



7 Columbia

Community Overview

Columbia has an area of 21.9 square miles (13,995 acres). The 2010 Census population count was 5,485 persons, a 10.3% increase from 2000 (4,971). Mainly rural with some agriculture, Columbia is about 10% developed. The Columbia Lake and Mono Pond areas are home to concentrations of the town’s population. Although some of this population is seasonal, a growing portion of residents live there year-round. Columbia is made up of approximately 68% forested land; 10% is developed. Water bodies include Columbia Lake and Mono Pond. Columbia’s elevation ranges from about 240 feet in the north/northeast section of town at the Willimantic River to about 770 feet at the peak of Post Hill in the southwest section.

Little new development has occurred since adoption of the former WinCOG’s 2015 Hazard Mitigation Plan Update (“2015 HMP”). Most activity has been related to improvements of existing structures and has not increased the Town’s hazard profile.

Critical Facilities

Critical Facilities throughout the Capitol Region are listed in Appendix B. In Columbia, critical facilities and cultural resources include one fire department, one resident state trooper’s office, four preschools, one elementary school, one high-school, three elderly facilities, one National Register historic district, seven group homes for individuals with special needs, a summer camp for youth on Columbia Lake, a commercial area along Route 6, one strip mall along Route 66, one telephone switch station, two cell towers, one electrical substation, a defense sub-contractor facility, one hazardous material site, and two high potential loss dams.

Table 7-1: Critical Facilities, Columbia

Facility	Shelter	Generator
Town Hall (and Resident State Trooper Office)		X
Volunteer Fire Association (EOC)		X
Horace W. Porter Elementary School	Primary	X
Saxton B Little Public Library		
Public Works Facility		X
High-School		X
4 Preschools		
3 Elderly Facilities		
7 group homes for individuals with special needs		
Summer camp for youth on Columbia Lake		
National Register Historic District		
Commercial area along Route 6		
Strip mall along Route 66 (toward Willimantic)		
Telephone switch station (Route 66)		
Two cell towers		
Electrical substation off Route 87		
Defense sub-contractor facility off Route 66		

Facility	Shelter	Generator
Hazardous material site on Lakeview Park West		
Two high potential loss dams.		

A generator was added to Town Hall in 2013.

Capabilities

Columbia’s hazard mitigation capabilities include its flood hazard district regulations, debris management and plowing services, and public warning notifications. Hazard mitigation is addressed specifically in the community’s Plan of Conservation and Development (POCD). The HMP document itself is cited. POCD actions specifically address natural hazards.

Columbia spends approximately \$500-\$700 per year to maintain, monitor, and conduct planning for the two dams it owns: the Columbia Lake Dam (class C) and the Fagan Dam (class BB). A relatively recent Columbia Lake Dam renovation cost \$200,000.

The Town has consistently participated in the NFIP since September 16, 1982. The Town’s Flood Hazard District Regulations were most recently updated on June 1, 1989 and include elevation requirements and strict construction demands. Structures may be required to be constructed with certain materials, elevated, flood proofed, watertight or anchored. It must be shown that any activity in the 100-year flood plain will not alter flood levels.

The Town monitors water levels at its dry hydrants during droughts. When a source becomes limited or unavailable, tankers can be used during a fire to move water from another location.

Columbia contributes to regional shelter facilities and performs debris management through Public Works with the assistance of the local electrical utility when necessary. The Town has implemented a Reverse 9-1-1 system and the State building code has been updated and locally adopted.

Plowing services are provided through Public Works; that department also cleans catch-basins on an annual basis.

The Town notifies the public when severe thunderstorms are to occur and performs debris management through Public Works with the assistance of the local electrical utility when necessary. The Town’s capability to mitigate thunderstorm damage is relatively limited to town-owned facilities and rights-of-way. The local electrical utility performed an intensive trimming program near electrical lines following the severe storms in 2011.

The Town uses a variety of regulatory, preparedness, and public information programs to mitigate the effect of wildfires, including the Open Burning Program, maintenance of dry hydrants and cisterns, and educational programs on fire safety. The Town has completed a study to determine where new dry hydrants or cisterns should be installed to improve overall fire protection capabilities. Cisterns are required in new developments.



New Capabilities

Since adoption of the 2015 HMP, one culvert that was contributing to poor-drainage flooding was replaced with newer culvert. Several bridges have also been replaced in recent years, although hydraulic improvements were not necessarily implemented in all cases; nevertheless, replacement of those bridges is expected to have improved the Town's access and evacuation capabilities.

Columbia has secured permits from the USACE to install bypass culverts and perform culvert repairs and replacements on the Hop River. This project will get underway in the coming years.

Two new water cisterns, as well as a new dry hydrant at Mono Pond, have been added to Columbia since the previous HMP, improving the Town's capability for fighting wildfires.

An updated Emergency Action Plan (EAP) has been completed for the Columbia Lake Dam. The Town is hoping to lower its risk classification from Class C.

Columbia has implemented the Everbridge warning system; additionally, the school system has a hazard notification system and it can use to communicate with parents.

A map modernization effort by FEMA is currently underway for Tolland County, but its full extent, and how much of Columbia it will cover, is unknown.

Challenges

Challenges Overview

Power outages and road blockages due to downed trees is a major concern for the Town. Floods, hurricanes, and winter storms, in that order, are the top concerns for Columbia. Dam failure is also a significant concern. There are 11 dams in Town ranging from Hazard Class AA (negligible hazard) to Hazard Class C (high hazard). Failure of the dam at the north end of Mono Pond (Class B) could cause serious damage, while failure of the Columbia Lake Dam (Class C) dam could cause catastrophic damage.

The overall risk of flooding is considered to be moderate. Flood sources include the Hop and Willimantic Rivers, and Columbia Lake. The Hop River experiences minor flooding and minor damage yearly, and a portion of Hop River Road is closed once a year because of high water events including ice jams. Other reported areas of flood risk include Parker Bridge and sections of Flanders Road.

Very limited losses may have occurred in the last 10 years; some losses of product have been reported by hay farmers, and on some occasions water levels in fire ponds and dry hydrants have dropped too low to provide a useful volume of water for firefighting. Quantitative information on these losses is not available. Recent droughts affected several residents who needed to drill new water supply wells.



Town staff estimate that wildfires burn less than five acres of land each year in Columbia.

Hazard Losses

The economic losses faced by Columbia from natural hazards can be estimated by reviewing historic, and modeling future, loss figures. Loss estimates are summarized below.

Historic FEMA Payments

FEMA reimburses communities for hazard losses through programs including Public Assistance (PA) and the National Flood Insurance Program (NFIP). Combining PA and private flood insurance payments can give an estimate for total losses to a community.

The Town of Columbia is home to one repetitive loss (RL) property, a non-residential property located in the 1% annual chance floodplain of the Hop River. The property has two reported losses with an average insurance payment of \$4,200 per loss and total losses of \$8,426. Overall, the NFIP has paid \$29,450 to 25 claims in Columbia.

Total PA reimbursements to the community were as follows:

- Flood Events: \$798 (\$42 annually)
- Hurricane Events: \$25,550 (\$1,345 annually)
- Winter Storm Events: \$172,079 (\$9,057 annually)

These are summarized in the tables below.

Table 7-2: Flood Event PA Reimbursements, Columbia

Incident	Oct 2005
Declaration	12/16/2005
Disaster No.	1619
Entity	FEMA PA Reimbursement
State	\$798
Municipal	\$0
Nonprofit	\$0
Total	\$798
Annualized	\$42



Table 7-3: Hurricane Wind Event PA Reimbursements, Columbia

Incident	Aug - Sep 2011 (T.S. Irene)	Oct - Nov 2012 (Storm Sandy)
Declaration	9/2/2011	10/30/2012
Disaster #	4023	4087
Entity	FEMA PA Reimbursement	
State	\$353	\$1,651
Municipal	\$23,546	\$0
Nonprofit	\$0	\$0
Total	\$23,899	\$1,651
Annualized	\$1,258	\$87

Table 7-4: Winter Storm PA Reimbursements, Columbia

Incident	Mar 2003	Dec 2003	Jan 2005	Feb 2006	Jan 2011	Oct 2011	Feb 2013	Jan 2015
Declaration	3/11/03	1/15/04	2/17/05	5/2/06	3/3/11	11/17/11	3/21/13	4/8/15
Disaster #	3176	3192	3200	3266	1958	4046	4106	4213
Entity	FEMA PA Reimbursement							
State	\$5,569	\$5,761	\$8,233	\$7,495	\$9,377	\$1,436	\$7,810	\$15,113
Municipal	\$9,005	\$13,275	\$10,878	\$0	\$28,077	\$3,230	\$28,620	\$18,203
Nonprofit	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$14,574	\$19,036	\$19,111	\$7,495	\$37,453	\$4,666	\$36,429	\$33,315
Annualized	\$767	\$1,002	\$1,006	\$394	\$1,971	\$246	\$1,917	\$1,753

National Centers for Environmental Information Losses

The National Centers for Environmental Information (NCEI) severe storm database was reviewed to identify events that had impacted Columbia. No events in that database that were specifically noted as having impacted Columbia since 2012, though they did impact Tolland County and nearby towns. NCEI losses are reported in Section II of this Plan.

HAZUS-MH Losses

CRCOG used FEMA’s Hazus-MH model to analyze the risks that the Town of Columbia might face from flooding, hurricanes, and earthquakes. The model estimates economic losses to the town due to damage to buildings and building contents, as well as other economic disruptions. Both residential and commercial structures are addressed. Losses from different hazards are summarized below.



Table 7-5: Estimated Damages to Columbia from a 1% Annual-Chance Flood

Loss Type	2018 Results
Households Displaced	49
People Needing Shelter	26
Buildings at Least Moderately Damaged	0
Economic Losses	
Residential Building & Content Losses	\$3,280,201
Other Building & Content Losses	\$18,043,365
Total Building & Content Loss	\$21,323,565
Total Business Interruption Losses	\$1,779,558
TOTAL	\$23,103,124

Table 7-6: Estimated Damages to Columbia from a 1% Annual-Chance Hurricane

Loss Type	2018 Results (1% track)
Buildings at Least Moderately Damaged	1
Buildings Completely Damaged	0
Total Debris Generated (tons)	7180
Truckloads (at 25 tons/truck) of building debris	287
Economic Losses	
Residential Building & Content Losses	\$2,373,622
Other Building & Content Losses	\$115,364
Total Building & Content Loss	\$2,488,986
Total Business Interruption Losses	\$144,636
TOTAL LOSSES	\$2,633,622

Losses were calculated from a modeled probabilistic earthquake (1% annual-chance of occurrence), as well as for four specific scenarios with epicenters around Connecticut.

Table 7-7: Estimated Damages to Columbia from a Probabilistic Earthquake

Loss Type	2018 Results
Wage Loss	\$461
Rent Loss	\$480
Relocation Loss	\$933
Income Loss	\$376
Inventory Loss	\$81
Total Business Disruption	\$2,330
Structural Loss	\$1,934
Non-Structural Loss	\$6,961
Total Building Loss	\$8,896
Total Content Loss	\$2,784
TOTAL LOSSES	\$14,010



Table 7-8: Estimated Damages to Columbia from Modeled Earthquake Scenarios

Epicenter Location	Magnitude	Estimated Total Losses
East Haddam	6.4	\$210,176.61
Haddam	5.7	\$41,646.15
Portland	5.7	\$43,051.85
Stamford	5.7	\$1,190.42

Other Hazard Costs

The Connecticut DEEP estimated the damage to the Columbia Lake Dam from the June 1982 flood to be \$20,000.

Recent droughts forced several residents to drill new water supply wells, which typically costs around \$6,000 per well.

As necessary following severe storms, the Town hires a tree service to do major cleanups for approximately \$900 per day. Smaller cleanups are handled by Town staff within current budget allocations. \$3,366 was paid to a tree service for cleanup following Hurricane Irene.

The overall cost of property damage due to wildfires is believed to be minimal since vacant lands are typically affected. The Town typically spends less than \$1,000 each year to fight wildfires, with most of the costs attributed to food, equipment, and provisions for the volunteer firefighters.

Average Annualized Losses

Average Annualized Loss (AAL) figures are useful tools for comparison of the risks faced from different hazards with different likelihoods of occurring in a given time period. AAL estimates were prepared for Columbia based on the methodologies discussed in Section II of the Multi-Jurisdictional HMP. Dam failure, drought, tornado, and wildfire losses were sourced from the 2014 Connecticut Natural Hazard Mitigation Plan Update, with dam failure data supplemented by the National Performance of Dams Program and the Connecticut Department of Energy & Environmental Protection. Earthquake and hurricane losses were calculated in HAZUS-MH. Losses for flooding came from NFIP claims, for winter storms from Public Assistance Reimbursements, and for thunderstorms from the NCEI database. These are presented in the table below in dollars per year. Note that Hurricanes and Tropical Storms represent the largest share of total annualized losses.

Table 7-9: Average Annualized Losses, Columbia

Dam Failure	Drought	Earthquakes	Flooding	Hurricanes and Tropical Storms	Severe Winter Storms	Thunderstorms	Tornadoes	Wildfires	Total
\$337	\$0	\$14,010	\$817	\$317,699	\$9,057	\$1,997	\$1,594	\$2,886	\$402,396



Losses Summary

A review of the above loss estimates demonstrates that the Town of Columbia has experienced significant expenses as a result of natural hazards and is at risk for additional losses if some of the less-frequent events were to occur. These actual and potential losses justify hazard mitigation actions to reduce losses in the future.

Mitigation Strategies and Actions

Noted Hazard Mitigation Needs

During the course of this Plan development, multiple hazard mitigation needs of Columbia were noted, including:

- Install bypass culverts and perform culvert repairs and replacements on the Hop River, as described in the permits granted by the USACE.
- Expand and increase funding for tree maintenance.
- Identify owner of the one RL Property owner and contact them about mitigation options.

Status of Previous Mitigation Strategies and Actions

The Town of Columbia reviewed the mitigation actions proposed in the 2015 HMP and determined the status of each. That information is included in the table below.

Table 7-10: Status of Previous Mitigation Strategies and Actions, Columbia

Action #	Action	Notes	Status
GOAL: TO REDUCE THE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF NATURAL DISASTERS.			
Objective 1: To reduce the likelihood of flooding by improving existing natural and artificial drainage systems.			
1.1	Upgrade drainage on Hennequin Road, upgrading/retrofitting all culverts on the west side of Hennequin Road, from Recreation Park to Lake Road.	Design completed. Construction has begun.	Carry Forward
1.2	Encourage CT DOT to upgrade drainage system on Route 87 west of Lake Road to Curland and Vanderbilt to mitigate against icing.	Currently there is a legal action. Party has been notified and fined for illegal changes to drainage. State Jurisdiction. Drop.	Drop
1.3	Upgrade drainage system at Parker Bridge Road. Elevate road with cross culverts to mitigate against flooding.	Not yet started due to budgetary constraints.	Carry Forward with Revisions
1.4	Replace culvert pipe and possible basin retrofit at Macht Road.	Project underway, to be completed in 2018.	Carry Forward
Objective 2: Ensure access to critical facilities.			
Objective 3: Whenever practical, incorporate natural hazard mitigation strategies into existing town projects.			
3.1	Identify location for secondary access to Island Woods Subdivision and prepare and file map of proposed street in the office of the town clerk in accordance with CT General Statute Section 8-29.	No secondary access has yet been identified.	Carry Forward



Action #	Action	Notes	Status
Objective 4: Reduce the frequency and severity of power outages and road closures as a result of wind and ice storm events.			
4.1	Increase the amount of preventative tree maintenance.	This action has been partially completed, but additional budget increases are desired	Carry Forward with Revisions
4.2	Encourage tree management along private roads through public education on street plantings using Eversource Energy brochures.	Town does not feel this action would be productive.	Drop
Objective 5: To reduce the likelihood of wildfire hazards by improving water availability.			
5.1	Install fire protection water cistern at Island Woods Subdivision.	Action completed.	Complete
Objective 6: To reduce the likelihood of catastrophic loss as a result of dam failure.			
6.1	Create maps illustrating the inundation zone of all high hazard dams and distribute information to property owners with inundation area and info on emergency notification system.	An EAP has been completed for Columbia Lake Dam. Town is petitioning DEEP to change the dam classification (currently class C).	Complete
6.2	Create Emergency Operations Plan for Columbia Lake Dam (in progress).	An EAP has been completed for Columbia Lake Dam	Complete
Objective 7: To reduce the likelihood of flooding by improving bridge conditions.			
7.1	Update single-lane Roses Bridge Rd/Pucker Street bridge to a double-lane bridge.	Action completed.	Complete
Objective 8: Continue to educate the public in areas of natural disasters, mitigation activities, and preparedness.			
8.1	Distribute informational materials regarding emergency preparedness. Make 1,000 copies available at the senior center, events and town hall. Use Columbia Crossroads newsletter to notify residents of other resources.	Revise to use social media and Town magazine. Have Everbridge since last plan and a school hazard notification system.	Carry Forward with Revisions

Active Mitigation Strategies and Actions

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Each of the following actions has been prioritized based on FEMA guidelines, listed from highest to lowest priority, and numbered.

Action #1	
Enter the Sustainable CT program through Registration and review actions that can be undertaken to pursue Certification. Make progress with the actions related to hazard mitigation.	
Goal	4. Increase the use of natural, "green," or "soft" hazard mitigation measures, such as open space preservation and green infrastructure.
Category	Natural Resources Protection
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	01/2019 - 12/2019
Priority	High



Action #2

Identify location for secondary access to Island Woods Subdivision and prepare and file map of proposed street in the office of the town clerk in accordance with CT General Statute Section 8-29.

Goal	7. Improve the emergency response capabilities of the region and its communities
Category	Preparedness & Emergency Response
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2020
Priority	High

Action #3

Assess vulnerable population disaster preparedness and emergency assistance protocol to identify opportunities for improvement.

Goal	7. Improve the emergency response capabilities of the region and its communities
Category	Preparedness & Emergency Response
Lead	Emergency Management
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2020
Priority	High

Action #4

Install bypass culverts and perform culvert repairs and replacements on the Hop River, as described in the permits granted by the USACE.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Structural Projects
Lead	Public Works
Cost	More than \$100,000
Funding	Grants
Timeframe	07/2022 - 06/2023
Priority	High



Action #5

Conduct outreach to local small businesses with the aim of preventing the accidental release and pollution from chemicals stored and used at their facilities during or following natural hazard events.

Goal	6. Improve public outreach, education, and warning systems
Category	Education & Awareness
Lead	Planning, in coordination with DEEP
Cost	\$0 - \$10,000
Funding	Materials & Resources Provided by CT DEEP
Timeframe	01/2019 - 12/2019
Priority	Medium

Action #6

Participate in EMI courses or the seminars and annual conference held by the Connecticut Association of Flood Managers.

Goal	3. Improve institutional awareness and understanding of natural hazard impacts and mitigation within municipal governments and other decision-making bodies
Category	Education & Awareness
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2024
Priority	Medium

Action #7

Review the LID Manual developed by the Northwest Hills Council of Governments and determine whether LID can be incorporated locally to increase rural resiliency.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Prevention
Lead	Planning
Cost	\$10,000 - \$25,000
Funding	Town Operating Budget
Timeframe	07/2021 - 06/2022
Priority	Medium



Action #8

Progress through planning phase for drainage system upgrade at Parker Bridge Road. Road should be elevated with cross culverts to mitigate against flooding.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Structural Projects
Lead	Public Works
Cost	\$25,000 - \$50,000
Funding	Grants
Timeframe	07/2021 - 06/2023
Priority	Medium

Action #9

Replace culvert pipe and perform basin retrofit, if necessary, at Macht Road.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Structural Projects
Lead	Public Works
Cost	\$50,000 - \$100,000
Funding	Grants
Timeframe	07/2023 - 06/2024
Priority	Medium

Action #10

Complete drainage upgrade on Hennequin Road: upgrade/retrofit all culverts on the west side of Hennequin Road, from Recreation Park to Lake Road.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Structural Projects
Lead	Public Works
Cost	More than \$100,000
Funding	Grants
Timeframe	07/2022 - 06/2024
Priority	Medium



Action #11

Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Property Protection
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget / DEMHS
Timeframe	07/2021 - 06/2022
Priority	Low

Action #12

Increase the annual-budget for preventative tree maintenance.

Goal	5. Improve the resilience of local and regional utilities and infrastructure using strategies including adaptation, hardening, and creating redundancies.
Category	Natural Resources Protection
Lead	Public Works
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	01/2021 - 12/2022
Priority	Low

Action #13

Distribute informational materials regarding emergency preparedness through social media and the Town magazine.

Goal	6. Improve public outreach, education, and warning systems
Category	Education & Awareness
Lead	Emergency Management
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	01/2021 - 12/2022
Priority	Low



Action #14

Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (such as flood or wildfire hazard zones and areas near steep slopes), to support identification of vulnerable historic properties and preparation of resiliency plans across the state. This action leverages existing resources and best practices for protection of historic and cultural resources through an ongoing statewide initiative by CT SHPO.

Goal	8. Ensure community character and social equity are addressed in mitigation activities
Category	Property Protection
Lead	Planning, in coordination with SHPO
Cost	\$10,000 - \$25,000
Funding	SHPO
Timeframe	07/2021 - 06/2023
Priority	Low






Capitol Region Natural Hazards Mitigation Plan Update











Columbia, Connecticut

Flood Plains, Dams & Critical Facilities



Dam Hazard Class

-  BB, A, AA OR Unclassified
-  Class B - Significant Hazard
-  Class C - High Hazard

Critical Facilities

-  Fire Station
-  Police Station
-  School
-  Healthcare Facility
-  State Facility
-  Town Facility
-  Waste Water Facility
-  Emergency Center
-  NRHP Buildings/Sites
-  NRHP Districts/Areas

FEMA Flood Hazard Area

-  100 Year Flood Zone
-  500 Year Flood Zone

Data Sources: FEMA, National Register of Historic Places, CT DEEP, CRCOG, ESRI



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