



## **Town of Scituate, Massachusetts ANNUAL FLOOD MITIGATION PROGRESS REPORT 2018**

The Town of Scituate enjoys scenic, economic, and recreational advantages associated with our shoreline. However, inherent in being an oceanfront community, there exists a unique set of challenges that the Town faces, specifically impacts from high water and storms. The direct impacts of climate change include sea level rise and more intense storm events. Significant areas of town can even experience flooding during astronomically high tides without the presence of a storm event.

The Town of Scituate has been aggressive in our efforts to anticipate and mitigate activities along high hazard coastal areas and inland floodways over the past few years. The Town continues to pursue funding through Federal, state and local opportunities, including utilization of our capital budget and grant applications for drainage projects, to rebuild seawalls, nourish eroded beaches, and retrofit structures vulnerable to storm damage as a means of preserving and protecting public and private property in our flood zones.

### ***Hazard Mitigation***

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The Federal Disaster Mitigation Grant Act passed in 2000, requires that all municipalities that wish to continue to be eligible to receive FEMA funding after hazard events must adopt a local hazard mitigation plan. To meet the requirements of the Disaster Mitigation Act, the Town updated its 5-year plan, the *Natural Hazard Mitigation Plan, Scituate, Massachusetts* in August, 2016. All Town Departments meet annually to review previous and projected actions and determine current and future mitigation activities to assist with preparation for and recovery from natural hazards.

Structural elements of the Hazard Mitigation Action Plan are currently being engineered, permitted and constructed under the Town’s capital plan or through grant applications. These include seawall replacement and/or repair, beach nourishment, culvert replacement, coastal erosion mitigation and drainage upgrades. The Town has been very proactive in its efforts to reduce flooding and prioritizing projects to address major problems first. The repair and replacement of several sections of the Oceanside Drive seawall to improve resilience from storm surge, coastal flooding and sea level rise has been realized with the acceptance of three state grants from the EOEEA Dam and Seawall Repair or Removal funds. Upgrade, repair and improvement of undersized culverts on Gilson Road and Bailey’s Causeway with revised engineering designs are being completed. Other areas in Town where drainage upgrades and improvements could provide necessary mitigation of flooding will continue to be a focal point of our coastal erosion and resiliency plan moving forward.

*Foreshore Protection Grant Funding*

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On-going threats to public and private infrastructure continue to be a major concern for the Town, as both long-term coastal erosion and relative sea-level rise in the coming decades will continue to increase. With this understanding the Town is pursuing shore protection improvements through grants and appropriation of funds at Town Meetings to address coastal issues that the community is facing. The following table provides information on coastal grants the Town has pursued from 2015 to 2018:

<b>Town of Scituate Coastal Grants 2015 - 2018</b>			
<b>Coastal Grants</b>	<b>Project</b>	<b>Amount Requested</b>	<b>Status</b>
Executive Office of Energy and Environmental Affairs (EOEEA) & Coastal Zone Management (CZM) Resiliency Grant	Engineer and study for beach nourishment on N. Scituate Beach	\$118,000.00	Completed
FEMA FMA 13-01 Elevation Grant	Elevation of 14 Properties in the floodplain	\$2,100,000.00	Completed
Executive Office of Energy and Environmental Affairs (EOEEA) & Coastal Zone Management (CZM) Resiliency Grant	Engineer , design and permit for beach nourishment on N. Scituate Beach	\$241,163.00	Completed

Executive Office of Energy and Environmental Affairs Dam, Levee and Seawall Grant	Repairs to 760+/- feet of seawall along Oceanside Drive	\$4,000,000.00	Completed
Environmental Protection Agency Resiliency Grant	Technical Assistance for flood resiliency in a Coastal Community	\$50,000.00	Completed
Executive Office of Energy and Environmental Affairs (EOEEA) & Coastal Zone Management (CZM) Resiliency Grant	Assessing Coastal Erosion, Sediment Transport & Prioritization Management Strategy for Shoreline Protection	\$270,000.00	Completed
Executive Office of Energy and Environmental Affairs Dam, Levee and Seawall Grant	Repair and Replacement to 525+/- feet of seawall along Oceanside Drive on Town owned property	\$3,000,000.00	Completed
MAPC Planning Assistance Grant	Scituate Municipal Vulnerability Plan	\$60,000.00	Completed
Executive Office of Energy and Environmental Affairs (EOEEA) & Coastal Zone Management (CZM) Resiliency Grant	Humarock Roadway Elevation, Beach and Dune Nourishment Conceptual Designs	\$140,000.00	Completed
Executive Office of Energy and Environmental Affairs Dam, Levee and Seawall Grant	Repairs to 640+/- feet of seawall along Oceanside Drive near 7th Avenue	2,500,000.00	Completed
Massachusetts Emergency Management Agency HMGP Grant	Elevation of 5 properties in the floodplain	\$616,252.00	In progress
FEMA FMA 15-01 Elevation Grant	Elevation of 2 properties in the floodplain	\$303,386.00	In Progress
FEMA Storm Reimbursement	Foreshore Damages 3rd Cliff	1,680,000.00	Awarded
FEMA Storm Reimbursement	Foreshore Damages	5,900,000.00	Obligated
Executive Office of Energy and Environmental Affairs (EOEEA) & Coastal Zone Management (CZM) Resiliency Grant	Humarock Roadway Elevation, Beach and Dune Nourishment Conceptual Designs	\$240,000.00	Completed
Executive Office of Energy and Environmental Affairs (EOEAA) & Metropolitan Area Planning Council	Downtown Harbor Resiliency Plan	\$62,500	In Progress
Metropolitan Area Planning Council	Peggotty Beach Managed Retreat Feasibility Study	\$35,000	In Progress
FEMA FMA 19-01	Elevation of 1 Property in the floodplain	\$170,380	In Progress

The Town provided the necessary information and documentation to FEMA for approval of damage costs that occurred from Storm Riley on 3/3/2018. The FEMA storm team came and assessed the Storm Damage from Storm Riley on March 3, 2019. The FEMA team provided inspection documentation forms to the Town which is currently under review for approval with the Scituate Engineering Department.

*Sea Level Rise & Climate Change*

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The Town has participated in ongoing climate change and sea level rise studies and actively pursues advice from experts in the field. The Town finalized the *Assessment of Coastal Erosion, Sediment Transport and Prioritization Management Strategy for Scituate Shoreline Protection* report, funded as part of the FY16 Coastal Zone Management (CZM), *Coastal Community Resilience Grant Program*. Most recently, the Town completed its now adopted Municipal Vulnerability Plan titled *Building a Resilient Scituate* in July of 2018.

Two studies have been conducted for the towns of Scituate, Marshfield, and Duxbury, identifying the potential effects of sea level rise and possible ways to mitigate its impact. These reports predicted the magnitude of local sea level rise including the effects of land subsidence and storm surge, with long-term implications, and how it might affect public infrastructure, low lying estuaries and floodplains subject to tidal action, natural resources, businesses, recreational opportunities, local economy and finances, and long range planning options. These studies utilized current high accuracy LiDAR topographic data from 2011 to: (1) generate maps, (2) identify adaptation strategies to help mitigate the long-term effects, (3) educate the public, (4) inform Town officials and State legislators about projected impacts so that the Town can make informed decisions that will avoid or minimize future costly impacts to public and private property, the local economy and natural resources. Based upon planning horizons of 25, 50 and 75 years, the following sea level rise projections have been provided for Scituate and surrounding towns as follows:

**PREDICTED SEA LEVEL RISE (NOAA)**

<b>PLANNING HORIZON</b>	<b>25</b>	<b>50</b>	<b>75</b>
Year	2038	2063	2088
Total Relative Sea level Rise (feet)	1.08	2.80	5.16

These sea level rise predictions include results of local land subsidence that correspond to the “Highest Scenario” of three forecasts made in NOAA’s *Technical Report on Global Sea Level Rise Scenarios for the United States National Assessment* (December, 2012) . Research also predicts an increase in frequency of high intensity storms in North American as a result of climate change.

*Coastal Erosion, Sediment Transport, Prioritization Management Strategy, Assessment for Shoreline Protection*

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In 2016, Scituate received a Coastal Resiliency Grant for \$270,000, to complete a coastal erosion assessment, sediment transport, engineering solutions and prioritization for flood protection measures along the entire Town coastline. The resulting *Coastal Erosion, Sediment Transport, and Prioritization Management Strategy Assessment* is the end product of engineering analysis, incorporating historical data and public input from Scituate residents and Town officials. These efforts have resulted in an increased level of knowledge and awareness that is helping the Town build coastal resiliency into long-term Town financial planning efforts, taking a multi-disciplined approach and utilizing both scientific and engineering disciplines while considering economic concerns.

To implement the recommendations of the *Assessment*, the Town has begun to identify funding sources for the top priorities in order to protect our most vulnerable areas along the coast. Based upon the analysis of these priorities, it has been possible to generate an overall rating for each section of shoreline. Specifically, damage susceptibility of private property and public infrastructure was deemed most critical for prioritizing shore protection needs. A summary of the results of the prioritization analysis ranked the study areas from high to low priority as outlined following:

Prioritization Matrix (high to low)	
Priority	Study Area
1	Oceanside Drive
2	Humarock (north)
3	Cedar Point
4	Peggotty Beach
5	Surfside Road
6	Egypt Beach
7	Humarock (south)
8	North Scituate Beach
9	Minot Beach
10	Mann Hill Beach
11	First Cliff
12	Third Cliff

13	Edward Foster Road
14	Fourth Cliff
15	Second Cliff

Note the top priority, upgrades to the Oceanside Drive seawall, has been largely addressed with construction completed. The second highest priority, protection of North Humarock, has been studied and conceptual design documentation has been developed with funding assistance received through the FY17 Coastal Community Resiliency Grant from Massachusetts Coastal Zone Management. This portion of Town suffers extensive flood damage during storm events, with the sole access roadway, Central Avenue, often rendered impassable by sand and cobble overwash. A conceptual plan for elevating a portion of Central Avenue paralleling North Humarock Beach was developed, as well as a plan for optimizing dune and beach nourishment. Unfortunately, the required easements from residents were not been obtained and the project was not able to move forward.

As another central component of preparedness, the Town engages in ongoing evaluation of all foreshore protection structures. The Town has continued its contract with CLE Engineering to maintain a current evaluation of condition of seawalls, dikes, jetties and natural barriers to determine which ones are in need of repair, replacement, or nourishment and what the likely impacts of their failure would be.

The Town continues to reconstruct or rehabilitate, and/or replace seawalls, perform culvert improvements, beach nourishment, and revetment repairs in several neighborhoods. The Departments of Public Works, Engineering and Coastal Management have specifically focused on priority areas outlined in the *Coastal Erosion, Sediment Transport, and Prioritization Management Strategy Assessment* for shoreline protection.

The following items are being implemented to enhance the mitigation process:

Coastal Projects	Completed	Current Status
North Scituate Beach Nourishment Project	Design & Engineering & Permits	Completed
Oceanside Drive Seawall 4th to 6th Avenue	Design, Engineering & Permits	100% Completed
Edward Foster Road Seawall Reconstruction	Design, Engineering, Permits & Construction	100% Completed
Oceanside Drive Seawall (Town Property)	Design, Engineering, Permits & Construction	90% Completed
Oceanside Drive 7th Avenue	Design, Engineering, Permits & Construction	90% Completed
Gilson Road Culvert	Design & Engineering & Permits	Underway
Bailey's Causeway Culvert	Design & Engineering & Permits	Underway
South River Dredge Project & Beneficial Reuse of material	Alternatives analysis, Sampling Plan, & Permitting	Underway
Musquashicut Berm Restoration	Design, Engineering	RFP out for services
Minot Revetment Repair	Design, Engineering	Contract awarded
2nd Cliff Revetment Repair	Design, Engineering	Contract awarded
1 <sup>st</sup> Cliff Revetment Repair	Design, Engineering	Contract awarded
3rd Cliff Revetment Repair	Design, Engineering	Contract awarded

### *FEMA Elevation Program*

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The Town has continued to apply for Flood Mitigation Assistance grants to help property owners elevate homes in the floodplain. With the completion of the Phase VIII of the Coastal Mitigation Grant program, several additional homes have been elevated so that their supporting structure and utilities are now a minimum of one to three feet or more above base flood elevation. This makes a total of over 72 residences permitted and elevated to date.

Fourteen home elevations funded by a grant received in 2013 are now completed. Of these fourteen properties, nine were previously classified as Severe

Repetitive Loss. The Town recently applied for FEMA Elevation grant funding in 2019 for 1 home elevation, and applied in 2016 for two properties, and five more under the HMGP Grant in 2015. The 2015 HMPG homes have been approved for elevation as well as the 2016 HMA applicants. The elevation grant program has proven highly effective and the Town plans to continue to seek and offer funding obtained through FEMA Grants to assist owners of Repetitive and Severe Repetitive Loss properties in elevating their homes and/or utilities to reduce vulnerability to flooding and storm surge.

### *Emergency Management*

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Installation of a power grid shut-off system has been a priority for the Scituate Emergency Management Team. The plan involves isolating power grids in flood-prone and storm sensitive coastal areas. This effort has resulted in Eversource installing a remote electrical shut-off system for all of Humarock. For other vulnerable shore neighborhoods, the Town worked with National Grid to break the coastal streets into six zones from Lighthouse Point to the north end of Oceanside Drive. National Grid engineers moved the current shut-offs to safer areas far enough from the flooding to be accessible during a storm, and close enough to minimize the number of homes impacted. Scituate Harbor Village, the Town's main commercial area, experienced significant flooding during Storm Grayson on January 4, 2018. The Scituate Emergency Management Team was considering cutting power to the whole of Front Street as many businesses were becoming impacted. A burning electrical odor from CVS forced a decision on whether to cut-off power to 2,000 properties or directly shut off power at each individual business experiencing flooding. The Town opted to go business to business shutting off services only if they were threatened. Going forward, the Town plans to study a system which would isolate cut-offs to Front Street from the surrounding grid.

On another public utility hazard mitigation measure, Columbia Gas has worked with the Town concerning the installation of gas flow limiters. These are installed between the main in the street and the service meter. In a case where the meter is damaged and leaking, an inline check valve limits the flow. Installing gas flow limiters in high hazard ocean front areas has reduced the potential damage from escaped gas, improved safety for responders and improved recovery and restoration time.

## Outreach and Education

The Town continues to strengthen its outreach and education program efforts. Our outreach strategy is to target the right audience with the appropriate message in order to educate residents about their risks from storms and climate change and the floodplain management measures available to them. Research shows that when public information efforts are actively planned and well-coordinated, people will take the necessary steps to protect themselves from flood damage. The Town commits to continue utilizing available outreach resources in a responsible and effective manner. The programs provided to residents during this past year were well attended and received, and generated considerable conversation and interaction, confirming that targeted messaging can bring about a successful outcome.

A flood preparedness informational meeting, hosted by the Massachusetts Coastal Coalition in partnership with the Scituate Coastal Coalition, was held in November 2018 at the Scituate Public Library. In addition, five other meetings were held on a variety of coastal issues. Topics included flood mitigation practices, emergency preparedness and management of flood hazards, protection of property and infrastructure, responsible development and construction, protection of natural resources, debris control, coastal erosion, sea level rise and climate change.

The Town provided educational handouts at the meetings including the Flood Information brochure, Scituate Alliance Natural Disaster Services (SANDs) brochure, *Homeowners Handbook to Prepare for Coastal Hazards*, *Fact Sheet for Elevation Grants*, Building and other departmental requirements related to construction in the floodplain, and *Stormsmart Coast – Raise Your Home, Lower Your Monthly Payments with Freeboard*. Recent public informational meetings have included:

Outreach & Education Public Meetings	
Program	Date
Humarock Detailed Engineering Designs	6/25/2018
Climate Vulnerability Assessment Public Presentation	7/17/2017
Pre-disaster Outreach	11/15/2018

Humarock Easement Results	12/18/2018
Coastal Community Assessment Presentation	1/30/2019

In 2018, the Town of Scituate undertook a Coastal Community Assessment in which residents, businesses and civic organizations, as well as Town staff and leadership were interviewed to determine what they believed the strengths and weaknesses are of being a coastal community. The assessment was conducted by the Consensus Building Institute and includes recommendations for the Town to implement. These recommendations include: developing and adopting a long term coastal resilience vision and strategy, summarize the existing work done to date and present it in a simple format, convene community conversations about managed retreat, and update the emergency management protocols for storms.

Other outreach endeavors included mailing the Flood Information brochure to all homeowners in flood prone areas. Additionally, a Repetitive Loss Letter was mailed to all of the Repetitive and Severe Repetitive Loss properties in the Town. Lending, Real Estate and Insurance Agencies received a letter discussing all the flood information services the Town has to offer.

### *FEMA Flood Insurance Rate Maps*

The Town of Scituate contracted with the Woods Hole Group in February of 2017 to perform a technical review of the existing Flood Insurance Rate Maps. The review was completed in August of 2017 and the proposed Letter of Map Revision Application and flood map changes were submitted to the Town on April 16, 2018. The Town decided not to move ahead with the proposed changes as there were concerns that the proposed mapping does not accurately reflect flood risks within specific Town areas including: Humarock Beach, Cedar Point, and Oceanside Drive. Representatives from the Building Department and Planning & Development Office met with the Coastal Coalition on October 22, 2018 and the Coastal Advisory Commission on October 23, 2018 to discuss the flood map changes proposed by Woods Hole.

### *Regulating Development in the Floodplain*

Regulating development in flood-prone areas is a critical component in flood hazard mitigation and is a requirement for participating in the National Flood Insurance Program. The Town, through its Planning Board, Conservation Commission and Building Department, continues to exercise an extremely high level of regulatory control over construction in flood prone areas. Such matters as elevation and freeboard requirements in flood zones and compliant foundation design and construction on barrier beaches are strictly enforced. Currently, existing development rules and regulations are being studied to develop and identify a new, overlay “high hazard district” where further control can be exercised over expansion in the Town’s most vulnerable areas.

Several Town Departments, including Building Inspections/Zoning Enforcement, Planning, Conservation and Health closely monitor homeowners and contractors who are required to meet all current flood proofing and flood damage mitigation practices for all construction in the flood plain. Regulations incorporated in the current edition of the State Building Code (780 CMR, 9<sup>th</sup> Edition) as well as applicable FEMA regulations must be adhered to. When the value of an intended project exceeds the Code definition of “substantial improvement” (50% of “fair market value” of the structure), that project must include elevation of the structure, special foundation design (e.g. driven pilings, flood vents in solid foundations) and restrictions on allowed use of areas below the base flood elevation for the Zone. Major repairs and/or replacement of heavily damaged properties and razing and reconstruction of damaged or deteriorated properties is allowed only with the above conditions. For previously undeveloped land, new construction is not permitted in areas defined by the limits on a map titled, “Town of Scituate, Massachusetts, Flood Plain and Watershed Protection District, 1972”, incorporated in the Town’s Zoning Bylaws.

All new subdivisions, regardless of location within the Town, are required to meet Massachusetts DEP Stormwater Regulations, as well as the Town of Scituate Stormwater Bylaw and regulations. This compliance has been incorporated into the Planning Board and Conservation Commission permitting process. The Town Bylaw requires management of any increase in amount and/or rate of stormwater runoff caused by new development, using a combination of detention, retention and infiltration devices to control rate and volume, such that properties adjacent to new development are not negatively impacted.

The Office of the Building Commissioner continues to maintain a comprehensive file of Elevation Certificates. These are kept available for public records and are frequently consulted by realtors, appraisers, prospective buyers, owners, insurance agents and mortgage lenders. The Building Department, in conjunction with the Planning and Conservation Departments and the Coastal Resource Officer, provides floodplain map information, direction on how to obtain an Elevation Certificate, information on the LOMA process and construction requirements within flood zones. Letters are sent out each year to real estate offices, insurance agencies and mortgage companies with information concerning these services. The Building Department and the Coastal Resource Officer, also offer guidance on retrofitting existing structures to increase flood resiliency, encouraging homeowners and contractors who are remodeling to consider flood proofing as a major consideration in their plans.

The current FIRM mapping, as adopted on November 4, 2016, is utilized by the Town. FIRM mapping data has been obtained from FEMA and integrated into the Town's mapping software so that permitting departments and citizens can see the relationship of flood zones to their properties on an orthographic photo base map available on the Town website.

In conjunction with the mapping effort, the Conservation Commission permits projects in the flood zones in compliance with the National Flood Insurance Program (NFIP), FEMA FIRM mapping, and NFIP performance standards, as well as The Massachusetts State Building Code regarding appropriate foundation design. The regulations are posted on the Town's webpage. Property owners are directed to elevate their homes on driven piles wherever land forms and/or soil conditions warrant. The Conservation Commission is working with the Massachusetts Department of Environmental Protection (MassDEP) toward the establishment of performance standards for projects proposed in Land Subject to Coastal Storm Flowage and will incorporate these standards into local regulations when finalized by MassDEP.

Repetitive losses to residences over the last 10 years have been minimized as a result of the success of the CRS program, the FEMA Hazard Mitigation Elevation grant

program which has enabled the elevation of many formerly flood prone structures, and the ready availability of flood proofing information provided to residents.

### *Town of Scituate Department Coastal Team*

On January 3<sup>rd</sup>, 2019 a Coastal Team made up of key department heads and staff met to discuss: “What we are doing now”, “What are the challenges”, and “Who are our partners”. The staff continues its system of coordination through meetings and discussions to improve the flood mitigation plan and its priorities. On January 3<sup>rd</sup> the following items were discussed:

- FEMA process for March storms/all coastal damage (combined project)
- The new sandbag machine
- De-watering pump
- Shelter expansion
- 211
- Dam breach notification
- Potential ‘host to the coast’ initiative

The Department of Public Works and the Engineering Department maintain and update a system of elevation benchmarks tied to the USGS elevation system that is used by engineers and surveyors for their work. The highway division has a program that on an annual basis cleans and maintains the storm water drainage system for the Town. This includes repairs to structures as well as cleaning of pipes, culverts, tide gates, outflows and channels. There is also a street sweeping program in place that includes all public ways.

### *Communication*

The Town’s website features rotating informational pages on flood mitigation matters including: (1) publication of the Hazard Mitigation Plan Update; (2) proposed and adopted copies of changes to the Wetlands Rules and Regulations, and; (3) proposed and adopted changes to the subdivision rules and regulations and other informational material on the impacts of floods and flooding; (4) Sea Level Rise Reports; (5) Elevation Grant Program Information; (6) storm ready activities and a variety of other

valuable topics. All this information is duplicated in hard form at the Town's library and posted in the Town Hall. In addition, copies of our Repetitive Loss Letter and the Floodplain brochure have been distributed in a mailing to homes town-wide and in flood hazard areas.

The Town is maintaining a web-based program of education, including the vital flood mitigation information on the Town web-site, and recently added a Facebook page for the same purpose. In 2017, the Town received the Kenneth E. Pickard Municipal Innovation Award from the Massachusetts Municipal Association for our Community Multi-media Emergency Notification System. This system was developed in response to a devastating winter storm in 2010, one of the worst in decades, with more than four hundred homes damaged, wires and trees down and severe coastal flooding. There was a need to get emergency information disseminated to the public, but with conditions changing daily and countless residents without power, the Town faced the challenge of advising residents via traditional channels of communication. From experience with this storm and subsequent emergencies, the Town realized the need to develop a multi-media communication strategy to better inform residents in the event of a disaster. The system which has emerged integrates real-time messaging among various social media technologies. This system creates a unified methodology intended to optimize communications during emergencies and to maximize resident awareness. With an organized notification process to disseminate information rapidly, Town residents have become well-schooled in how to obtain up-to-date information for any type of situation.

Along with multi-media updates, the Town periodically posts helpful information on its website as what to do in the event of an emergency. Of course, traditional media platforms such as local radio, newspaper and Reverse 911, continue to be employed since not all residents have access to these social media tools. Working through the Plymouth County Sheriff's Department, the Town utilizes the reverse 911 system and CODE RED alert system which sends out a pre-recorded message to homes, cell phones, and emails of occupants in hazard areas alerting them to situations that could threaten their safety. This system has been operational for several years. Also the Massachusetts Emergency Management Agency (MEMA), in partnership with the National Oceanic and Atmospheric Administrations (NOAA), provides *Massachusetts*

*Alerts*, a free public safety app. which alerts users based on their location, proximity to an event or incident, and the references selected, providing real-time information.