Project Narrative
Apple Street Roadbed Elevation and Culvert Replacement Project
Town of Essex

1. Project Description, Rationale, and Climate Data

- Utilization and report from the RMAT Climate Resilience Design Standards Tool

  ☒Project is focused on a specific site and includes physical asset/s -- e.g., building, infrastructure, natural resources-- at any project phase

  - The RMAT tool report has been uploaded on the online form.

- Degree to which the most up-to-date climate science and data (including data found on resilientma.org, the RMAT Climate Resilience Design Standards Tool, and/or local-level studies) will be utilized, including specific reference to the climate data utilized.

  - **For Project Type 2:** Design and Permitting – How will the project utilize the preliminary climate risk rating and recommended design standards from the RMAT Climate Resilience Design Standards Tool in the design of the project's physical assets? What other climate data and standards will be used to inform the design process and how will they be utilized?

    The project proposes to improve the site's resilience to flooding by raising the road profile along nearly 900 feet of Apple Street (starting at the Southern Avenue intersection). The Town has already completed data collection and preliminary engineering along this section of Apple Street including resource area delineation, existing conditions survey and property research, geotechnical explorations adjacent to the existing culvert within the project limits, and an extensive hydraulic and hydrologic study including onsite data collection of observed water elevations in the unnamed tributary to the Essex River which passes beneath Apple Street. See **Attachment C** for more details.

    Results of data logger monitoring of water surface elevations at the crossing indicate that water levels only fluctuated by approximately two inches during the monitoring period (one month in December 2021 to January 2022) and suggest that tidal influences may only minimally extend upstream to the Apple Street crossing. Additionally, projections of coincident sea level rise and storm surge completed by the Woods Hole Group utilizing the Massachusetts Coast Flood Risk Model (MCFRM) predict a maximum sea level elevation (NAVD 88) from approximately 4.7 feet currently to 9.0 feet in 2070. The proposed project includes an adjustment to the road elevation of Apple Street to 15.54 ft. in the vicinity of the culvert replacement and the model results suggest that the road will not be overtopped under predicted future conditions.

    Further, Atkins, a technical consultant to the Massachusetts Emergency Management Agency (MEMA) has completed its own analysis of the situation using the MCFRM and results are similar to the analysis developed by the Town's own engineering consultant, TEC. Please see the Atkins charts, tables, and methodology in **Appendix 1** at the end of this narrative for more details.

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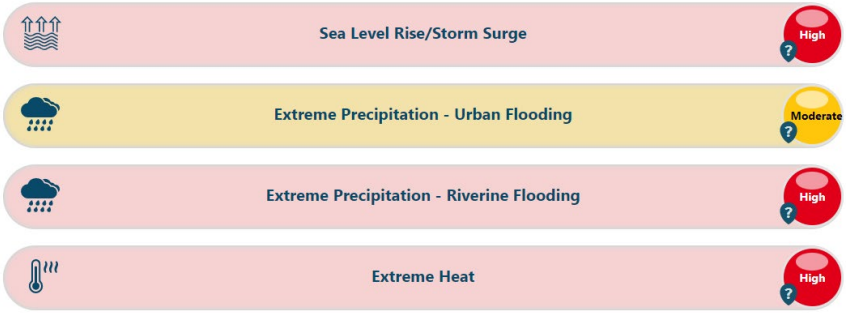
- Inclusion of MVP yearly progress report (Attachment D)

  ☒MVP Planning Grant process was completed more than a year ago

  - Yearly progress report (**Attachment D**) has been uploaded on the online form.

- Description & Rationale:
  - What are the climate change impacts/vulnerabilities this project will address?
    - Please reference the RMAT Climate Resilience Standards Tool climate exposure ratings and how the project is responding to the climate exposures identified through the tool.



Exposure Ratings from RMAT Climate Resilience Standard Tool for this Project.

As depicted above, the RMAT Climate Resilience Standard Tool (Project #8634) produced high vulnerability ratings in the project area for sea level rise/storm surge, extreme precipitation - riverine flooding, and extreme heat, with a moderate rating for extreme precipitation - urban flooding. While the tool may not perfectly capture the project site and its environs, the project will certainly increase resilience to all of these climate-related issues, to one degree or another.

Primarily, the project will be immensely responsive to sea level rise and storm surge. As figures 1-5 located on subsequent pages of the application clearly illustrate, the physical elevation of a short section of the Apple Street roadbed will certainly stave off astronomically-high tides and coastal storm surges when the Essex causeway on State Highway Route 133 is flooded. Given that all remaining portions of Apple Street (the intended, in-Town alternate route to Route 133) are well above any expected sea level or storm surge elevations expected through 2070, the project provides great confidence that any investments made will stand the test of time.

With respect to extreme precipitation, while this factor is not the primary driver for the project, the replacement of the inadequately-sized, environmentally-unresponsive, partially-damaged culvert that is proposed as part of the project is certainly a barrier to upstream hydraulic throughput at this time. As extreme precipitation events increase, the frequency of pipe-full flow occurrences and associated road over-wash and erosion will only serve to diminish the usefulness of Apple Street as an alternative transportation route further. Climate change may also increase the frequency of "rain on snow" events, which will require substantial hydraulic capacity. The precast concrete frame with natural substrate streambed that is proposed by the project will allow for much greater hydraulic throughput resilience while producing a substantial ecological restoration co-benefit.

With respect to extreme heat and drought, during low flow times of the year, the consistent streambed that will be restored by the new stream crossing (which will meet Mass Stream Crossing Standards) will allow for constant flow, a definite ecological resilience benefit. Further, the streambed materials will be well graded with a combination of larger stones with natural streambed material to prevent a "disappearing stream" effect under low flow conditions, if only large stones were utilized in the streambed design.

As outlined later in this narrative, the Town has also evaluated its social environment and this project will not only allow Essex in general to cope with and rebound from future expected events and trends, but our climate-vulnerable senior citizens as well.

- What are the project's goals and objectives?

This project will advance the elevation of a portion of the roadbed of a critical alternative transportation route (Apple Street in Essex), including the reconstruction of a stream crossing to Mass Stream Crossing Standards, through the final design and permitting phases. During coastal storm surge events, State Highway Route 133 typically floods along an area known as the Essex causeway (see **Figure 1**, below), in downtown Essex. If the surge is large enough, the only other in-Town transportation route connecting both halves of the Town (Apple Street) also floods along a short stretch comprised of two, distinct low areas near Apple Street's junction with Southern Avenue (see **Figures 2 and 3**, below). When Apple Street floods, the only path between the two halves of the Town involves a long detour through other communities using Route 128 – preventing the timely passage of emergency and DPW vehicles, regional commuter, tourist, and commercial transportation, and local traffic. While MA DOT has determined that the roadbed of Route 133 cannot be elevated due to complexities associated with businesses and restaurants that flank the Essex causeway – see **Figure 1a**, below – (including the in-progress replacement of the Essex River Bridge), this is not the case with Apple Street. Since Apple Street does not have any conflicts with flanking businesses or residences and since the entirety of Apple Street outside of the two low areas is already well above the coastal surge zone, a roadbed elevation project on Apple Street is very feasible. We hope to move into the construction phase with additional grants after design and permitting is completed.

Figure 1. *The Essex Causeway during the coastal storm of March 2, 2018, when Apple Street last also flooded.*

Figure 1a. *Views of the Route 133 corridor in downtown Essex with peripheral businesses – preventing roadbed elevation.*

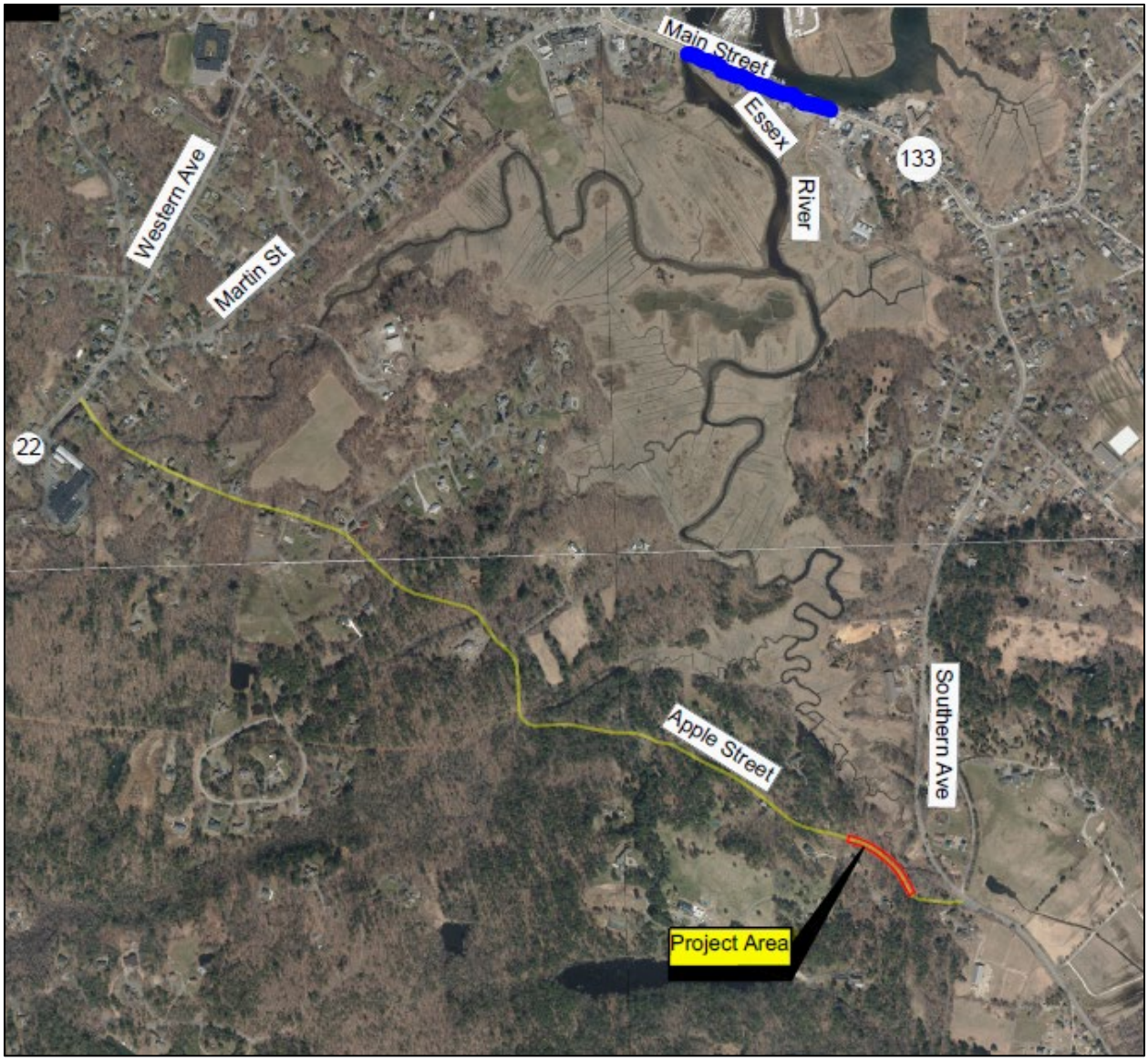


Figure 2. *The area shown in blue (top of map) typically floods during coastal storm surge events and even during some astronomically-high tides. The Project Area shown at the bottom of the map incudes both low sections of Apple Street (see Figure 4 for cross section). The remainder of Apple Street is already well out of the coastal surge zone. While the Essex Causeway on Route 133 cannot be feasibly elevated according to MA DOT, the low portion of Apple Street CAN be. These two routes are the ONLY in-Town routes connecting both halves of the Town. See Figure 3 for a better understanding of the regional transportation picture and the out of Town detour.*

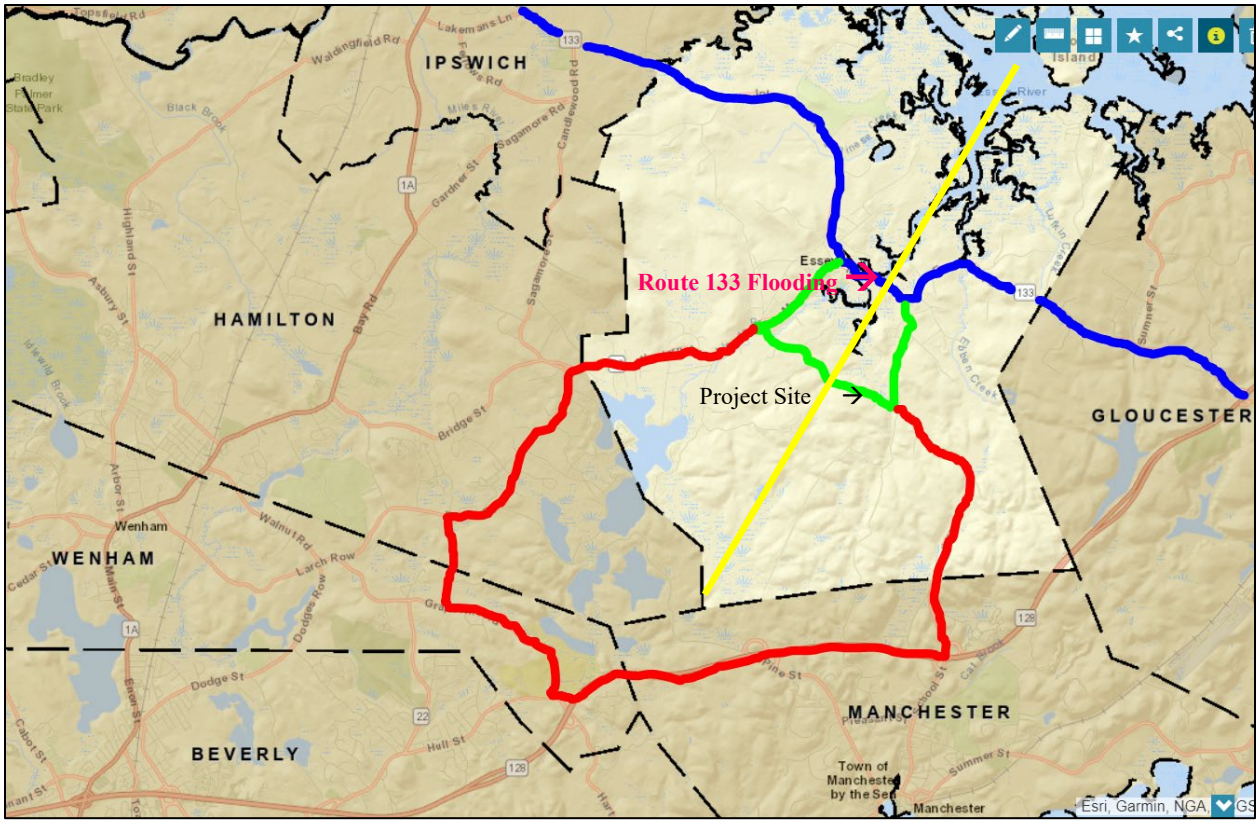


Figure 3. *The blue line is State Highway Route 133, a major artery which connects regional transportation and commerce along the coast. When Route 133 floods at the Essex Causeway in downtown Essex (see Figure 2), transportation can still stay within Town on the green route (Apple Street is the green segment between the two ends of the red route). When Apple Street also floods, a long and circuitous detour is required using the red route (involving State Highway Route 128 and the towns of Manchester-by-the-Sea, Wenham, and Hamilton). The yellow line illustrates approximately how the Town of Essex is divided into two halves from a transportation perspective when in-Town routes are flooded.*

Already, the Town has utilized two MA DER grants and a MA CZM grant to collect basic data about the area, to verify feasibility of the proposed work, and to begin the design plan process. Please see Attachment C for more details on what we have done to date, including links to various products. We also anticipate have pre-filing consultations with MA CZM and with the MEPA Office by June 30, 2022 (supported by funds associated with the second DER grant – which will soon close out). The first of the two low areas include a stream crossing culvert that is in disrepair and that does not feature the ecological advantages that will be made possible if the culvert is replaced with a much larger crossing that meets Mass Stream Crossing Standards. The second of the two low areas does not contain a stream or a culvert but is still well below the coastal surge elevation (see **Figure 4**). After we hopefully get through final design and permitting for both low areas with the award of MVP funding, we hope to apply for substantial Federal construction funding through the FEMA HMGP or BRIC grant programs or the USDOT RAISE grant program. We anticipate a need to come back to MVP for the required, non-Federal construction match at that time.

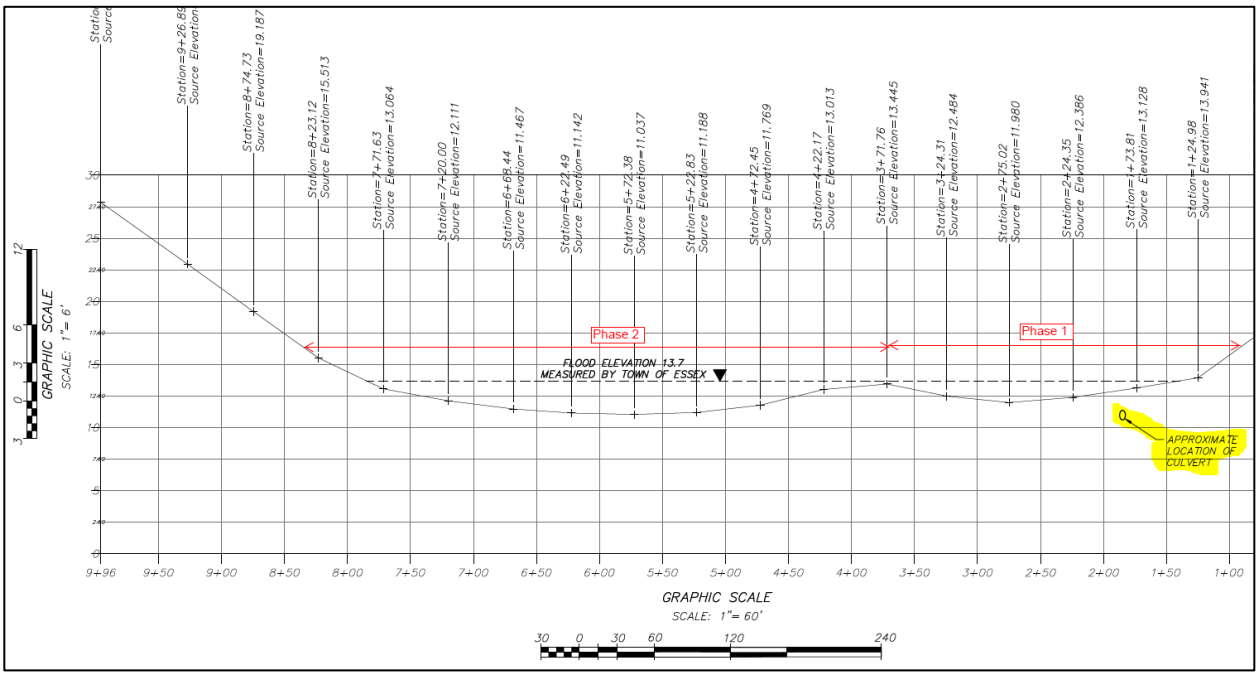


Figure 4. *Cross section of the two low areas on Apple Street. "Phase 1" is the low area with the culvert – closest to Apple Street's junction with Southern Avenue, and "Phase 2" is the low area without a stream crossing. This figure and other useful background may be found in the Feasibility Study that was recently funded via the MA CZM Coastal Resilience Grant Program.*

- Why was the project chosen?
  - How the project will positively impact the resiliency of the site and community.

    While we presently only observe inundation of both Route 133 *AND* Apple Street during major storms that carry appreciable surges, we anticipate from predictive sea level rise data that the closure of *BOTH* transportation routes will only become more and more common in the future. The Town has recognized the public safety, commercial, and climate-vulnerable population impacts that will become increasingly common with respect to Apple Street as high-priority issues in its MVP Final Report (see pages 15, 16, 19, 20, and 24)and its Hazard Mitigation Plan (see pages 2, 4, 22, 24, 27, 71, 75, 91, 99, 101-104, 109, 112, 114, 117, 124, and 127) and needs to address this matter now, so we will be able to cope with what is expected later. It will only be a matter of time before astronomical high tides, without any storm surge influence, will commonly close Route 133 and will threaten Apple Street in its current state (see **Figure 5**).

    Elevating the roadbed while improving the stream crossing will improve both community resiliency and ecological quality for the Town. The invocation of a long detour through other communities using Route 128 just to get back and forth between the two halves of the Town has a very detrimental effect on the continuity of public safety, public health, and public works services, especially during a major storm event where such services are more heavily required (and as the Town rebounds from such an event). Apple Street as a whole becomes a very important alternative transportation route if its low areas can be elevated, which translates to both local and regional resiliency on a number of fronts.

Figure 5. *This is an aerial view from the edge of the marsh that abuts Apple Street looking toward the Essex Causeway on Route 133, during a "King Tide". The Essex River, Essex Bay, and Ipswich Bay are in the distance. The segment of the causeway highlighted in yellow represents the area that typically gets flooded during storm surges and at some astronomically high tides (also see Figure 1). This picture is excerpted from a short drone video shot by DeRosa Environmental in Essex in 2016. You may view the entire video here, which will give you a sense of how Essex is already close to flooding when astronomically high tides are in play. Notice how the entire basin is already flooded well over the top of the marsh platform.*

- If applicable, please include quantifiable information about the historic or expected future damages that are likely to occur if the project is not completed (e.g., number of people/homes/structures at risk, number of people depending on the infrastructure being improved, extent of past flooding, expected cost if infrastructure fails, etc.).

  Atkins, a technical consultant to the Massachusetts Emergency Management Agency (MEMA) has completed its own analysis of risk recurrence using the Massachusetts Coast Flood Risk Model (MCFRM) and results align well with the Town's own engineering consultant's (TEC) expectations . Please see the Atkins charts, tables, and methodology in Appendix 1 at the end of this narrative for more details.

- How does the project reflect municipal priorities established in the community's MVP-approved report?

  This project will address the top municipal priority in the "Infrastructural Features" section of the Town's MVP-approved report (see page 24). The project will also allow for further implementation of the second municipal priority in the same section, which pertains to planning around the reality of more frequent and longer duration inundation events at the Essex Causeway section of State Highway Route 133 in downtown Essex. The project will essentially allow the Town to put in place an essential precursor to managed retreat should the situation lend itself to that strategy in the future.

2. Timeline, Scope, and Budget

- Please detail each task/step of the project here and include a summarized version in Attachment B. For each task, please identify if it is dependent on completion of another task.

  The scope of work shown in **Attachment B** provides a description of the services to be performed for final design and permitting. The progress plans completed to date are suitable for seeking the environmental permits for the project. The plan and design development will closely follow the MassDOT design development process for a transportation improvement project through 75%, 100%, and PS&E submissions. We have provided a Gantt Chart (see **Appendix 2** to this narrative) design schedule that provides the logic of tasks, when they occur, what tasks precede and what tasks follow in conjunction with public outreach, environmental permitting and Right of Way processes. A detailed description of services is also included as an attachment to the application filing.

- Project budget. Applicants will include budget numbers for each task and sub-task via Attachment B. There is a place to upload Attachment B as an Excel spreadsheet on the online form. The "optional budget data" tab on the spreadsheet is optional but can be used to calculate budget numbers to the extent helpful, identify assumed rates for project team time and municipal in-kind match, or justify high grant funding requests for specific tasks by providing greater detail. The Applicant may also use another format to provide greater detail on these items (e.g., a quote from a contractor or a separate spreadsheet). There is a spot to upload additional materials on the online form.

  Attachment B has been uploaded on the online form and additional information from our engineering consultant (TEC) including TEC's own detailed scope of work and a work hour estimate is attached to the on-line form as additional materials. The required match is in cash and exceeds 25% of the total project cost of $296,050 by about $6,000 (which the Town will use as contingency).

- Clear project timeline that can be completed within the specified contract period. For projects that require completion of Attachment C, please include major milestones, regulatory touchpoints and approvals, and information on how any project planning, design, and regulatory compliance efforts will be met during the grant period. Please ensure the timeline dates align with start and end dates for each task in Attachment B.

  Attachments B and C have been uploaded on the online form and **Appendix 2** to this narrative contains a **Gantt Chart** that highlights milestones and regulatory touchpoints/approvals, and demonstrates how project planning, design, and regulatory compliance will be accomplished during the grant period.

  Attachments B and C have been uploaded on the online form.

- Identification of regulatory project components (including satisfactory completion of Attachment C if a design, permitting, or construction project). Documented coordination with applicable regulatory agency/ies is encouraged. Projects with significant regulatory compliance barriers identified through assessment of Attachment C or construction projects that do not have all necessary permits and permissions in hand may be disqualified. There is a place on the online form to upload Attachment C.

  Attachment C has been uploaded on the online form.

3. Nature-Based Solutions and Environmental Co-Benefits

- Degree to which nature-based solutions (i.e., solutions that protect, restore, or manage ecological systems) are incorporated into the overall vision of this project and how the selected strategy/ies will help the community adapt to existing and projected impacts of climate change. More information about nature-based solutions can be found in the MVP toolkit. Consider the following questions in your response:
    - **For Project Type 2:** Design and Permitting – Describe all design options (including nature-based options) that will be evaluated or considered in the design process.

  (**Note**: Hard infrastructure projects in any phase may still receive a maximum of **5 points** for a response to this question that demonstrates why this approach was deemed necessary over nature-based approaches and illustrates how environmental conditions will improve with grey infrastructure implementation.)

  The work proposed in our application necessarily translates to a hard infrastructure project, since it involves the elevation of an existing roadway and the associated improvement of a stream crossing beneath the road to Mass Stream Crossing Standards. The stream crossing, however, will certainly serve to protect, restore, and properly manage the local ecological system. Wetlands flank one side of the roadway and the stream therefore transitions from wetland-adjacent conditions to upland-adjacent conditions, with the road as the divider. The new stream crossing will restore the natural transition between these two adjacencies and, as a result, will restore all ecological functions that would normally exist along that continuum, including a safe path for species mobility. This approach was deemed necessary since the project is primarily ensuring an alternative transportation route for years to come and must rely on hardscaped elements to meet load and durability standards. Nonetheless, the two ecological systems on either side of the road are presently extremely disjunct and this project will undoubtedly increase communication between the two. We are proposing wetlands replication near the site to compensate some minor wetland loss associated with the elevated road sides slopes. Further, given the inability to elevate the roadbed at the Essex Causeway on State Highway Route 133, having Apple Street as an alternative route may someday allow for retreat from that area, which could translate to better floodplain function if barriers are removed as the result of future work.

- Identifying and describing environmental co-benefits of the proposed project in the table below. For non-implementation projects, please identify how this work will "set the stage" for future co-benefits.

Co-Benefit		**Description of how the project will produce this environmental co-benefit**
Promotes Biodiversity (habitat restoration, creation, or enhancement)	☒	The undersized culvert that conveys a stream beneath Apple Street in the project area will be upgraded to Mass Stream Crossing Standards as part of the project. As such, habitat for both aquatic and terrestrially-based animals will be enhanced as these species will benefit from the restoration of the natural continuum between the wetland-based stream on one side of the street and the transition to an upland stream on the other side of the street. Improvements will positively impact proper stream velocity, removal of physical barriers, stream bottom morphology, etc. Terrestrial animals will have a safe place to cross under the road

		versus the risk of roadkill associated with surface crossing.
Restores/remediates Project Site	☒	The present stream crossing interrupts the natural stream transition from upland to wetland and the new crossing will meet standards necessary to restore that transition and the simple, physical continuity of the stream for all species.
Promotes Environmentally-Sustainable Development / Reduces Development in Climate Vulnerable Areas	☐	
Improved Water Quality and/or Increased Groundwater Recharge	☒	The proposed culvert crossing with have an open bottom utilizing a combination of natural streambed media and scour resilient stones to provide increased groundwater recharge to the project area as opposed to a closed bottomed structure (i.e. pipe or box culvert).
Improved Air Quality	☐	
Climate Mitigation (carbon sequestration, site-scale improvements for cooling, reduced energy use)	☐	
Other Environmental Co-Benefit: roadway pollutant decrease	☒	Since the roadway itself will be out of the tidal surge zone as a result of the project, future events that would have inundated the road surface will entrain less pollutants from vehicles and asphalt in the future. While rain runoff washes pollutants from every road, inundation provides an opportunity for additional mobilization of pollutants into the adjacent wetlands.

4. Environmental Justice and Public/Regional Benefits

- Is the project located within a mapped EJ Population?

  No, but the Town does have a substantial Climate Vulnerable Population – its senior community.

  - Provide specific relevant demographic information related to the Climate Vulnerable Population (i.e., income, race, and English isolation) and a description of where the community is located geographically relative to the project site.

  In the Town of Essex, more than 25% of the Town's population (around 900 individuals) is over the age of 60 (source, Essex Council on Aging) and the trend is expected to increase in coming years. From a Climate Vulnerable Population perspective, this project will particularly assist our seniors who already experience systemic inequities in Essex and in the region – due to factors such as reliance on third-party transportation, low/fixed incomes, and disabilities caused by health problems at advanced ages. Given that seniors tend to experience more isolation than other groups, and given that this project has the ability to eventually keep local and regional transportation through the Town intact, the project will help avoid making that isolation worse.

  Although the proposed project is at a definite location within the Town, Essex seniors are located throughout the entire Town and transportation to and from various destinations is adversely

affected when both Route 133 and Apple Street are closed due to flooding. Service providers don't necessarily have major roadway closures factored into their operations – especially since flooding events are not entirely predictable. Whether a service or a relative needs to get across Town internally or travel through one half of the Town to get to the other half (where the senior citizen lives), having Apple Street as a functional alternative is key to keeping the senior population well served. There is nothing more frustrating than having to go through other communities just to reach other areas of one's own community. Since important destinations such as the post office, Town offices, commercial centers, and public parks and attractions are spread throughout the Town, it is necessary for residents from each half of the Town to reach destinations in the other half. When flooding impacts the ability to easily move back and forth, it becomes a serious imposition to residents' quality of life and flooding events are expected to become more common.

This project will also serve seniors regionally since many seniors need to travel through Essex to reach other desired locations on Cape Ann and to the north of Essex (like Ipswich and Rowley). Regional service providers also need to be able to get to seniors and flood-caused delays and interruptions presently make senior isolation worse.

- Demonstrate how the project will increase climate resiliency for this CV Population.

Seniors do not have a high degree of adaptive capacity and often rely on transportation from others (whether public, private, or family-based) to stay connected to group-based activities, for shopping and in-person family interactions, and for services to visit their homes directly. Seniors also rely disproportionately heavily on the swift operation of emergency services. This project will substantially decrease emergency and general transportation delays/interruptions during storm surge events and, just as importantly, will likely contribute to an alternative transportation route that could eventually become the primary route. Keeping open a vital transportation route that will allow service continuity for the Town's seniors most definitely serves to provide increased resiliency for the Town's major Climate Vulnerably population, both immediately and in the future, as this age group continues to grow.

<u>Please also see important comments from the Director of the Essex Council on Aging and from the Executive Director of SeniorCare in the "Document with all letters of support combined" that is attached to the online grant application form.</u>

- Demonstrate support from the CV Population that the project is intended to benefit. Demonstration of support may include:

  - Letters of support from residents or community groups representing these populations.

    Please see the "Document with all letters of support combined" for a letter of support from the Essex Council on Aging, which officially represents a segment of the CV population that the project will benefit – Essex seniors. Please also see the letter of support from SeniorCare, a regional organization specializing in recognizing and fulfilling needs of the senior population on Cape Ann and in the general region.

  - Indication that residents or community groups representing these populations will be part of the project team (i.e., the community liaison model described in Attachment F) and, **if so, specifically how much of the project budget will be used to compensate them for their work and on what tasks?** (Please make sure this partnership is easily identifiable in your Attachment B scope/budget).

SeniorCare and the Essex Council on Aging will be part of the project team and constituents will be constantly kept up to speed through the SeniorCare Executive Director and the Council on Aging Director. Also, the Essex Housing Authority has a total of 40 housing units in Essex that are primarily occupied by senior citizens. The Council on Aging Director has a direct channel of contact with the Housing Authority and its residents, which will certainly be utilized during the project. There is no need to compensate these individuals, the Council members, or any constituents. The Town has chosen to meet the required local match using a cash appropriation from the Essex Town Meeting, since the work requiring paid expertise is primarily engineering. Any involvement of the SeniorCare, the Council, or their employees will just represent an in-kind match that is over and above the minimum match requirement (about $6,000 over and above 25% of the total project cost has been pledged by the Town in cash – the Town will save that $6,000 for contingency).

- Degree to which the project has broad and multiple community benefits. Rationale should include:
  - How the project will provide the highest level of climate resilience for the greatest number of people and/or largest geographic area possible.

Given that the project is focused on both local and regional transportation, the added climate resilience resulting from this work will translate to resilience for all residents of Essex and the entire region (also including businesses and commerce dependent on efficient transportation). Elevating the Apple Street roadbed will effectively transfer to Apple Street during times of Essex Causeway flooding a way to meet the needs of all of the people who already count on State Highway Route 133 on a daily basis, throughout Essex, Cape Ann, and the surrounding larger region. As such, the proposed project is effectively providing the highest level of climate resilience possible for every person and for every reason State Highway Route 133 currently satisfies. Please see **Figure 6**, below, for more detailed traffic information.

The 2019 Average Daily Traffic on this segment were developed based on the recent traffic counts referenced above. The results are as follows:

Table 1 - Existing Traffic*		
	Main Street at subject Bridge	Route 22 south of Essex Street
Actual Daily Count	14,357 vpd	5,652 vpd
ADT Seasonally adj.	15,951 vpd	6,280 vpd
Design Hourly Volume	1,358 vph	565 vph
Daily Truck Pct.	6%	5%
Peak Hr. Truck Pct.	7%	4%

** The existing bridge is currently posted as noted above. Vehicle counts provided above are based on the bridge restrictions in place at the time.*

Figure 6. *Mass DOT is currently replacing the bridge over the Essex River at the Route 133 Essex Causeway. In preparation for that project, DOT conducted a traffic volume study, in 2019. Over 14,000 vehicles per day travel over the causeway (and almost 16,000 during the summer season). The Town of Essex only has about 3,600 residents. As such, this data illustrates how important an alternative through-Town route is to the social, economic, public health, recreational and public access needs of the region during times of flooding.*

- What community co-benefits will the project provide (e.g., social, economic, public health, recreational, public access, equity, etc.)?

Socially, the proposed project will help to continue to meet the needs of senior citizens in Essex and in the region, since this group is climate-vulnerable. As described in much more detail in Section 4, senior citizens rely heavily on efficient and swift transportation, including the provision of emergency services – especially during times when State Highway Route 133 may be compromised due to severe weather. While other demographic groups may be able to deal with transportation problems more readily, keeping reasonable transportation routes open for seniors brings equity to that community more than for most other groups (including direct links to public health for the senior sector). Economically, both the local and the regional economies rely on Route 133 for commerce (both with respect to patrons being able to conveniently get to businesses and with respect to businesses being supplied by vendors and shipping goods produced to other locales). Keeping commerce moving along efficiently is most definitely a co-benefit, especially in an area reliant so much upon tourist spending. The economic co-benefit is closely tied to recreation and public access, since eco-tourism is a major industry in Essex and in the region. Marinas, pleasure boating, charter services, guided recreational paddling, and boat cruises all rely upon good transportation routes for customers to find getting to such businesses and attractions for recreation a convenient process. Keeping detours as short as possible is very important when one considers that the frequency of Route 133 flooding will only be increasing.

- Regional benefits, including:
  - If the project is being led by a regional partnership (i.e., two or more municipalities are submitting the application together). If yes, the application should include a letter of support from each partnering municipality.

No, the project is not being led by a regional partnership in the sense that more than one municipality is party to the grant application. However, as noted in the various letters of support attached to this application, regional interest and support for the project is high. Please see the letters from the Greater Cape Ann Chamber of Commerce (which includes the Essex Division of this organization) and the Ipswich River Watershed Association, as examples. As noted above, the regional benefits of this project are far-reaching, since the project seeks to back up a major regional transportation artery.

  - To what extent resilience benefits of the project go beyond the boundaries of one municipality.

Commuters, commerce, emergency services, and human services all rely on State Highway Route 133 for efficient and convenient access through Essex to and from destinations along the coast (such as Rockport, Gloucester, Ipswich, Rowley, Newbury, and Newburyport) – via connections to Route 1A, Route 1, and Interstate 95. When both the Essex Causeway on Route 133 in downtown Essex and Apple Street in Essex are closed due to coastal flooding, major implications accrue to all of the above sectors of our entire region because of the long detour involved (see data in Figure 6, above, demonstrating that over 14,000 vehicles per day utilize this important regional route). While such flooding certainly has major impacts on local travel for residents as well, the proposed project will be extending resilience benefits to dozens of industries and services that rely on the corridor from Gloucester to Newburyport. Further, while Essex itself does not have any mapped Environmental Justice populations, several of the other communities that rely on continuous passage through Essex to deliver goods and services, to commute, and to allow visitors to conveniently arrive do (Rockport – 1 mapped block comprising 987 people, Gloucester – 9 mapped blocks comprising 11,650 people, Ipswich – 2

mapped blocks comprising 3,962 people, and Newburyport – 2 mapped blocks comprising 2,142 people) – source Mass.gov. Please also see our discussion above concerning the benefit of this project to senior citizens on a regional basis.

5. Public Involvement and Community Engagement

Public Involvement and Community Engagement Plan Narrative:

The Town of Essex plans to involve and engage the general public, business and commerce, and a significant, climate-vulnerable population (senior citizens) on both a local and a regional scale. As evidenced by our support from the Greater Cape Ann Chamber of Commerce, SeniorCare, and the Essex Council on Aging, our project lends itself to continuous updates, with feedback features, as the final design and permitting work progresses. While we have built in some specific involvement of senior citizens, it is important that all sectors deriving co-benefits from the project are also kept abreast of developments and have the opportunity for input throughout the effort.

With respect to printed strategies, we propose a poster campaign within the Town of Essex and we will also offer posters to SeniorCare and the Greater Cape Ann Chamber of Commerce for display in various outlets/businesses within their spheres of influence. We will round out our printed work with newspaper articles and flyers that can be updated and refreshed from time to time. Some printed messaging will be targeted to the Essex senior population and the Essex Council on Aging Director will assist with distribution. Of course, as the project enters the permitting phase, all standard public hearing notices will be issued so that all persons may be involved in applicable portions of permit review.

Our digital strategies will feature an on-line survey that residents and business owners from Essex and throughout the region can respond to with respect to how the final project design shapes up. Seniors who need assistance with the task will be offered paper versions of the survey that will be input by Council on Aging staff or even direct assistance with entering information into the online survey. The digital version of the Essex Council on Aging newsletter and its e-mail push capability, the Town Administrator's report, and the Town's general e-mail push capability will serve to keep both general audiences and climate-vulnerable audiences (chiefly our seniors) up to date. The Essex Town Clerk will assist further with regular updates on her Facebook page. Further, we will maintain a dedicated project web page on the Town website with a prominent link to that page on the Town's home page.

In-person engagement and involvement will consist of two featured presentations of the project at Council on Aging meetings and a special in-person presentation of the project by the Town Administrator at the Essex Senior Center (both of which will be open to general and climate-vulnerable audiences). The Essex Senior Center staff will make themselves available to discuss the project with interested parties at daily Senior Center drop-in hours and the Town Administrator and Council on Aging Director will offer a walking tour of the project site for all audiences (with special transportation accommodations for senior citizens offered by the Council). The walking tour will feature two stops: the Essex Causeway on State Highway Route 133 and the project site on Apple Street – so that participants can get a full understanding of both the problem and the solution. Public hearings before all required local and State authorities for project permitting will offer additional in-person opportunities for interaction, involvement, and engagement. Our in-person engagement strategy is also intended to tease out individual stories from seniors so that, collectively, a better picture of seniors' challenges, fears, and ideas for assistance with respect to climate change will emerge.

Finally, community and regional feedback will be collected via the on-line survey and through opportunities provided by the Council on Aging at the Essex Senior Center. The Town Administrator will provide telephonic, digital, and in-person contact information at all presentations and on all

digital and printed materials so that interested parties can directly communicate with him, as the Project Coordinator. Further, feedback will be collected in a very official sense at public hearings concerning permits necessary for the project to proceed. The Town Administrator will share the results of the Town's feedback, input, and involvement efforts on a regular basis using his Town Administrator's Report, which is published every two weeks and is available in digital form (with the ability for individuals to sign up for the report to automatically be sent to them). The Council on Aging Director will provide similar information in her monthly Senior Newsletter, which is available both digitally and in print.

Public Involvement and Community Engagement Plan Table

Apple Street Roadbed Elevation and Culvert Replacement Project Public Involvement and Community Engagement Plan Table Summary			
	Print	Digital	In-Person
Principal Strategies	Posters hung and updated throughout the project in the Essex Senior Center, the Essex Town Hall, the Essex Public Library, the Essex Public Safety Facility, Department of Public Works Office, the Essex Transfer Station, and the Essex Post Office. These are the areas where Essex seniors frequent. These areas are also visited by non-seniors. We will also hang posters in at least 13 other locations, likely businesses. This strategy will cover both CV and non-CV individuals.	1. Online survey requesting resident feedback on the project. 2. Dedicated web page on the Town's website with prominent link on the Town home page.	1. Council on Aging Director features the project at two Council on Aging meetings to update the Council and those in attendance on project progress and to accept feedback (one meeting at the start of the project and one toward the end). Open to all. 2. Town Administrator offers an in-person presentation at the Essex Senior Center for interested senior citizens, toward the beginning of the project. Also open to others.
Assisting Strategies	1. Town Administrator works with two local newspapers to run a feature story on the project just after the project kicks off. This strategy will keep the general public informed. 2. Flyers describing the project and how to provide feedback are made continuously available at the Essex Senior Center and are featured at all Senior	1. Post in Council on Aging digital newsletter information and in the Town Administrator's general report how to submit comments directly to project team and link to our online survey. This information will also appear via the Town Clerk's	1. Council on Aging staff make project information and discussion available at daily Senior Center drop-in hours. 2. Town Administrator and Council on Aging Director offer a walking tour of the project, for both seniors and the general population. Tour will include stops at both the Essex Causeway and at Apple Street so that participants get a true feel for both the problem and the solution.

	Center events and functions. This strategy will keep our CV population informed.	Facebook page. 2. Use e-mail list that the Council on Aging maintains to directly provide project updates to Essex seniors and push the same messages out over the Town's general e-mail subscription service for Town news. This information will also be pushed out over the Town Clerk's Facebook page.	
Equitable Engagement Modifiers	1. The Essex Council on Aging Director will directly implement and coordinate actions. 2. Specific project messaging crafted for and shared with our Climate Vulnerable Population (Essex seniors) to spur engagement – will appear on posters and in newsletter. All materials will also be offered to SeniorCare, to keep the senior population informed on a regional basis.	Council on Aging personnel will directly input senior citizen feedback into on-line survey for seniors who would rather communicate their input verbally, whether over the phone or at the Senior Center.	Council on Aging provides van transportation to the walking tour for those who need this assistance to attend.

How community feedback will be incorporated into project and mechanism by which results will be shared:

Community and regional feedback will be collected via the on-line survey and through opportunities provided by the Council on Aging at the Essex Senior Center. The Town Administrator will provide telephonic, digital, and in-person contact information at all presentations and on all digital and printed materials so that interested parties can directly communicate with him, as the Project Coordinator. Further, feedback will be collected in a very official sense at public hearings concerning permits necessary for the project to proceed. The Town Administrator will share the results of the Town's feedback, input, and involvement efforts on a regular basis using his Town Administrator's Report, which is published every two weeks and is available in digital form (with the ability for individuals to sign up for the report to automatically be sent to them). The Council on Aging Director will provide similar

information in her monthly Senior Newsletter, which is available both digitally and in print. The dedicated web page will be another outlet for project feedback.

6. Project Transferability, Measurement of Success, and Maintenance

- Use as a demonstration project transferable to other communities (i.e., innovative projects that provide deliverables that can be easily adopted by other communities or outline processes that will streamline other similar projects). Please outline what these deliverables are and how they will be shared with other communities.

  Project deliverables that can be reviewed and possibly adopted by other communities using our project as an example include: a) the scope and methodology of data acquisition for observing/determining extent of tidal influence to the waterway; b) our public outreach materials and campaign if proven effective throughout our final design and permitting efforts for this project; and c) the project deliverables prepared as part of this effort will closely resemble the MassDOT design development process for a transportation improvement project. Although this process is commonly used, it's adaptation within the MVP grant program can be promoted as an effective approach to successful project management and timely deliverables to ensure project milestones are met within the grant period.

- How project success will be measured and monitored. Please provide outcomes that can be linked to the project (e.g., reduction in flooding, increase in tree canopy cover, reduced risk of sewer overflows) and any metrics that the applicant will be able to track to indicate whether or not the project is accomplishing these outcomes over time. The review team is not looking for general statements around the completion of tasks in the scope of work (e.g., "the project is successful if we complete it on time").

  The most indicative measure at the completion of the project's construction will be the validation that Apple Street will not overtop and remain open in extreme storm events. The Town will also be able to monitor stream stability and condition periodically while conducting culvert inspections on a predetermined frequency. The expectation is that the project will result in a reduction of flooding, improved ecological benefit at the culvert, and a durable roadway and structure that will provide low maintenance to the Town for many years to come.

- Clear description of plans for how any future maintenance needs of or updates to the proposed project would be addressed to ensure the project's goals continue in the long-term.

  - **For Project Type 2:** Design and Permitting – Describe the path forward for the project – construction, further regulatory approval, potential funding sources. Describe any initial plans for how the asset would be maintained into the future if/when implemented.

    At the conclusion of this grant-funded effort, the Town will have final plans, project specifications, a construction cost estimate, and Environmental Permitting Clearance from the all applicable permitting agencies. The Town will be seeking future funding through various other opportunities to fully fund the project's advertisement, procurement, construction and construction administration through project completion. Potential funding sources include: the FEMA Building Resilient Infrastructure and Communities (BRIC) grant program, the FEMA Hazard Management (HGMP) grant program, or the DOT

Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program. Other State grants will also be explored. Upon construction completion, the Town will develop an ongoing inspection and maintenance program to ensure that the transportation infrastructure including the pavement, guardrail, slopes, wetlands, and structure are properly maintained and remain in serviceable condition for the intended service life of 75 years.

7. Need for Financial Assistance

- Equalized valuation per capita, **to be completed by EEA**

- Financial need as demonstrated through Applicant narrative, as described below:
  - Demonstration that the municipal budget cannot accommodate this project, including specific examples beyond regular budgetary constraints.

The Town of Essex has a very limited tax base, with a Proposition 2 ½ tax levy limitation that provides only about $320,000 of new taxation each year. The municipal government generally proposes increases for operational activities that are around two percent for labor and just under two percent for expenses. Even with that level of fiscal conservatism, other expenses, such as the rising cost of employee health insurance and the requirements of the regional school district that Essex belongs to, the tax levy increase is generally outstripped fairly quickly. In fact, for fiscal year 2023, the increase to the regional school district budget apportionment to Essex alone is $381,841 (well over the allowable levy increase without even considering municipal budget needs). While the Town does try to maximize its non-tax revenue via fees, only a portion of the shortfall can be made up with fee revenue. As such, the Town will be utilizing approximately $200,000 in reserves just to balance the fiscal year 2023 budget. Reserves will also be used to provide the 25% match for the project ($80,000 in cash was appropriated by Town Meeting on May 2, 2022, which is greater than 25% of the total project cost of $296,050 by about $6,000). The $6,000 above the required match will be saved as contingency.

  - Demonstration that other grant programs were considered, and it was determined that MVP was the best programmatic fit.

The Town has already made great progress toward baseline planning for this project, including two rounds of past Culvert Replacement Municipal Assistance Grant funding from the Massachusetts Division of Ecological Restoration (DER) - $41,050 and $83,500 and a separate Coastal Resilience grant from the Massachusetts Office of Coastal Zone Management (CZM) - $27,282. Given that only the low area with the culvert is suitable for DER funding and that CZM already assisted with a feasibility study for the second low area, the project is at a point where MVP funding will help to unify the work and bring both areas to the final design stage and through all necessary permitting together. Precursor projects have already collected much baseline data and have determined all necessary permitting pathways. As such, we are coming to MVP with a project in its advanced planning stages after having tapped more appropriate programs for initial study.

  - Demonstration that MVP funding would clearly address a funding gap that would make an otherwise robust project unlikely to be implemented.

As noted above, the Town has a very limited ability to fund the work proposed in this application, beyond using reserves to provide the necessary 25% match, with a small contingency to spare. The project has already been well-vetted and preliminary work shows that the project is feasible and will accomplish the Town's goal. In this sense, the project is most definitely "robust" but does not yet represent work that needs to be implemented to achieve

everyday operational goals. While the importance of the Apple Street alternative route will grow with each passing year, more pressing needs of the Town must take precedence at this point. The MVP Action Grant program was designed to help bring funding today to avoid or improve problems in the future and will most certainly be the difference between advancing the work now versus having to react to a problem later.

8. Project Feasibility, Support, and Management

- Description of the project team's technical, financial, and management capacity. (Note: If your municipality has a previously awarded MVP Action Grant that will be ongoing at the same time as this proposed project, please list that grant and detail your municipality's capacity to manage multiple grants in FY23.)

The project will be managed by Brendhan Zubricki, Essex Town Administrator (resume attached) and Jody Trunfio, P.E. (resume also attached), a Principal at The Engineering Corp (TEC). Although Essex has received MVP Action Grants in the past, they have all been closed out and no second MVP project will be ongoing at the time the proposed project commences. Mr. Zubricki has served the Town for almost 25 years and has been Town Administrator since 2000. Mr. Zubricki is responsible to promote coordination and cooperation among Town departments and is the lead officer in managing projects involving the Town and outside agencies. He is the point person for Town employees and Town residents to answer questions and address concerns. He also is the Town's Personnel Officer, Chief Procurement Officer, Grants Coordinator, Information/Technology Officer, and Facilities Manager for certain properties and buildings. As Grants Coordinator, Mr. Zubricki often manages multiple grant awards simultaneously and has kept the Town in good standing with all awarding agencies after dozens of projects. He will work closely with TEC and with the MVP program to ensure project tasks are completed in a timely manner, provide access to study areas within the town, and coordinate progress meetings. He will be the chief liaison among Town residents and agencies, MVP personnel, and TEC. Mr. Zubricki's longstanding service to the Town of Essex and good track record with grant makers makes him uniquely qualified to lead this effort.

TEC has been the engineering firm responsible for both of the past DER projects and for the past CZM project and Mr. Trunfio has been involved in all of them. The firm has a wide array of professionals on staff and maintains relationships with specialist subcontractors to deliver other services and analyses as needed. Reviews and critiques of TEC's work from DER and CZM during the development of work products for those projects has been detailed and highly technical. TEC has always been able to answer questions posed by State reviewers and to adapt work products to suit stated needs and objectives. All projects have left the Town and TEC in good standing with the State agencies involved.

The Town of Essex has been receiving both State and Federal grants for almost 25 years under Mr. Zubricki's guidance and has always been able to efficiently manage all financial aspects of all projects and programs. The Town pays vendors in a very timely fashion and provides all necessary information and work products for successful request for reimbursement from awarding agencies.

- **Letters of support from landowners, public, and/or community partners.** Applications with 3+ letters of support from diverse groups (e.g., community-based organizations, local businesses, nonprofits, neighborhood groups, etc.) and a letter of support from landowner (if project is to take place on non-municipal land) will be scored highest. There is a place on the online form to upload support letters that have been combined into a single PDF document. Support letters should be submitted in this fashion and not sent in separately.

  We have uploaded with the online application form a wide variety of support letters. Municipal agencies involved with the project that have provided support letters include the Board of Selectmen, the Conservation Commission, the Fire Department, the Police Department, the Council on Aging, and the Department of Public Works. The Essex Division of the Greater Cape

Ann Chamber of Commerce and the organization as a whole support this important project from local and regional economic development and sustainability perspectives and the Ipswich River Watershed Association (IRWA) supports the project from a regional resource management perspective. Further, we have included a letter from SeniorCare relative to how the project will serve climate vulnerable senior citizens regionally and a letter from the Town's State legislative delegation.

With respect to private abutters, the project has a total of seven. It would be advantageous for the project to utilize small portions of these abutting properties for grading. At the time of this grant application, we have received letters of support from five of the seven abutters – including the Essex County Greenbelt (all attached to the on-line application form) and we intend to provide the other two abutters with updates as the status of the design plan is advanced so that they can draw on more refined information in the future and possibly also express their support. It is the Town's intent to work with willing parties and to avoid takings by eminent domain if at all possible. Our engineering firm's scope of services includes all services necessary for takings but we hope to be able to simply use the necessary plans to get abutters' assent. If we do not get abutter support from some owners, the design may also be tailored to work with the private areas we do have access to. The Town will cover the cost of any Town Counsel fees necessary in our relations or transactions with abutters (an unquantified cost that is over and above the cash match that has been pledged). Further, it is important to point out that this project will not likely improve the marketability of abutting land since much of the abutting land is wetlands and since all abutting uplands are already directly accessible off of Apple Street at its existing elevation. Several abutters actually use nearby Andrews Street for access as well. Thus, the project itself will not encourage any transportation complications or congestion in the area that are not already plausible.

- Good standing in the MVP program – based on timely submittal of progress reports, lack of project extensions, timely correspondence, and compliance with program guidelines, **to be completed by MVP program team.**

APPENDIX 1. Analysis of Apple Street Flooding Projected Recurrence (provided by Atkins, a technical consultant to MEMA)

Products are Available at the Following Links:

Maps Visualizing Annual Coastal Flood Exceedance Probability and Estimated Flood Depths from Massachusetts Coastal Flood Risk Model

Length of Inundated Segments of Apple Street per Expected Flood Depth, Scenario Year, and Return Interval

Data Sources and Methodology Informing Flood Frequency and Depth Predictions

APPENDIX 2. Project Gantt Chart

Please click this link to be taken to the Project Gantt Chart.