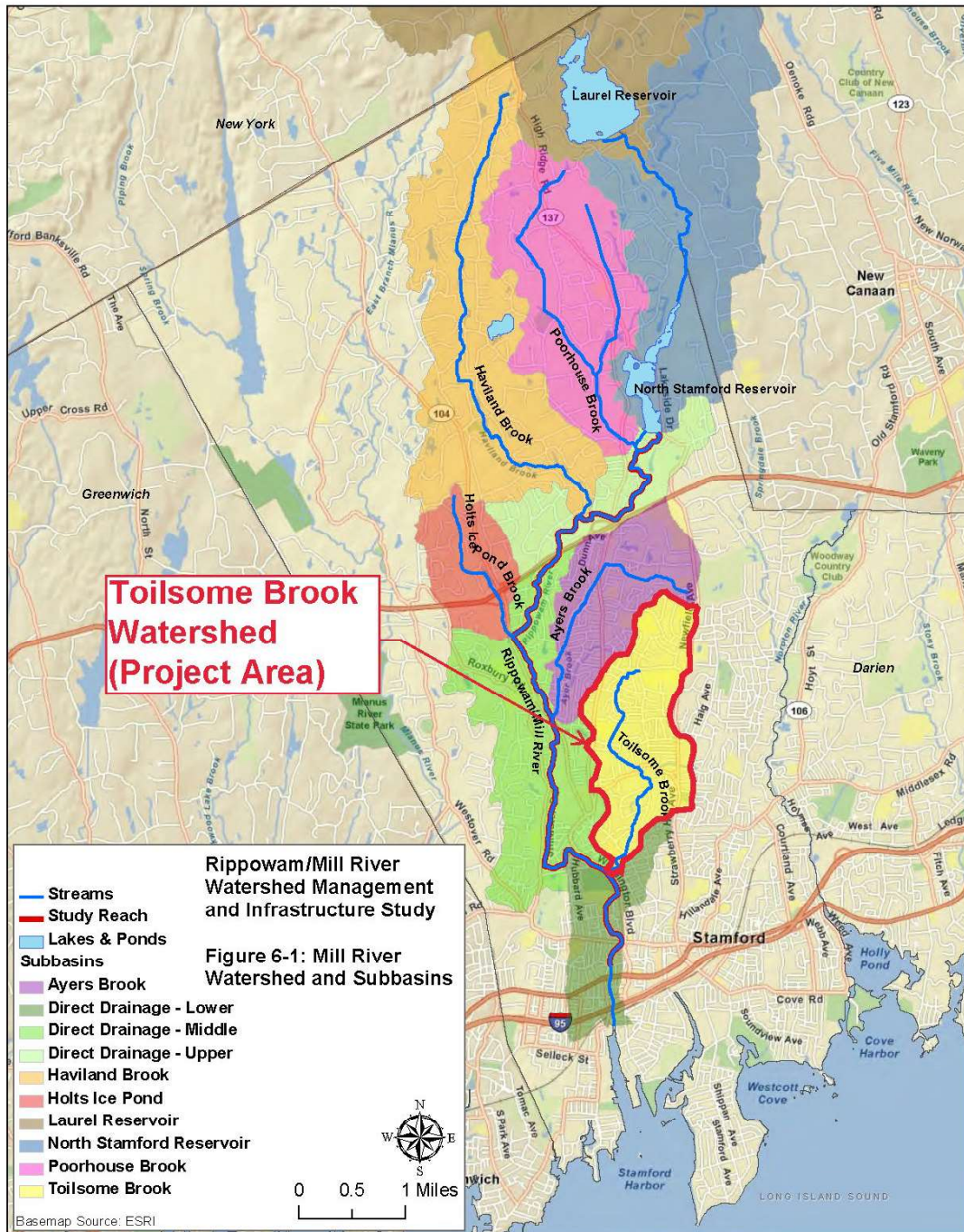
## Section 2 – Proposal Overview

1.	<p><b>Which of the following relevant hazards will your plan or project address? (select all that apply)</b></p>	<p><input checked="" type="checkbox"/> Extreme precipitation</p> <p><input checked="" type="checkbox"/> Flooding from riverine (including ice jams and dam failures), stormwater, tidal sources, or a combination.</p> <p><input type="checkbox"/> Sea level rise (including groundwater impacts)</p> <p><input checked="" type="checkbox"/> Extreme temperatures (heat and cold)</p> <p><input checked="" type="checkbox"/> Extreme weather (winter storms, nor'easters, severe thunderstorms, tornadoes)</p> <p><input checked="" type="checkbox"/> Tropical storm and hurricane impacts</p> <p><input type="checkbox"/> Windstorms</p> <p><input type="checkbox"/> Fire</p> <p><input type="checkbox"/> Drought</p>
2.	<p><input checked="" type="checkbox"/> <b>[CHECK BOX] I understand that projects must incorporate climate change impacts out to 2050 or beyond and that DEEP will provide technical assistance for support throughout the process. The final report to DEEP must detail how this task was accomplished.</b></p>	
3.	<p><b>Is your project development team including a budgetary request for grant writing for federal resilience funding at the end of the project development work as part of this application?</b></p> <p>(Note: this is an allowable cost and is encouraged for project development teams that want to pursue federal resilience grant competition funding for next steps.)</p>	<p><input checked="" type="checkbox"/> (a) Yes.</p> <p><input type="checkbox"/> (b) No. We have our own support for applying for federal resilience grant funding.</p> <p><input type="checkbox"/> (c) No. We do not intend to apply for federal resilience grant funding.</p>

## Section 3 – Community Overview

4. Which municipality/municipalities will this project serve? Please include a map of the project area (a screenshot of a Google map is fine).

This project will serve the residential and commercial neighborhoods within the Toilsome Brook watershed, located north of the downtown area in the City of Stamford.



5. **Please state where this project was identified as a need in previous resilience planning. Include a link with relevant page number identified here (or include a copy of the plan in your application, if no link is available)**

There is a long history of flooding along Toilsome Brook, an urban stream that drains an approximately 1.7 square mile watershed in the commercial and residential neighborhoods north of downtown Stamford. The brook receives drainage from small streams and drainage channels and flows in and out of culverts while passing through densely populated neighborhoods and receiving stormwater runoff directly from street drains. Toilsome Brook is an historical tributary to the Mill/Rippowam River and has been culverted for several decades.

The residential neighborhoods and commercial areas along Toilsome Brook are susceptible to flooding. Flooding of numerous residential properties (several feet of water in garages and basements) and public roads has occurred since the 1970s due to undersized culverts, clogging of the culverts with debris, and sedimentation of the channel as a result. In 2008, the City of Stamford investigated the Toilsome Brook flooding problems in the Dannell Drive area, although no long-term solutions were implemented and this area still experiences routine flooding, underscoring the need for a comprehensive, watershed-scale flooding evaluation.

Toilsome Brook is included in the [FEMA Flood Insurance Study of Fairfield County](#) (effective June 18, 2010 and last revised October 16, 2013). The hydrologic and hydraulic analyses for Toilsome Brook in the original FIS was completed in 1979. The FIS also describes the City's prior flood protection measures along the lower part of Toilsome Brook:

*"The City of Stamford widened a portion of the Toilsome Brook channel between Dann Street and Dartley Street, as well as the Bracewood Lane section. Further improvements on Toilsome Brook are in the planning stage."*

The City's [2015 Community Resilience Building Workshop](#) process and summary report (pages 4, 11, and 15) identified inland flooding as one of the City's top climate hazards and associated high-priority flood risk reduction recommendations, particularly along the Mill/Rippowam River floodplain among other areas with ongoing and increasing flood exposure.

The [WestCOG Multi-Jurisdiction Hazard Mitigation Plan Update](#) (August 2021, page 24) identified Toilsome Brook along with other tributaries of the Mill/Rippowam River and their associated floodplains as susceptible to flooding. The HMP Update also includes a recommendation to conduct an extensive flood risk assessment to evaluate risks in repetitive loss areas, to critical facilities, and to critical infrastructure, which includes areas and infrastructure in the Toilsome Brook watershed. The [2010 Mill River Watershed Plan](#) (pages 2-5, 2-6, 3-9, and 3-10) also identifies flood-prone areas of the Mill/Rippowam River watershed including Toilsome Brook.

**6. If applicable, please describe previous community engagement efforts about this project and what responses have been, especially from residents who are considered part of vulnerable populations (see Section 4 for definition).**

Over the past 15 years, the City has conducted a variety of planning studies and efforts which included Toilsome Brook and the overall Mill/Rippowam River watershed. Along the way, community engagement efforts have been incorporated into these processes. Most notably, both the 2010 Mill River Watershed Plan development process and the later Hazard Mitigation Plan Update included numerous opportunities for public engagement. The Watershed Plan process, for example, held neighborhood briefings in 2008, followed by 7 events at various locations and for various audiences throughout 2009 and 2010. Additional meetings and follow-up have occurred since as part of implementation of the plan.

These engagement efforts were not focused solely on Toilsome Brook or the particulars of a likely resilience project but have set the stage for an understanding of the watershed context and the relationship of hazard events to localized impacts.

The upcoming project will more specifically seek to engage the public, and in particular, residents who are considered part of the climate vulnerable populations, in discussions around resilience and nature-based solutions through a series of public workshops and engagement opportunities. The public outreach and community engagement for this project will target the affected residents and businesses within the project area, in addition to municipal stakeholders and the general public.

**7. How is this project consistent with the municipality's Plan of Conservation and Development (POCD)? Please include a link to the most recent POCD.**

Stamford is part of the Western Connecticut Council of Governments, 2020-2030 Regional Plan of Conservation and Development (<https://www.stamfordct.gov/home/showpublisheddocument/3537/637477922226370000>). The proposed project is consistent with the recommendations for infrastructure and climate resilience, which focus on redundancy, mitigation, and adaptation. In particular, this project focuses on adaptation, using green infrastructure and nature-based solutions as a means of developing long-term investment strategies to make Stamford better able to establish sustainable development patterns and increase the resilience of municipal infrastructure in the face of climate change.

Further, the POCD highlights the issue of increasing precipitation as a result of climate change and the need to consider increased precipitation intensity and frequency in future infrastructure planning. Consistent with this directive, this project will utilize the best available climate projections and design guidance by incorporating guidance from the Resilient Massachusetts Action Team (RMAT) design standards as well as downscaled existing and future precipitation estimates available through Connecticut Institute for Resilience & Climate Adaptation (CIRCA).

The project is further consistent with the themes for building climate resilience identified in the POCD and the goals and policies outlined for stormwater management and floodplain management.

The green infrastructure and nature-based solutions included in this project go above and beyond strategies spelled out in the POCD, such as “minimize the installation of impervious surfaces in new developments” and requesting updates to flood boundary information. This project will lead to the identification of strategies and solutions that will actively address improvements over existing conditions in line with these same strategic goals.

## Section 4 – Vulnerable Populations

Executive Order 21-3 states that at least 40 percent of the resources in this program MUST go to planning activities/project development that serves vulnerable populations. For example, if DEEP awards a total of \$10 million in planning grants, at least \$4 million of that amount must directly serve vulnerable populations as defined in Section 16-243y(7). The questions in this section will help DEEP evaluate whether your proposed plan will benefit vulnerable populations.

8.	<p><b>Is your project located in an Environmental Justice municipality or census tract identified on the <a href="#">DEEP Connecticut Environmental Justice Communities map</a>?</b></p>	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> No
9.	<p><b>Is your project located in a <a href="#">community eligible for community reinvestment</a> pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time?</b></p>	<input type="checkbox"/> Yes
		<input checked="" type="checkbox"/> No
10.	<p><b>People who are considered vulnerable to climate change with limited capacity to adapt include:</b></p> <ul style="list-style-type: none"> <li>• <b>Communities of color</b></li> <li>• <b>Children and seniors</b></li> <li>• <b>Low-income communities</b></li> <li>• <b>People with disabilities</b></li> <li>• <b>Pregnant people</b></li> <li>• <b>People with Limited English Proficiency (LEP)</b></li> <li>• <b>Other historically disadvantaged people</b></li> <li>• <b>People impacted by the social determinants of health</b></li> <li>• <b>Populations identified by the American Public Health Association.</b></li> </ul> <p><b>Tell us more about the vulnerable populations in the area the project will serve? Be specific and include data if available.</b></p> <p>While not included in the DEEP Connecticut Environmental Justice Communities map, the neighborhoods within the Toilsome Brook project area do have substantial communities of color and relatively high percentages of children and seniors. Communities of color in particular are typically considered to be among the most vulnerable to climate change, and to have limited capacity to adapt to the impacts of climate change. The project area (census tract 09001022102) is not identified as eligible for the purposes of the Community Reinvestment Act, as of 2022. The three neighborhoods within the study area have the following demographics:</p> <ul style="list-style-type: none"> <li>• <b>Ridgeway-Bullshead</b> is a neighborhood located immediately north of downtown Stamford and spanning from Strawberry Hill Avenue to the Rippowam River. The neighborhood includes 19% Hispanic, 18.5% Asian, and 11.2% Black residents. 7.6% of households identify as having limited English proficiency. This is below the overall average for Stamford (~10%), but above the Connecticut state average. The per capita income is slightly above that of</li> </ul>	



	<p>Stamford as a whole, at \$56,533. 17.6% of the population are youths under 18, and 14.1% are over 65.</p> <ul style="list-style-type: none"> <li>• <b>Turn of River-Newfield</b> is located north of Ridgeway-Bullshead and just south of Route 15. It stretches from the Noroton River to the east to Long Ridge Road to the west. This neighborhood is predominantly white (75%), with 10% Hispanic residents, and approximately 10% Asian residents. The per capita income is \$62,556, and less than 2% of households identify as having limited English proficiency. 20.9% of the population is under 18, and 19.2% are over 65.</li> <li>• <b>Glenbrook-Belltown</b> is located immediately east of Ridgeway-Bullshead, stretching between Strawberry Hill Avenue and the New York New Haven and Hartford Rail line. A relatively small portion of the neighborhood is within the Toilsome Brook project area. The neighborhood makeup is 28.3% Hispanic, 11.6% Black, and 10.8% Asian residents. 6.5% of households indicate limited English proficiency. The per capita income is \$47,661, slightly above the Connecticut state average and below the Stamford average. The neighborhood also has 23.5% of its population under age 18, and 12.5% over age 65.</li> </ul>
11.	<p><b>How will your project, if constructed, benefit the people you have identified as vulnerable? Be specific.</b></p> <p>City of Stamford residents who live in these flood-prone neighborhoods will primarily benefit from reduced risk of flooding. Numerous residential and commercial properties are currently impacted by a combination of riverine and drainage-related flooding along the Brook. Residents will have the opportunity to be included in an engaged stakeholder process which will examine resilience solutions and their potential co-benefits for the neighborhood. For example, green infrastructure produces co-benefits such as urban heat island reduction as well as water quality enhancement and flood risk reduction. DCRF funding will support the engagement of city and institutional planners and other City stakeholders.</p> <p>The various resilience solutions proposed through the project will have multiple benefits to this community directly by:</p> <ul style="list-style-type: none"> <li>• helping to limit flooding risks in the neighborhood</li> <li>• attenuating the impacts of increasingly heavy precipitation</li> <li>• addressing existing riverine flooding and planning for future climate conditions</li> <li>• infiltrating stormwater in place to enhance groundwater recharge and limit transport of sediments and nutrient pollution</li> <li>• decreasing operational disruptions in the neighborhood and increasing ability of residents to access critical neighborhood services (groceries, transportation, etc.) during or directly after storm events or heavy rainfalls</li> <li>• raising or relocating infrastructure and structures outside of areas impacted by flooding</li> <li>• providing aesthetic and quality of life benefits</li> <li>• increasing shade for increased cooling during extreme heat</li> </ul>

## Section 5 – Project Development

**12. Please briefly describe the climate-related problem that the project area is experiencing.**

The City of Stamford has experienced a substantial increase in the frequency and intensity of riverine and drainage-related flooding in recent years, impacting infrastructure and public safety in many areas of the City. Stamford’s Multi-Jurisdiction Hazard Mitigation Plan Update (2021-2026) identifies riverine flooding, drainage-related flooding, and drainage system improvements as a high priority for the City.

Toilsome Brook is an urban stream that drains an approximately 1.7 square mile watershed in the commercial and residential neighborhoods north of downtown Stamford. The Brook begins near Newfield Elementary School and flows south for approximately 3 miles to its confluence with the Mill/Rippowam River near Scalzi Park. The brook receives drainage from small streams and drainage channels and flows in and out of culverts while passing through densely populated neighborhoods and receiving stormwater runoff directly from street drains. Toilsome Brook is a historical tributary to the Mill/Rippowam River and has been culverted for several decades.

The residential neighborhoods and commercial areas along Toilsome Brook are susceptible to flooding due to the historical development in the watershed, which consists of 83% developed land uses (primarily medium and high density residential and commercial uses), large contribution of streamflow from stormwater runoff, and the culverted nature of the stream which is believed to restrict flow in the brook. A number of areas have been hit particularly hard by storm events in 2007 and 2021, including the following areas along Toilsome Brook from north to south:

- Vine Road (hard hit in 2021)
- Residential neighborhoods on Dannell Drive, Fawn Drive, and Crestwood Drive (hard hit in 2021)
- Neighborhoods on Unity Road, High Clear Drive, Dann Drive, Oaklawn Avenue (hard hit in 2007)
- Neighborhoods east of the Mill River between Urban Street and First Street (hard hit in 2007 and 2021)

The FEMA Flood Insurance Rate Maps (last updated in 2010) and associated Flood Insurance Study (modeling performed in 1984) for Toilsome Brook show numerous residential and commercial properties within the one percent annual chance flood boundary, including parcels along the aboveground and culverted portions of the brook. Toilsome Brook flooding has impacted numerous residential properties with several feet of water in garages and basements as well as public roads. The drainage infrastructure in this area is undersized, including several culverts along Toilsome Brook that are believed to restrict the flow of the brook during intense storm events. Many of the residences impacted by flooding are mapped by FEMA within the 100-year flood zone and in some cases near or within the mapped regulatory floodway. These areas are all expected to see an increase in the frequency of flooding events as climate change continues to bring increasingly intense, high volume precipitation events.

**13. Please describe the proposed project that is intended to reduce risk and increase resilience to the climate-related problem. If implemented, how would it increase resilience?**

A comprehensive engineering evaluation of the root causes of flooding in the Toilsome Brook watershed and potential flood mitigation interventions (e.g., culvert upgrades, stream daylighting, floodplain restoration, flood storage, drainage system improvements, neighborhood scale green stormwater infrastructure, etc.) is a necessary first step in developing strategies to make this area of the City more resilient to current and future flooding.

The City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. The evaluation will better define the causes and factors contributing to flooding in the watershed and provide strategies to make these neighborhoods more resilient to existing and future flooding while also improving water quality and providing other community and ecological benefits. The watershed-scale flood resilience evaluation will result in concept-level flood mitigation recommendations to alleviate flooding along Toilsome Brook, including a combination of drainage system improvements (increased capacity of storm drain pipes, culverts, etc.), nature-based solutions such as green stormwater infrastructure and floodplain restoration, and raising or relocating infrastructure and structures outside of areas impacted by flooding. The evaluation will also include development of prioritized project recommendations, project costs and benefits (Benefit Cost Ratio), and grant writing to support a subsequent request for federal resilience funding for plan implementation. This project will also complement the City's parallel efforts to conduct a citywide drainage assessment and develop a coastal flood resilience plan focused on coastal flood risk reduction.

**14. What, if any, initial designs or development work have been done on this project to date? In your emailed application, you may include attachments of designs or development work described.**

The City has been exploring the flooding problem around Toilsome Brook for nearly 15 years. In 2008, the City of Stamford investigated the Toilsome Brook flooding problems in the Dannell Drive area, although no long-term solutions were implemented and this area still experiences routine flooding and increasing flood risk, underscoring the need for a comprehensive, watershed-scale flooding evaluation.

The [2010 Mill River Watershed Plan](#) identifies flood-prone areas of the Mill/Rippowam River watershed including Toilsome Brook and suggested the possibility of reconnecting the river to its floodplain within the Toilsome Brook subbasin, and exploring the possibility of daylighting the brook. Further development or design of these ideas has not yet been explored.

[Stamford's Multi-Jurisdiction Hazard Mitigation Plan Update \(2021-2026\)](#) identifies Toilsome Brook along with other tributaries of the Mill/Rippowam River and their associated floodplains as susceptible to flooding. The HMP Update also includes a recommendation to conduct an extensive flood risk assessment to evaluate risks in repetitive loss areas, to critical facilities, and to critical infrastructure, which includes areas and infrastructure in the Toilsome Brook watershed.

The proposed project would pick up where each of these efforts left off, providing the detailed and comprehensive flooding evaluation that is necessary to further identify specific resilience solutions.

15. **Please describe what specific component of the project development process you are seeking funding for from DEEP and how you intend to accomplish this.**

The following outlines the specific tasks and scope proposed for the project.

**TASK 1: Project Management & Meetings**

Task 1 includes the overall coordination of project tasks between the City of Stamford, the consultant team, and project stakeholders. Task 1 also includes an initial project kickoff meeting to review the overall project approach, schedule, work plan, and stakeholders that will be engaged in public outreach.

Task 1 also includes recurring monthly project team meetings (18 half-hour meetings are planned). Draft deliverables such as site investigation findings, modeling results, and conceptual designs will be reviewed at these meetings. These meetings will also be coordinated with meetings with regulators, property owners, and other stakeholders. Six (6) quarterly progress reports will be prepared and distributed electronically to the project team with critical project updates.

**TASK 2: Existing Conditions Review & Mapping**

Task 2 includes collecting and reviewing available information on existing conditions within the Toilsome Brook watershed, including but not limited to the following sources:

- City's GIS datasets on stormwater assets such as conduits, manholes, culverts, and other structures. Other information such as land use, imperviousness will also be collected, if available.
- Available utility survey information obtained for other projects.
- Record drawings and other relevant documents such as engineering reports that can provide information on the properties of existing stormwater assets as well as design parameters such as capacity.
- Planning level and permitting reports that can provide information on the existing stormwater system contributing areas or catchments. Examples include reports already developed by the City to comply with the MS4 Permit, which requires identification of all stormwater outfalls and respective catchments.
- Readily available remote sensing data such as aerial imagery used to calculate imperviousness or land use types or ground elevations from Light Detection and Ranging (LiDAR) datasets.
- Information collected by the City during O&M operations (CCTV, pipe cleaning and maintenance reports, etc.) to provide valuable information on the condition of hydraulic assets.

Previous flood studies and plans in the watershed will be reviewed to identify those areas or neighborhoods that are vulnerable to flooding, including:

- Information regarding historic flooding and flood damage within the watershed such as available flood complaints and flood records
- Rainfall and flooding resulting from high-intensity storms in 2021 and 2022

- FEMA Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs)
- Mill/Rippowam River Watershed Management Plan (2010)
- West COG Natural Hazard Mitigation Plan (2016)
- Multi-jurisdictional Hazard Mitigation Plan Update (2021)
- Resilient Connecticut Phase II (2021)

Areas vulnerable to flooding will be classified as “High-Risk” or “Low-Risk” areas, which will determine the level of detail in the existing and future conditions hydrologic and hydraulic models. Base mapping of the watershed and areas vulnerable to flooding will be developed by integrating the above information.

### **TASK 3: Gap Analysis & Data Collection**

The existing conditions information compiled in Task 2 will be used to develop an existing conditions model (see Task 4). Once this information has been reviewed, a gap analysis will be performed to identify missing information or confirmation of information critical for the development, calibration, and validation of the hydrologic and hydraulic models. Vulnerable areas of the watershed will require more detailed information whereas areas with little or no flooding risk will need less.

The following field data collection tasks will be performed to address identified data gaps:

- Ground truth locations of Toilsome Brook culverts, conduits, and stormwater assets in critical areas.
- Perform additional limited field survey where GIS mapping or record drawings are incomplete. Survey data collection will include:
  - Road-stream crossing data (invert and obvert elevations, structure dimensions) along Toilsome Brook at selected high-risk crossings (culverts, bridges, etc.) from the upstream portion of the brook downstream to the confluence with the Mill/Rippowam River.
  - Cross sections of the Toilsome Brook channel and overbank areas, including at locations upstream and downstream of underground/culverted segments.
- Perform strategic condition assessment of buried/culverted segments of Toilsome Brook or other storm drainage conduits via CCTV. CCTV can also be used to confirm connectivity of pipes in critical areas.

The data collection effort will also include field reconnaissance of high-risk areas of the watershed to verify drainage area characteristics, as well as inspection of the structural condition of the Toilsome Brook road crossings to identify crossings that need upgrades, repair, or maintenance.

### **TASK 4: Hydrologic & Hydraulic Modeling**

An existing conditions hydrologic model will be developed for the Toilsome Brook watershed and subwatersheds, and an existing conditions hydraulic model will be developed for Toilsome Brook from the upstream portion of the brook downstream to the

confluence with the Mill/Rippowam River. The models will be used to identify the main causes of flooding (i.e., root cause analysis) and develop flood resilience strategies for high-risk areas (see Task 5).

A hydrologic model for the Toilsome Brook watershed will be developed using the US Army Corps of Engineers HEC-HMS (version 4.9) software and publicly available land use, land cover including impervious cover, soils, topographic, and rainfall information. The existing conditions model will be used to simulate and evaluate various flood risk reduction alternatives for a range of existing and future storm events. The hydrographs will be developed in the HEC-HMS model and will be based on storm depths obtained from NOAA Atlas 14. The peak flows obtained from the updated hydrologic analysis will be used as the inflows to the HEC-RAS hydraulic model.

Toilsome Brook water surface elevations will be modeled using the US Army Corps of Engineers HEC-RAS hydraulic model (version 6.1). A duplicate effective model will be created utilizing the HEC-RAS 1-dimensional (1D) approach. A floodplain and floodway analysis will be performed to document any differences between the duplicate effective model and the published FEMA FIS model. The culvert and bridge openings and stream cross sections obtained from the field survey will be used to update the FEMA FIS model where necessary.

#### **TASK 5: Concept Development & Alternatives Analysis**

Once the causes of flooding are well understood, the hydrologic and HEC-RAS models will be configured to develop and evaluate the effectiveness of potential flood mitigation alternatives in high risk areas. Up to five (5) conceptual level alternatives will be developed and evaluated to address flood risk reduction and other climate resilience goals, like reducing extreme heat and addressing social resilience through public gathering spaces and equitable design. The alternatives may include a range of approaches prioritizing nature-based solutions such as:

- Increased culvert capacity or improved conveyance at hydraulic restrictions
- Partial daylighting of buried/culverted stream segments
- Floodplain restoration and increased flood storage
- Green stormwater infrastructure including increased urban tree canopy and green spaces
- Property buy-outs or floodproofing

The alternatives will demonstrate the achievable flood risk reduction from “small”, “medium”, and “large” storms. Given the uncertainty in the exact return intervals for flooding in the project area, the specific design storms used for the alternatives analysis will be determined after finalizing the existing conditions analysis. The alternative approaches will be summarized in terms of order-of-magnitude costs (-30% to +50%), advantages and disadvantages, and concept plan views and typical sections.

The preferred alternatives will be refined during a workshop with project stakeholders. Once the preferred alternatives and design storms are selected, the model will be run under a potential future climate change scenario. Massachusetts has developed the Resilient Massachusetts Action Team (RMAT) climate resilience design standards tool which provides scaled precipitation factors depending on design storm and project life expectancy. While Connecticut does not currently have similar statewide resilient design guidelines or tool, the Connecticut Institute for Resilience & Climate Adaptation (CIRCA) has developed downscaled existing and future precipitation estimates for Connecticut for various emissions scenarios, future planning horizons, and return periods. The RMAT precipitation multipliers and CIRCA downscaled precipitation will be used to select appropriate precipitation estimates for the project area under a potential future climate change scenario.

The alternative approaches will be summarized in terms of costs, advantages and disadvantages, and concept plan views and typical sections. The alternatives will also be evaluated for consistency with FEMA NFIP regulations, including “no rise” within a FEMA floodway. The results of the modeling, concept development, alternatives analysis, and recommendations will be summarized in a technical memorandum.

#### **TASK 6: Benefit-Cost Analysis**

A benefit-cost analysis (BCA) will be conducted for the preferred flood resilience alternatives using FEMA’s BCA Toolkit. The calculator assesses pre and post conditions of the project area and assigns a benefit dollar value to areas that achieve flood reduction. Projects with benefits that exceed the project cost are deemed cost-effective and have a Benefit-Cost Ratio (BCR) greater than 1.0. The BCA will be used to determine the cost-effectiveness of the preferred alternatives and to support future grant funding requests that require a BCA such as the FEMA hazard mitigation assistance grant programs. Other non-quantifiable benefits will be identified (e.g., water quality and ecological benefits, community benefits, heat reduction, social benefits) but not necessarily included in the BCA.

#### **TASK 7: Stakeholder & Community Engagement**

The consultant will form, facilitate, and provide updates to a Citizen and Technical Advisory Committee through a series of dedicated meetings over the course of the project. Identification and selection of stakeholders for participation on the advisory committee will be done in coordination with the City; and should reflect a broad cross section of community stakeholders with expertise on the project area. The public outreach and community engagement for this project will target the affected residents and businesses in the neighborhoods within the Toilsome Brook watershed, in addition to municipal stakeholders and the general public. Project stakeholders will include, but not be limited to:

- Turn of River-Newfield, Glenbrook-Belltown, and Ridgeway-Bullshead neighborhood associations
- City staff from Engineering, Land Use, Parks, Public Safety, and MS4 Compliance
- Mill River Park Collaborative

- Principals, staff, and students from Turn of River School, Newfield Elementary School, Rippowam Middle School, and Cardinal Kung Academy
- Representatives from Districts 11, 14, 16, and 18
- Environmental organizations (Southwest Conservation District, Save the Sound, etc.)
- Local business representatives
- Homeowners

The consultant will organize a minimum of 4 meetings with the advisory committee, including: Meeting 1 - Evaluate and discuss existing plans and data, review climate conditions analysis and impacts of flooding and heat. Meeting 2 -- Establish and review priorities and discuss trade-offs and compromises of potential adaptation strategies, Meeting 3 – presentation and interactive discussion of adaptation alternatives for priority areas after Public Workshop #2, and Meeting 4 – presentation and review of the preliminary draft report and steps to complete the project. The Consultant will be responsible for scheduling, preparing agendas and meeting materials, and providing meeting minutes to the Committee and the City following each meeting. The Consultant should prepare options for in-person or virtual meetings based on public health guidance from the State of Connecticut and the preferences of participating Committee members. Locations for in-person meetings should be coordinated with City staff.

The Consultant will organize a series of 3 public workshops to present information, gather input, and develop consensus among community members and stakeholders on key milestones and deliverables. At a minimum, the events will include Workshop 1 – presentation of project scope, review of climate impacts, and solicitation of feedback on community needs and priorities related to the planning study area; Workshop 2 – workshop on adaptation strategies and potential project concepts to mitigate climate risks in the planning study area and; Workshop 3 – present draft final report and discuss implementation next steps with the community and stakeholders. The Consultant will be responsible for facilitating the events and preparing meeting agendas and materials, including maps and visual aids for presentations. A summary of outcomes and feedback from the community should be developed as a Public Engagement Memorandum for inclusion in the final report. A project webpage (like a GIS StoryMap) will be established and maintained where documents and presentations can be made available for public access in English and Spanish. The team will also produce information sheets, flyers, and related materials to raise awareness and facilitate participation in engagement activities. Outreach materials should be available in both English and Spanish.

#### **TASK 8: Flood Resilience Plan**

Task 8 will document the process and outcomes of this project in a highly graphic report to serve as a roadmap for the next recommended actions to progress this project towards implementation. The final document will include a detailed project prioritization as well as the Final Resilience Plan. The Final Resilience Plan will detail: Short- and long-term priority projects; Draft project narrative for federal applications; Funding/financing strategy including locally derived match funding strategy exercise that examines measures authorized in An Act Concerning Climate Change Adaptation (Public Act 21-115); Separate



executive summary highlighting the process and lessons learned; and a presentation slide communicating accomplishments and lessons learned. In addition to the flood and ecological resilience components of the project, the final plan will highlight the relationship building process throughout this project enhancing community and social resilience.

**TASK 9: Grant Application for Next Steps**

Task 9 includes budget for the development of the grant application identified to progress this project through final design and implementation. This task will include the production of any necessary application materials including but not limited to detailed scope, project budget, project timeline, project location maps, and project descriptions and narrative.

16. **A primary goal of the DEEP Climate Resilience Fund is to set Connecticut communities up for success when applying for federal resilience grants, which will fund construction and implementation. Which federal grant program(s) is your municipality intending to apply to for final design, construction, and/or implementation funding?**

- [Federal Emergency Management Agency \(FEMA\) Building Resilient Infrastructure and Communities \(BRIC\) program](#)
- [FEMA Hazard Mitigation Grant Program \(HMGP\)](#)
- [FEMA Flood Mitigation Assistance Program \(FMA\)](#)
- [National Fish and Wildlife Federation \(NFWF\) National Coastal Resilience Fund \(NCRF\)](#)
- [NFWF Long Island Sound Futures Fund \(LISFF\)](#)
- [NOAA Transformational Habitat Restoration and Coastal Resilience Grants](#)
- [NOAA Coastal Habitat Restoration and Resilience Grants for Underserved Communities](#)
- [Connecticut Clean Water Fund](#)
- Other (specify)  
Click or tap here to enter text.

17. **How does this project connect to the [PERSISTS decision-support criteria framework](#)? PERSISTS stands for Permittable, Equitable, Realistic, Safe, Innovative, Scientific, Transferable and Sustainable.**

**Permittable** – There is ample precedent for permitting green infrastructure and nature-based solutions of the types anticipated to be proposed here. Federal, state, and local permitting timelines need to be incorporated into the project pathway, but there is no reason to anticipate unusual permitting hurdles in this case.

**Equitable** – Project co-benefits focus on equitable outcomes for climate vulnerable populations, and a robust outreach element is incorporated into the project, including hosting numerous opportunities for public involvement in the project as well as providing translation services for outreach materials and making all outreach information available online.

**Realistic** – Green infrastructure solutions and riverine flood resilience projects such as the solutions anticipated here are tried and true nature-based solutions that can be realistically engineered and have a history of successfully receiving implementation funding in the types of funding programs targeted for this project.

**Safe** – By better managing stormwater from large precipitation events, the proposed solutions will reduce risks to people and infrastructure. Management of stormwater via green infrastructure and other nature-based solutions also helps to improve water quality and remove contaminants. Reducing flood damage to property will also increase safety, both in terms of direct risks from flooded buildings and streets as well as indirect risks associated with mold and other post-flooding conditions.

**Innovative** – Nature-based solutions are innovative approaches to flood resilience that make use of natural processes to promote resilience in ways that are effective in the long term and add significant community co-benefits.

**Scientific** – The project will utilize current climate projections and best practices for climate resilient design to develop solutions for future conditions and combine this approach with cutting edge nature-based solutions approaches.

**Transferrable** – The approach and solutions developed for Stamford will serve as a model for other communities seeking to identify holistic resilience solutions to address stormwater management and related flooding issues, while simultaneously addressing other community needs.

**Sustainable** – Green infrastructure is socially, economically, and ecologically sustainable and supported by the public and leadership. Green infrastructure designs contribute a suite of co-benefits to the community, including aesthetic improvements, green space, reduction of urban heat island effects, as well as the addressing the core problems of managing extreme precipitation and flooding.

18.	<b>Please describe how this project incorporates nature-based solutions. If it does not, state that.</b>

This project proposes to utilize green infrastructure and floodplain restoration as nature-based solutions to provide flood resilience.

Green infrastructure for stormwater management will promote environmentally-sustainable redevelopment, and this project specifically aims to carve out space for low-impact development practices in a neighborhood that was not developed with green space or infiltration in mind. The green infrastructure installations will serve as demonstration projects and provide the scaffolding for sustainable development and redevelopment projects that can be implemented throughout Stamford in the future, enabling protection of vital natural resources while also serving and protecting the citizenry.

Infiltration-based green infrastructure stormwater control measures will also increase groundwater recharge and improve water quality by filtering out pollutants and sediment. Water quality problems are expected to be exacerbated by climate change impacts (increasing temperatures, drier summers, and lower water levels), but also by land use practices and excessive use of fertilizers. By encouraging green infrastructure this project will ultimately result in improved water quality and less influx of pollutants into the City's groundwater and surface waters.

Green infrastructure measures such as tree box filters, bioswales, and other vegetation-based practices will also provide micro-scale habitat enhancements, including important pollinator habitat. This project will also utilize nature-based solutions focused on restoring and/or enhancing natural habitat and flood storage functions of floodplain areas to increase flood storage and lower flood elevations as a means of protecting against riverine flooding. We anticipate that specific nature-based restoration techniques along Toilsome Brook could potentially include excavation to increase floodplain storage, widening the stream channel in areas where development has resulted in encroachment into the river's natural floodplain, daylighting buried stream channels, and right-sizing culverts to provide adequate capacity to safely pass storm flows and debris without restriction.

**19. Please describe how this project incorporates co-benefits (reduces emissions, solves multiple problems, serves as a community amenity, etc.)? If it does not, state that.**

By providing a more natural stream channel/floodplain interaction, the project will evaluate opportunities for restoring riparian buffers and areas of floodplain restoration. These will ultimately help to buffer storms, filter nutrients and sediment, and allow for enhanced tree cover for cooling and offsetting of urban heat island effects.

In the process, the project may seek to re-imagine and/or re-purpose sites in the floodplain to ensure that any uses, e.g., for recreation, are compatible with sporadic flooding and will consider relocating incompatible uses on public lands to create additional flood storage capacity.

Green infrastructure implemented in upgradient areas outside of the floodplain will also create additional green space within the urbanized area, creating new green linkages and enhancing tree canopy within the neighborhoods for aesthetic benefits, as well as increased shade cover and cooling to counter urban heat island effects while also increasing essential pollinator habitat.

The project will offer numerous opportunities for public engagement and curricular involvement of the schools (in particular the staff and students from Turn of River School, Newfield Elementary School, Rippowam Middle School, and Cardinal Kung Academy). Educational signage can highlight the process of engaging with nature to create resilience, helping people to understand climate change and its impacts, as well as better appreciate and value the ecosystem services provided by natural systems.

20. **Is there anything else you would like to share with DEEP regarding the community's commitments to improving resilience?**

The City of Stamford is committed to city-wide climate resilience and sustainability initiatives, as demonstrated through an ongoing city-wide drainage assessment, an upcoming coastal resilience planning project, the recently completed tree inventory for downtown Stamford, implementation of a city-wide stormwater drainage manual to promote the implementation of Low Impact Development and green infrastructure practices, and the Mayor's Climate Council and Task Force on Sustainability. This watershed-scale flood resilience plan will build upon and complement these other resilience and sustainability initiatives.

The project team will be led by City staff and supported by a consultant team, working closely with a Technical and Community Advisory Committee including community-based organizations. **Erin McKenna**, Associate Planner with the City of Stamford Land Use Bureau, will serve as the municipal point of contact and overall project manager for this project. Erin will be responsible for the administrative aspects of the project and project management, and she will serve as the City's technical lead for the project. She has 12+ years of experience managing municipal planning projects, managing the mayor's sustainability task force, coordinating sustainability and transportation projects, and managing grant funded resilience and sustainability projects. Erin will be assisted by staff from other City departments including Engineering; Parks & Facilities; Stormwater Management; Transportation, Traffic & Parking; Land Use Bureau; and others.

The City intends to retain the planning and engineering consulting firm **Fuss & O'Neill, Inc.** to provide technical expertise and capacity to complete this project. Fuss & O'Neill provides comprehensive climate resilience and adaptation services to municipalities to address a variety of climate risks including extreme heat and flooding. Fuss & O'Neill is currently working on several CIRCA-led flood and heat resilience planning studies and concept design projects to develop adaptation solutions for urban neighborhoods in the Fair Haven neighborhood of New Haven and downtown Danbury. The Fuss & O'Neill team will be led by **Sara Morrison (Project Manager)** and a support team that includes **Erik Mas and Elsa Loehmann**. Sara specializes in large-scale climate resilience design and planning with an expertise in integrating natural and engineered systems using nature-based solutions. Sara and the supporting principals from Fuss & O'Neill are working on a wide array of flood resilience assessments, green infrastructure, ecological restoration, and similar projects elsewhere in southern New England.

Resumes for the above principals are attached to this application.

21.	<p><input checked="" type="checkbox"/> [CHECK BOX] I understand the final report submitted to DEEP with the deliverable that was funded must also include an exercise for municipal government to assess capacity to raise locally derived match funding and other capital costs associated with implementing resilience measures. This includes examining the measures authorized in An Act Concerning Climate Change Adaptation (<a href="#">Public Act 21-115</a>), including the opportunity to form stormwater authorities, explore special taxing districts, and form flood prevention, climate resilience, and erosion control boards.</p>
22.	<p><input checked="" type="checkbox"/> [CHECK BOX] I understand that the final report submitted to DEEP must identify what federal sources of resilience funding the applicant or partners intend to pursue to further fund implementation efforts, including construction. Additionally, the team must include a draft project narrative for federal applications in final reporting. Technical assistance will be available to support federal grant application development and submission. We encourage applicants to include in their budget funding for writing federal grant applications for funding next steps and implementation.</p>

## Section 6 – Community and Stakeholder Engagement

23. **Describe how this team will engage residents and stakeholders. Be specific. Include details about the number of meetings, charettes, workshops, public feedback sessions, etc., and any other outreach and engagement strategies. Also include how information collected during those sessions will be used to inform the project.**

Note: Project teams are required to hold at least two (2) public meetings, including one (1) to share results with residents. The overall number of public engagement opportunities should be commensurate with the scope and complexity of the project, and projects serving vulnerable populations should incorporate inclusive engagement practices specifically designed to meet the needs of those identified as vulnerable.

The project team will form, facilitate, and provide updates to a Citizen and Technical Advisory Committee through a series of dedicated meetings over the course of the project. Identification and selection of stakeholders for participation on the advisory committee will reflect a broad cross section of community stakeholders with expertise on the project area. The public outreach and community engagement for this project will target the affected residents and businesses in the neighborhoods within the Toilsome Brook watershed, in addition to municipal stakeholders and the general public. Project stakeholders will include, but not be limited to:

- Turn of River-Newfield, Glenbrook-Belltown, and Ridgeway-Bullshead neighborhood associations
- City staff from Engineering, Land Use, Parks, Public Safety, and MS4 Compliance
- Mill River Park Collaborative
- Principals, staff, and students from Turn of River School, Newfield Elementary School, Rippowam Middle School, and Cardinal Kung Academy
- Representatives from Districts 11, 14, 16, and 18
- Environmental organizations (Southwest Conservation District, Save the Sound, etc.)
- Local business representatives
- Homeowners

We will organize a minimum of 4 meetings with the advisory committee, including:

- Meeting 1 - Evaluate and discuss existing plans and data, review climate conditions analysis and impacts of flooding and heat
- Meeting 2 -- Establish and review priorities and discuss trade-offs and compromises of potential adaptation strategies
- Meeting 3 – presentation and interactive discussion of adaptation alternatives for priority areas after Public Workshop #2
- Meeting 4 – presentation and review of the preliminary draft report and steps to complete the project.

We will also organize a series of 3 public workshops to present information, gather input, and develop consensus among community members and stakeholders on key milestones and deliverables. At a minimum, the events will include:

- Workshop 1 – presentation of project scope, review of climate impacts, and solicitation of feedback on community needs and priorities related to the planning study area
- Workshop 2 – workshop on adaptation strategies and potential project concepts to mitigate climate risks in the planning study area and
- Workshop 3 – present draft final report and discuss implementation next steps with the community and stakeholders.

A summary of outcomes and feedback from the community should be developed as a Public Engagement Memorandum for inclusion in the final report. A project webpage (like a GIS StoryMap) will be established and maintained where documents and presentations can be made available for public access. The team will also produce information sheets, flyers, and related materials to raise awareness and facilitate participation in engagement activities. Outreach materials will be made available in both English and one additional language, based on the identified needs of residents with limited English language proficiency.

24. **Describe how your project team specifically will engage and collaborate with residents who are considered vulnerable populations.**

As noted above, outreach materials (web site, flyers, information sheets, etc.) will be translated into Spanish for accessibility among residents for whom English is not their primary language and language isolation may otherwise prevent the dissemination of information and engagement with the project.

Representation from and on behalf of vulnerable populations will be sought for participation on the Citizen and Technical Advisory Committee, which will meet regularly throughout the project to discuss options and provide input as to how solutions under consideration would impact or benefit vulnerable populations.

Finally, the public workshop process described above will allow a wider range of residents from vulnerable populations to be involved in the project and have their voices heard, without a substantial time commitment for participation.

All public input will be collected and summarized for re-distribution to communicate back to residents what was heard and establish accountability for the ultimate consideration of residents' voices and incorporation of feedback from vulnerable populations into the project outcomes.



25. **How will you communicate the results of the project work and get final input from residents and stakeholders, as necessary depending on scope and complexity of this proposal?**

As already detailed in questions 23 and 24, communication with residents and stakeholders, both to share information out and to gather input, will be achieved in three primary ways:

- Development of a Citizen and Technical Advisory Committee made up of project stakeholders including, but not limited to:
  - Turn of River-Newfield, Glenbrook-Belltown, and Ridgeway-Bullshead neighborhood associations
  - City staff from Engineering, Land Use, Parks, Public Safety, and MS4 Compliance
  - Mill River Park Collaborative
  - Principals, staff, and students from Turn of River School, Newfield Elementary School, Rippowam Middle School, and Cardinal Kung Academy
  - Representatives from Districts 11, 14, 16, and 18
  - Environmental organizations (Southwest Conservation District, Save the Sound, etc.)
  - Local business representatives
  - Homeowners

The advisory committee will meet at minimum four times throughout the project to review information, discuss priorities and alternatives, and summarize decisions made and recommendations to be finalized in the project reports.

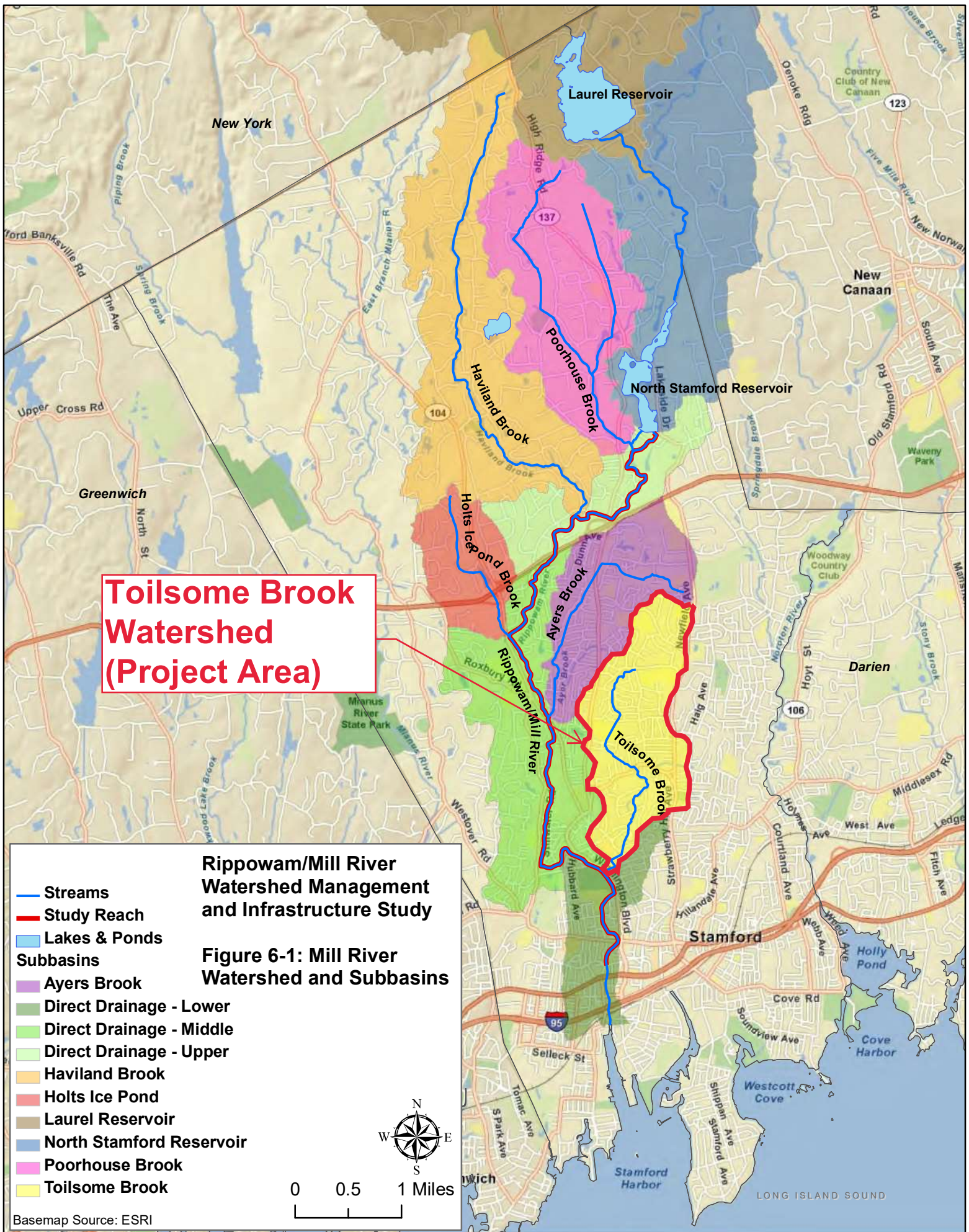
- A public workshop process will provide opportunities for a larger audience of residents and stakeholders to directly receive information, ask questions, and provide input on the project.
- All public input will be collected and summarized and shared back out to communicate to residents what was heard and discussed and establish accountability for incorporation of residents' voices into the project outcomes. Project work and updates will be presented on a project website in both English and Spanish.

## Attachments

Please attach this application document and the following documents in an email to [DEEP.climateresilience@ct.gov](mailto:DEEP.climateresilience@ct.gov) as your application submission.

- **Milestone Chart** ([Please use template provided.](#))
- **Budget summary and justification** ([Please use template provided.](#))
- **Resumes for all principals** (please keep to no more than 2 pages and edit to include only relevant experience, including volunteer work)

- **Letters of support from project partners, municipalities, community-based organizations, etc.**
  - Letters must include how project partners or organizations will participate in the project.
  - If the applicant is not a municipality, i.e., a Council of Government or non-profit organization, letters of support should come from every municipality involved in the plan, and those letters must commit staff time to participating in the planning process and engagement efforts.
  - Letters of support can be sent as part of the package or emailed by the author directly to [DEEP.climate resilience@ct.gov](mailto:DEEP.climate resilience@ct.gov). Subject line must include the name of the primary applicant and must be received by the application deadline.
- **Optional: If applicable, attach any initial designs or development work performed to date**



**Toilsome Brook  
Watershed  
(Project Area)**

**Rippowam/Mill River  
Watershed Management  
and Infrastructure Study**

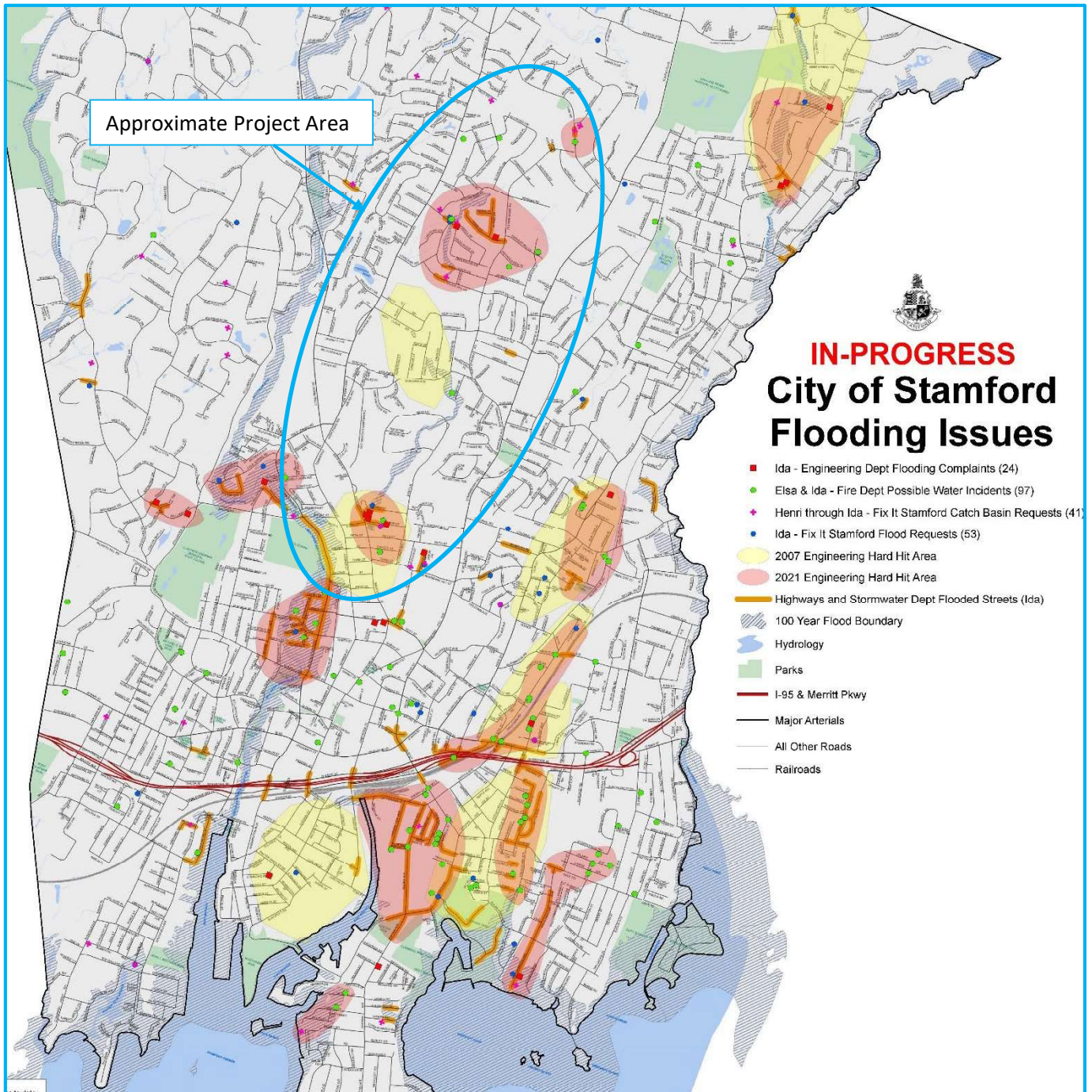
**Figure 6-1: Mill River  
Watershed and Subbasins**

- Streams
- Study Reach
- Lakes & Ponds
- Subbasins**
- Ayers Brook
- Direct Drainage - Lower
- Direct Drainage - Middle
- Direct Drainage - Upper
- Haviland Brook
- Holts Ice Pond
- Laurel Reservoir
- North Stamford Reservoir
- Poorhouse Brook
- Toilsome Brook



0 0.5 1 Miles

Basemap Source: ESRI





**DEEP Climate Resilience Fund Budget**

Toilsome Brook Flood Resilience Plan

City of Stamford

**Budget Summary**

Salaries *	\$0
Fringe	\$0
<b>Total Salary &amp; Fringe</b>	<b>\$0</b>
<b>Travel</b>	<b>\$0</b>
<b>Participant Support Costs</b>	<b>\$7,125</b>
Subawards	\$0
Contractual Services	\$587,000
Materials and Supplies	\$4,000
<b>Total Other Direct</b>	<b>\$591,000</b>
<b>Indirect</b>	<b>\$0</b>
<b>Total Budget:</b>	<b>\$598,125</b>

**Budget Justification**

**Direct Costs: \$598,125**

**Indirect Costs: \$0**

**Total Request: \$598,125**

**Personnel ..... \$0**

We are not requesting grant funding for City of Stamford personnel.

**Fringe Benefits ..... \$0**

We are not requesting grant funding for City of Stamford personnel.

**Travel ..... \$0**

We are not requesting grant funding for project-related travel by City of Stamford personnel.

Consultant travel costs are included in the contractual services budget item.

**Participant Support Costs ..... \$7,125**

We request participant support costs of \$4,750 in Year 1 and \$2,375 in Year 2 (\$7,125 total). We will work in partnership with a Citizen and Technical Advisory Committee, including City staff, community organizations, youth/school groups, and local business representatives and homeowners to conduct the following project meetings:



Meeting Description	Number of Meetings	In-person or Virtual?	Food Provided?	Language Translation Services?
Citizen and Technical Advisory Committee Meetings	4	In-person or virtual*	Yes	No
Public Workshop Meetings	3	In-person	Yes	Yes

\*In-person meeting format assumed for budgeting purposes.

In order to facilitate a high level of stakeholder participation, funds will be used to provide food for in-person meetings and language translation services for the public workshop meetings. We expect that up to 25 people will participate in each in-person meeting where food will be provided at a cost of approximately \$15 per person, per meeting (\$375 per meeting x 7 meetings = \$2,625). Meetings are anticipated to be 1 to 2 hours in duration depending on the specific focus of the meeting and include a light breakfast, lunch, or dinner depending on time of day. No facility rental fees are anticipated. An allowance of \$4,500 is requested for language translation services for up to 3 meetings (\$1,500 per meeting).

**Other Direct Costs . . . . . \$591,000**

Other direct costs include contractual services for a planning and engineering consultant, as well as materials, supplies, and printed translational services in support of stakeholder and community engagement activities.

**Contractual Services . . . . . \$587,000**

We request \$598,000 to contract with Fuss & O’Neill to provide planning and engineering services for this project. Fuss & O’Neill will work closely with the City, Citizen and Technical Advisory Committee, community organizations, youth/school groups, and other stakeholders providing overall project management, technical expertise related to flood modeling, identification and evaluation of various flood mitigation scenarios, and development of a flood resilience plan.

**Materials and Supplies . . . . . \$4,000**

We request \$2,000 for materials, supplies, and printing/distribution of outreach materials in support of the advisory committee and public workshop meetings. These are anticipated to include fact sheets, flyers, solicitations for feedback and participation in the project (e.g., on-line survey or questionnaire), and related materials. These materials will be distributed via electronic methods and via USPS to households and businesses within the project area. We request an additional \$2,000 for written translation services to translate English language community outreach and engagement materials to one additional language. The proposed



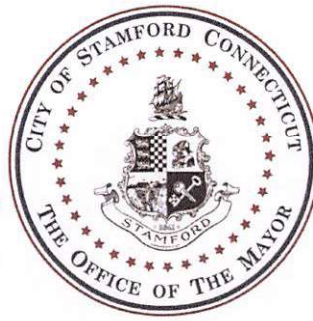
materials, supplies, and written translation services are essential for increasing participation in and enhancing the effectiveness of the stakeholder and community engagement meetings.

**Indirect Costs . . . . . \$0**

We are not requesting grant funding for indirect costs.







November 29, 2022

Commissioner Katie Dykes  
CT Department of Energy & Environmental Protection  
79 Elm Street  
Hartford, CT. 06106-5127

Dear Commissioner Dykes:

Re: Stamford Toilsome Brook Flood Resilience Study  
DEEP Climate Resilience Fund – Track 2 grant application

Please accept this letter as a demonstration of support and commitment for the application for Stamford Toilsome Brook Flood Resilience Study. Toilsome Brook, an urban stream and historical tributary to the Mill/Rippowam River (draining approximately 1.7 square mile watershed in the commercial and residential neighborhoods north of downtown Stamford) is particularly susceptible to flooding. The Toilsome Brook watershed is heavily developed, receives large quantities of stormwater runoff, and is culverted along portions of its approximately 3-mile length. Numerous residential and commercial properties and public infrastructure are impacted by a combination of riverine and drainage-related flooding along the Toilsome Brook corridor.

The City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. The evaluation will better define the causes and factors contributing to flooding in the watershed and provide strategies to make these neighborhoods more resilient to existing and future flooding while also improving water quality and providing other community and ecological co-benefits. The watershed-scale flood resilience evaluation will result in concept-level flood mitigation recommendations to alleviate flooding along Toilsome Brook, including a combination of drainage system improvements (increased capacity of storm drain pipes, culverts, etc.), nature-based solutions such as green stormwater infrastructure and floodplain restoration, and raising or relocating infrastructure and structures outside of areas impacted by flooding. This project will also complement the City's parallel efforts to conduct a citywide drainage assessment and develop a coastal flood resilience plan focused on coastal flood risk reduction.

Thank you in advance for your consideration of this project. I look forward to the implementation of this project and the many benefits it will bring to our community. Please do not hesitate to reach out if you have any questions or need any additional information.

Very truly yours,

A handwritten signature in blue ink, appearing to be 'Caroline Simmons', is written over a white background.

Caroline Simmons

cc: Sarah Watson, CT DEEP Office of Climate Planning



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December 1, 2022

Commissioner Katie Dykes  
CT Department of Energy & Environmental Protection  
79 Elm Street  
Hartford, CT. 06106-5127

Re: Stamford Toilsome Brook Flood Resilience Study  
DEEP Climate Resilience Fund – Track 2 grant application

Dear Commissioner Dykes:

Please accept this letter as a demonstration of support and commitment for the application for Stamford Toilsome Brook Flood Resilience Study. Toilsome Brook drains an approximately 1.7 square mile watershed into the Mill River. That watershed covers the commercial and residential neighborhoods north of Stamford Downtown and is particularly susceptible to flooding. The Toilsome Brook watershed is heavily developed, receives large quantities of stormwater runoff, and is culverted along portions of its approximately 3-mile length.

I know this geography and its challenges well as a resident and homeowner in an historic district within this watershed. With increasing storm intensity, flooding has become a more regular occurrence. In particular, during Hurricane Ida in 2021, many of the low-lying properties outside of the 100-year flood plain faced significant inundation. Personally, my household lost two vehicles and approximately 10 more were totaled in our neighborhood in addition to multiple basements and loss of boilers, hot water heaters, and other appliances.

The City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. The evaluation will better define the causes and factors contributing to flooding in the watershed and provide strategies to make these neighborhoods more resilient to existing and future flooding while also improving water quality and providing other community and ecological co-benefits. The watershed-scale flood resilience evaluation will result in concept-level flood mitigation recommendations to alleviate flooding along Toilsome Brook, including a combination of drainage system improvements (increased capacity of storm drain pipes, culverts, etc.), nature-based solutions such as green



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First County Bank  
**Joseph Graziose**, Sr. Vice President  
RXR Realty  
**Stephen J. Hoffman**, Managing Partner  
Hoffman Investment Partners LLC  
**Russ Hollander**, President  
R. Hollander: Master Goldsmith Inc.  
**Alice S. Knapp**, CEO  
Ferguson Library  
**Beth Krupa**, Allied ASID, IDS Associate, GREEN AP  
Beth Krupa Interiors  
**Todd Lindvall**, General Manager  
Courtyard by Marriott Stamford Downtown  
Residence Inn by Marriott Stamford Downtown  
**Gregory Lodato**, President  
MarLo Associates, Inc.  
**Michael Marchetti**  
Columbus Park Trattoria  
**Nagi Osta**, General Manager  
36 Atlantic St LLC and Old Town Square LLC  
**Teddy Pappas**, Property Manager  
Rubenstein Partners  
**Denis Patterson**  
Stamford Board of Representatives  
**Randall M. Salvatore**, President  
RMS Companies, LLC  
**Paul Senecal**, Managing Director  
United Services of America/AffinEco, LLC  
**Grant Silver**, Director  
CBRE  
**Caroline Simmons**, Mayor  
City of Stamford  
**Robert Stoddard**, Partner Strategic Corporate Tax  
KPMG  
**Dr. Sharon J. White**, Principal  
Dr. Sharon J. White & Associates, LLC  
**Alex Yaraghi**, Textile Buyer  
Safaviieh  
**Ari Yasgur**, Principal  
New England Investment Partners

### **Ex-Officio Commissioners**

**Ralph Blessing**, Land Use Bureau Chief  
City of Stamford  
**Heather Cavanagh**, President & CEO  
Stamford Chamber of Commerce  
**Alice S. Knapp**, CEO  
Ferguson Library  
**Loren Nadres**, Executive Director  
Urban Redevelopment Commission  
**Dr. Jennifer Orlikoff**, Campus Director  
UConn Stamford  
**Jon Winkel**, Executive Director  
The Stamford Partnership, Inc.

### **Commissioners Emeriti**

**Carl Bildner**, President  
Bildner Capital Corp.  
**Robert H. Kahn**, Present  
United Realty, Inc.  
**Robert Karp**, President  
BE Rep Group  
**Norman Lotstein**, Vice President  
Pyramid Real Estate Group  
**Frank J. Mercede**, President & CEO  
Frank Mercede & Sons, Inc.

**David M. Kooris**, President

stormwater infrastructure and floodplain restoration, and raising or relocating infrastructure and structures outside of areas impacted by flooding. This project will also complement the City's parallel efforts to conduct a citywide drainage assessment and develop a coastal flood resilience plan focused on coastal flood risk reduction.

In late 2021, I presented to a meeting of our neighbors on the challenges that we face and the opportunities that exist for mitigation. This planning process will be an incredibly welcome step of support by both the city and state governments. In addition to future capital projects to be implemented by the public sector, we hope that this plan results in individual actions that we and other property owners can take. I'm confident that the local will exists to significantly support these efforts.

Thank you in advance for your consideration of this project. I look forward to the many benefits it will bring to our community. Please do not hesitate to reach out if you have any questions or need any additional information.

Respectfully,

**David Kooris**  
President

cc: Sarah Watson, CT DEEP Office of Climate Planning

30 November, 2022

Commissioner Katie Dykes  
CT Department of Energy & Environmental Protection  
79 Elm Street  
Hartford, CT. 06106-5127  
Re: Stamford Toilsome Brook Flood Resilience Study  
DEEP Climate Resilience Fund – Track 2 grant application

Dear Commissioner Dykes:

Please accept this letter as a demonstration of support and commitment for the application for Stamford Toilsome Brook Flood Resilience Study. Toilsome Brook, an urban stream and historical tributary to the Mill/Rippowam River (draining approximately 1.7 square mile watershed in the commercial and residential neighborhoods north of downtown Stamford) is particularly susceptible to flooding. The Toilsome Brook watershed is heavily developed, receives large quantities of stormwater runoff, and is culverted along portions of its approximately 3-mile length. Over the last several years as a member of the Board of Representatives here in Stamford, many constituents of mine living in this area have faced flooding in their homes and properties, all of which faced difficulty in finding financial recovery. In addition, many constituents have found it difficult in maintaining the culverts because they abut more than one property and are not owned by the property owners. In turn, the city and state find it difficult accessing the culverts because they must access private property to do so. The infrastructure itself is dilapidating and can no longer handle the increase in severity of the storms we are experiencing.

The City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. The evaluation will better define the causes and factors contributing to flooding in the watershed and provide strategies to make these neighborhoods more resilient to existing and future flooding while also improving water quality and providing other community and ecological co-benefits.

Thank you in advance for your consideration of this project. **It is desperately needed.** Please do not hesitate to reach out if you have any questions or need any additional information on my personal cell at 203-312-3684.

Respectfully,



Dan Sandford  
Stamford Board of Representatives – District 14

cc: Sarah Watson, CT DEEP Office of Climate Planning

11/30/22

Commissioner Katie Dykes  
CT Department of Energy & Environmental Protection  
79 Elm Street  
Hartford, CT. 06106-5127  
Re: Stamford Toilsome Brook Flood Resilience Study  
DEEP Climate Resilience Fund – Track 2 grant application

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During Storm IDA, portions of the neighborhood we represent, were severely flooded and damaged and sadly this wasn't the first time. On Chester Street, we had a resident rescued from a submerged car under 3 feet of water. The road had a dip in it but it was not at the bottom of a hill or anywhere near the waterfront. On Urban Street, a renter had water coming into the first floor of their ranch house and moved out the following week. Any help to remediate this problem would be greatly appreciated.

The City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. The evaluation will better define the causes and factors contributing to flooding in the watershed and provide strategies to make these neighborhoods more resilient to existing and future flooding while also improving water quality and providing other community and ecological co-benefits. The watershed-scale flood resilience evaluation will result in concept-level flood mitigation recommendations to alleviate flooding along Toilsome Brook, including a combination of drainage system improvements (increased capacity of storm drain pipes, culverts, etc.), nature-based solutions such as green stormwater infrastructure and floodplain restoration, and raising or relocating infrastructure and structures outside of areas impacted by flooding. This project will also complement the City's parallel efforts to conduct a citywide drainage assessment and develop a coastal flood resilience plan focused on coastal flood risk reduction.

Thank you in advance for your consideration of this project.

Respectfully,

Representative Cara Gilbride, District 11, Stamford  
Representative Maureen Pollack, District 11, Stamford, CT  
cc: Sarah Watson, CT DEEP Office of Climate Planning





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Ryan Salvatore  
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Jim Shapiro  
Camille S. Spaulding  
Adam Whittingham  
Jon Winkel  
Jennifer Young  
Fabrizio Zichichi  
Nate Zubal

Nette Compton,  
*President & CEO*

November 29, 2022

Commissioner Katie Dykes  
CT Department of Energy & Environmental Protection  
79 Elm Street  
Hartford, CT. 06106-5127

Re: Stamford Toilsome Brook Flood Resilience Study  
DEEP Climate Resilience Fund – Track 2 grant application

Dear Commissioner Dykes:

Please accept this letter as a demonstration of support and commitment for the application for Stamford Toilsome Brook Flood Resilience Study. Toilsome Brook, an urban stream and historical tributary to the Mill/Rippowam River is particularly susceptible to flooding. The Toilsome Brook watershed is heavily developed, receives large quantities of stormwater runoff, and is culverted along portions of its approximately 3-mile length. Numerous residential and commercial properties and public infrastructure are impacted by a combination of riverine and drainage-related flooding along the Toilsome Brook corridor.

Our organization strongly supports the City of Stamford is seeking Track 2 grant funding through the CT DEEP Climate Resilience Fund to conduct a comprehensive engineering evaluation of the flooding problems in the Toilsome Brook watershed. As an organization we are deeply connected to the importance of climate resilience, but also dependent on upstream resilience work for the continued health of the Rippowam River at the heart of our park. Having quality engineering analysis and public understanding of requisite work for this watershed is critical to our future as an organization and as a city.

Thank you in advance for your consideration of this project. I look forward to the implementation of this project and the many benefits it will bring to our community. Please do not hesitate to reach out if you have any questions or need any additional information.

Respectfully,

*Nette Compton*

Nette Compton

cc: Sarah Watson, CT DEEP Office of Climate Planning

# Erin McKenna

## CITY OF STAMFORD LAND USE BUREAU

888 WASHINGTON BLVD.

STAMFORD, CT 06901

(203) 977 4715

EMCKENNA@STAMFORDCT.GOV

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Associate Planner with 12+ years of experience primarily managing parks planning projects; managing the mayor's task force on sustainability; and coordinating sustainability and transportation projects.

I am looking to broaden my knowledge of urban sustainability strategies, particularly with regard to urban adaptation to climate change.

### Professional Experience relevant to Innovative Governance of Large Urban Systems Program

#### CITY OF STAMFORD, STAMFORD, CT

##### *Associate Planner, April 2004 - present*

- Project management of all aspects of design development for park master plans including hiring consultants, public meetings, the design process, consultant contracts, permitting, and coordinating with City staff during both planning and construction.
- Co-founded the Mayor's Task Force on Sustainability. Accomplishments include the Solarize Stamford program, membership in Energize CT's *Clean Energy Communities* program, the *Corporate Challenge* (energy & water efficiencies), creation and adoption of the Sustainability Amendment to the City's Master Plan, and the LEED Ordinance for City Buildings.
- Project management of the 2015 Glenbrook/Springdale Transit Oriented Development Feasibility Study, centered on the two neighborhood train stations.
- Project management of sustainability projects including electric car charging stations in City garages, one which is connected to a solar array; ongoing work with hydrogen advocate groups to locate a demonstration hydrogen fueling station in Stamford; and ongoing efforts with the Grants & Engineering Departments and local business organizations to pursue funding/grants to create a comprehensive climate change risk assessment for the City.
- Coordination of policies, grants, constructions projects, outreach, and volunteer projects for "Friends of Parks" groups, including Friends of Mianus River Park, the Scalzi River Nature Preserve, the Cove Island Wildlife Sanctuary, and the Friends of Sleepy Hollow Park.

#### NEW YORK CITY PARKS DEPARTMENT – STREET TREES DIVISION, NEW YORK, NY

##### *Construction Project Manager, September 1997 – September 2000*

- Construction management of all aspects of street tree planting projects and contracts in Greenpoint & Williamsburg neighborhoods in Brooklyn, NY.

### Education

#### YALE SCHOOL OF FORESTRY & ENVIRONMENTAL STUDIES, NEW HAVEN, CT

- MES, Environmental Management

#### COLUMBIA UNIVERSTIY, NEW YORK, NY

- BS English Literature, Geology Minor
- Graduated Magna Cum Laude, Phi Beta Kappa

### Additional Skills

- GIS ArcMap



## Sara Morrison, MLA, WEDG

*Coastal Adaptation and Community Engagement*

"I get most excited about working on projects at the intersection of land and water and am passionate about helping communities and ecosystems evolve and adapt in the face of an evolving climate. I like working on multi-disciplinary teams to integrate natural and engineered systems using nature-based solutions to achieve socially-resilient, economically-viable, and environmentally-sustainable projects."

[smorrison@fando.com](mailto:smorrison@fando.com)

800.286.2469 x5300

### EDUCATION

MS, Landscape Architecture - City College of New York

BS, Psychology - 2005 Louisiana Tech University

### LICENSES & REGISTRATIONS

WEDG Associate

### PROFESSIONAL AFFILIATIONS

American Soc Adaptation Profs  
CT Association of Flood Managers  
MA Assoc of Floodplain Mgmt  
American Soc of Landscape Architects

### EXPERIENCE

15 Years Professional Experience

Sara Morrison is a Business Line Manager specializing in Climate Adaptation in our Water and Natural Resources Business Line with a background in systems-based, urban landscape architecture and large-scale climate resilience design and planning. Sara's expertise is integrating natural and engineered systems using nature-based solutions to achieve socially resilient, economically viable, and environmentally sustainable projects. She has led the management, planning, and design of climate adaptation projects of varying scales across the northeast including complex, interdisciplinary coastal resilience projects in NYC in the aftermath of Superstorm Sandy. Her experience includes both coastal and inland environments and ranges from living shorelines, salt marsh and dune enhancements to floodplain and river restoration projects.

### REPRESENTATIVE PROJECTS:

**Pocasasset River Flood Control Improvements, Cranston, RI:** A \$48M capital project that combines traditional gray infrastructure and nature-based practices. The project includes buy-outs of more than 120 privately-owned buildings, with plans to convert that space to restored floodplain in urban neighborhoods. In addition to creating floodplain storage in a high-vulnerability watershed, these restored floodplain nodes will create open space and recreational access to the river in their urban neighborhoods. Sara leads the coordination of the buyout process and design of nature-based solutions, community access, and floodplain compensation.



**Tottenville Shoreline Protection Project, Staten**

**Island, NY:** At her previous firm, Sara served as Project Manager and Lead Designer for this \$32.5M coastal and community resiliency project to provide a layered system of risk reduction, ecological resiliency, and social resiliency for the community of Staten Island's south shore. The design of the system incorporates structured dunes, eco-revetments, and a robust shoreline planting and restoration plan to reduce erosion and attenuate wave action. Sara was responsible for coordination among five internal cross-disciplinary groups and six subconsultants. She supported the client by leading working groups that included members of the public, city/state agencies, academics, and elected officials to foster communication and attain buy in, improve understanding of local issues, and educate on risks to coastal habitats.

**Updates to Connecticut Statewide Stormwater**

**Manuals, Statewide, CT:** Supported lead author in developing updates to the Connecticut Stormwater Quality Manual and Connecticut Guidelines for Soil Erosion and Sediment Control.

**Easton's Beach Program Planning Study, City of**

**Newport, RI:** Fuss & O'Neill is performing a program planning study at Easton's Beach taking into account the impacts of our changing climate and visitor needs now and in the future. As the Atlantic's water levels rise, storm activity increases in frequency and strength, and overland flooding threatens the beach from the north. Preserving the beach and any associated structures and amenities required by beachgoers necessitates rethinking how the constructed and natural landscape interact.

**Portland Landing, Portland, ME:** At a previous firm, Sara led the resiliency design approach for a study of an underutilized three-acre parcel on the Portland waterfront. The City envisioned a highly programmed, climate-change responsive, iconic civic amenity. The proposed solution that not only satisfied the City's program, but also addressed climate change through a dramatic and highly-usable landscape that advanced the City's initiative to sustain and enliven its waterfront.

**Climate Change Vulnerability and Risk Assessment of Infrastructure, Winthrop, MA:**

At a previous firm, Sara served as Landscape Lead on vulnerability assessment of public infrastructure to coastal flooding using the Boston Harbor Flood Risk Model. The assessment systematically evaluated and prioritized critical infrastructure at a Town-wide level. Concept level adaptation measures were developed for key locations integrating hard and soft solutions.

**GATE 195082A – Jamaica Bay West Pond Shoreline Restoration, Queens, NY:**

At a previous firm as Landscape Architectural Designer, Sara lent knowledge to the development of living shoreline solutions leading to the preliminary design for West Pond. The site is one of the largest coastal wetland ecosystems in the region with an approximately 45-acre fresh water pond on the western side of the Jamaica Bay Wildlife Refuge. The embankment of the pond was beached during Hurricane Sandy, resulting water flowing between West Pond and Jamaica Bay. Initiated by the NPS, the goals of the project are to control bank erosion, restore approximately 5 acres of low and high marsh wetland habitat, stabilize the shoreline, and to function as a sustainable living shoreline to protect the breach repair in the West Pond embankment.



## Erik Mas, PE

*Project Manager*

“Applying math and science to solve environmental problems is what first attracted me to engineering, but working with really bright, passionate people on real-world projects – both simple and complex – is what I enjoy the most about being a consultant.”

[emas@fando.com](mailto:emas@fando.com)

800.286.2469 x4433

### EDUCATION

BS, Civil Engineering - 1992  
Tufts University

MSE, Civil Engineering - 1995  
Princeton University

### LICENSES & REGISTRATIONS

Professional Engineer CT  
Professional Engineer MA

### PROFESSIONAL AFFILIATIONS

New England Water Env Assoc  
Water Environment Federation

### EXPERIENCE

29 Years Professional Experience

Erik is a Principal of the firm and his background and experience combine planning and engineering in the areas of flood protection, climate resilience, and stormwater management. Erik is working with the City of Stamford and the City of Danbury on FEMA grant development for flood mitigation initiatives. He directed the creation of the RIDOT Road-Stream Crossing Assessment Handbook and developed a flood resilience plan for the 300-square-mile Wood-Pawcatuck watershed in southeastern CT and southern RI. He is also the lead author for updates to the Connecticut state stormwater manuals, and leads the firm's MS4 practice in Connecticut. Erik served on the Rivers Subgroup of the Connecticut Governor's Council on Climate Change (GC3) Working and Natural Lands Working Group. He also leads the firm's municipal climate resilience practice in Massachusetts (MVP Program), providing project management and technical oversight of climate vulnerability assessments and adaptation projects for municipalities.

### REPRESENTATIVE PROJECTS:

#### **FEMA BRIC/FMA Grant Development, Coastal Flood**

**Resilience Plan, Stamford, CT:** Project Manager for development of a city-wide coastal resilience plan to address existing and future flood prone areas.

#### **FEMA HMGP Grant Development, Neighborhood-Scale Flood Mitigation Evaluations, Stamford, CT:**

Project Director for evaluation of flood protection alternatives to address riverine and drainage-related flooding in the Dannell Drive and Cummings Pond neighborhoods.

#### **FEMA BRIC Grant Development, Upper Falls Dam Removal Feasibility Evaluation, Norwich, CT:**

Project Director for a feasibility study to evaluate the removal of Upper Falls Dam to reduce flood risk along the Yantic River.

**Municipal Stormwater Drainage Manuals, Greenwich, Stamford, Danbury, CT:** Project Manager for development of municipal design manuals to promote the use of low impact development and green infrastructure for more effective and resilient stormwater management.

**Updates to Connecticut Statewide Stormwater Manuals, CT DEEP, CT:** Project Manager and lead author for updates to the Connecticut Stormwater Quality Manual and Connecticut Guidelines for Soil Erosion and Sediment Control.

**Coastal Flood Resilience Project, City of Milford, CT:** Project Manager for the initial planning phase of coastal resilience projects to address flooding in low-lying areas of Milford. The projects included a vulnerability assessment and feasibility study for raising a section of Beachland Avenue, and conceptual design of drainage infrastructure and outfall improvements to address tidal and storm-related flooding in the Bayview Beach area.

**RIDOT Statewide Manual and Road-Stream Crossing Assessment Pilot Study, Woonasquatucket River Watershed, RI:** Project Director for an assessment of 300+ culverts and bridges in the Woonasquatucket River watershed as part of the development of a statewide road-stream crossing assessment manual for RIDOT.

**Wood-Pawcatuck Watershed Flood Resilience Management Plan, RI and CT:** Led the development of a flood resiliency management plan for the 317-square-mile Pawcatuck River watershed.

**Town-wide Road Stream Crossing Assessment and Climate Change Adaptation Plan, Town of Belchertown, MA:** Project Director for Belchertown's MVP Action Grant in the first round of MVP implementation funding from EEA. The project identified and provided recommendations for high-priority crossings to enhance community resiliency, mitigate existing and potential future flooding, and increase stream continuity and aquatic passage. The project included field survey of beaver activity and development of vulnerability assessments to quantify potential flood storage or flood risk from beaver impoundments and recommend management actions from restoration to beaver exclusion.

**Infrastructure Planning for Climate Change Resilience, City of Northampton, MA:** Project Manager for development of resilience strategy recommendations related to storm drainage infrastructure and flood control/floodplain management to support development of a Climate Resiliency and Regeneration Plan.

**Integrated Water Infrastructure Vulnerability Assessment and Climate Resiliency Plan, Towns of Charlton and Spencer, MA:** Project Manager for a joint MVP Action Grant project in the first round of MVP implementation from EEA. The project examined culverts and bridges, dams, water and wastewater infrastructure, and green infrastructure opportunities.

**Upper Susquehanna River Watershed Flood Resilience Study, Tioga and Broome Counties, NY:** Project Manager for the development of a watershed-based flood resilience study and management plan for flood-prone tributaries to the Upper Susquehanna River in the Southern Tier of NY.



## Elsa Loehmann, PE

*Plan Development Technical Lead*

“I am driven to provide sustainable solutions to create a resilient future. My passion is developing strong relationships to bring my clients’ visions to life.”

[eloehmann@fando.com](mailto:eloehmann@fando.com)

800.286.2469 x5339

### EDUCATION

BS, Civil Engineering - 1999  
Montana State University-Billings

MS, Civil Engineering - 2002  
Montana State University-Billings

### LICENSES & REGISTRATIONS

Professional Engineer CT

### PROFESSIONAL AFFILIATIONS

Assoc State Dam Safety Offcls

### EXPERIENCE

16 Years Professional Experience

Elsa leads Fuss & O’Neill’s South Region Water Resources Practice, furthering and promoting climate resilience through stormwater management, dam safety, stream restoration, fish passage, and floodplain management services. The Water Resources Practice protects New England’s waterways, watercourses, and the land, species, and habitats of the surrounding areas.

Elsa is an engineer and fluvial geomorphologist with experience throughout New England. She has a passion for climate adaptation and resiliency, as evidenced by her work on living shoreline, aquatic habitat restoration, flood control, and green infrastructure projects.

### REPRESENTATIVE PROJECTS:

**FEMA HMGP Grant, Neighborhood-Scale Flood Mitigation Evaluations, Stamford, CT:** Technical lead for development of hydrologic/hydraulic analysis approach to address riverine and drainage-related flooding in the Dannell Drive and Cummings Pond neighborhoods.

**FEMA Grant, Hartford Flood Control System, Hartford, CT:** Project Manager and technical oversight for a FEMA BRIC/HMGP grant application and Benefit-Cost Analysis for proposed flood protection measures associated with the City’s existing flood control system.

**Stormwater Drainage Manual, City of Danbury, CT:** Project Manager for the development of a municipal design manual to promote the use of low impact development and green infrastructure for more effective and resilient stormwater management

**Stormwater Management Plan, Norwich, CT:**

Developed stormwater Best Management Practices (BMP) guidance for municipal staff.

**Harbor Brook Flood Control Project, Meriden, CT:**

Project Manager for the ongoing design and implementation of nature-based floodplain restoration, building floodproofing, and acquisition/removal of several structures in downtown Meriden.

**East Shore Park Living Shoreline, New Haven, CT:**

With a previous firm, Elsa coordinated design for 1,500 linear feet of living shoreline at East Shore Park in New Haven Harbor. Submitted grant application to NOAA Coastal Resilience Grant Program.

**Shoreline Stabilization Manual, FirstLight Power, CT:**

With a previous firm, Elsa prepared shoreline stabilization designs, including living shorelines and vegetated buffer zones for inclusion in the Shoreline Stabilization Manual. This guide received the 2014 Honor Award from the Connecticut Chapter of the American Society of Landscape Architects. The manual provides appropriate sustainable shoreline management practices to improve water quality, stabilize banks, and enhance shoreline habitat.

**Sunken Meadow State Park Green Infrastructure Retrofit, Smithtown, Long Island, NY:**

With a previous firm, Elsa assessed green infrastructure retrofit of 16.6-acre parking lot at Sunken Meadow State Park. Reviewed site plans, technical reports, and stormwater modeling.

**New Haven Green Infrastructure, New Haven, CT:**

With a previous firm, Elsa completed technical review of street-side bioswales for treatment of road runoff for 200+ bioswales. Elsa recommended design improvements.

**Mill/Rippowam River Dam Removal and Habitat Improvements, Stamford, CT:**

With a previous firm, Elsa developed a HEC-RAS hydraulic model of proposed conditions for dam removal and habitat improvement in downtown Stamford. Developed permit applications to support the proposed dam removal, channel restoration, and linear park along this urban river corridor. Successfully secured Stream Channel Encroachment, Diversion and Dam Safety permits from CTDEEP Inland Water Resources Division and a Structures, Dredging, and Fill permit from the Office of Long Island Sound Programs.

**Natural Hazard Mitigation Plan, New Haven, CT:**

With a previous firm, Elsa co-prepared a natural hazard mitigation plan for the City of New Haven. Evaluated hazard effects of sea level rise, inland and coastal flooding, hurricanes, tornadoes, earthquakes, and land subsidence. Recommended improvements including land acquisition, beach nourishment, changes to regulations and municipal zoning, as well as structural and infrastructure improvements. Within five years, the City had implemented most of the plan's recommendations, which addressed resilience and disaster preparedness.

**Natural Hazard Mitigation Plan, Greater Bridgeport Planning Agency, Southwestern CT:**

With a previous firm, Elsa contributed to a natural hazard mitigation plan for the City of Bridgeport and four adjacent municipalities. Evaluated hazard effects of sea level rise, inland and coastal flooding, hurricanes, tornadoes, earthquakes, and land subsidence. Recommended mitigation strategies, including planning and prevention, structural projects, public information, and resource protection.