

# Hazard Identification and Risk Assessment (HIRA)

EPSOM HAZARD MITIGATION

with Overall Risk Ranking of Hazard

**HIRA Completed.**  
Identify Magnitudes on Pages 1-4

Work Session 1.3
8/2/2023
CNHRPC   Contact Stephanie at salexander@cnhrpc.org



**HMC, Identify the Highest Magnitude that could occur in Epsom for each of these Natural Hazard extent scales. Click on the hyperlinks How Bad Could It Get in Epsom? Use the scientific, measurable Scales to identify.**  
Assume the Natural Hazard WILL OCCUR. Note the Highest Magnitude/Extent you think could occur in TOWN (in Next 10 Years) using the PRIMARY Scale (see SECONDARY & TERTIARY scales for further information).

Natural Technological and Human Hazard Categories	Severity of Impact to the Town				Overall Risk SCORE	RANKED TOP Natural Hazards	Highest Magnitude of Hazard in Epsom within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/Extent Measurement Scale or Index	PRIMARY Magnitude/Extent Scale or Index Hyperlink	SECONDARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	TERTIARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)
	Probability of Occurrence in 10 Years	Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact								
DROUGHT	3	2	3	4	9.0		D0 Abnormally Dry to D4 Exceptional Drought	US Drought (D-scale) Monitor Intensity Scale	<a href="https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH">https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH</a>			
EARTHQUAKE >4.0MM	2	1	1	1	2.0		I Not Felt to X Extreme Shaking Intensity	USGS Modified Mercalli Intensity Scale	<a href="https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale">https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale</a>	USGS ShakeMap Instrumental Intensity <a href="https://earthquake.usgs.gov/data/shakemap/">https://earthquake.usgs.gov/data/shakemap/</a>		
							<1.5 Magnitude to 8> Magnitude	KGS Earthquake Moment Magnitude (Size) Scale, formerly Richter Magnitude	<a href="https://geokansas.ku.edu/measuring-earthquake-magnitude-and-intensity">https://geokansas.ku.edu/measuring-earthquake-magnitude-and-intensity</a>	New England Seismic Network at Weston Observatory Boston College <a href="http://aki.bc.edu/index.htm">http://aki.bc.edu/index.htm</a>	USGS Earthquakes 2.5M+ <a href="https://earthquake.usgs.gov/earthquakes/map/">https://earthquake.usgs.gov/earthquakes/map/</a>	
LANDSLIDE Roadside Erosion, Soil, Rockslide, Excavation Areas, etc	1	1	1	1	1.0		Very Low Risk (Blue) to Very High Risk (Red)	No widely-used scale measuring the complex magnitude of landslides FEMA National Risk Index Map (Landslides) Link below	USGS Landslide Inventory Mapper <a href="https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d">https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d</a>	<a href="https://www.usgs.gov/publications/landslide-handbook-a-guide-to-understanding-landslides">https://www.usgs.gov/publications/landslide-handbook-a-guide-to-understanding-landslides</a>	NASA Landslide Viewer <a href="https://maps.nccs.nasa.gov/arcgis/apps/experiencebuilder/experience/?id=29bd25e78ff45f0a6dbfd0328b4d03e">https://maps.nccs.nasa.gov/arcgis/apps/experiencebuilder/experience/?id=29bd25e78ff45f0a6dbfd0328b4d03e</a>	
PUBLIC HEALTH Infectious Diseases, Air & Water Quality, Biological, Addiction, Arboviral, Tick-borne, etc	4	4	4	4	16.0	1	Bacteria Advisory to Bacteria Warning	NHDES Cyanobacteria/Public Beach Bacterial Warning Levels	<a href="https://experience.arcgis.com/experience/180c28fa3a4c4371a9771d999454e8c4/">https://experience.arcgis.com/experience/180c28fa3a4c4371a9771d999454e8c4/</a>	<a href="https://www.des.nh.gov/water/healthy-swimming">https://www.des.nh.gov/water/healthy-swimming</a>		
							Good to Hazardous Air Quality	NHDES Air Quality Index	<a href="https://www4.des.state.nh.us/airdata/">https://www4.des.state.nh.us/airdata/</a>	EPA Air Quality Index (AQI) <a href="https://www.airnow.gov/aqi/aqi-basics/">https://www.airnow.gov/aqi/aqi-basics/</a>		
							Good Water Quality (Green) to Severe Water Quality (Red)	NHDES Watershed 305(b) Assessment Summary Reports by Watershed 2020-2022	<a href="https://www.arcgis.com/apps/webappviewer/index.html?id=d1ba9c5ec85646538e032580e23174f7">https://www.arcgis.com/apps/webappviewer/index.html?id=d1ba9c5ec85646538e032580e23174f7</a>	NH DES Drinking Water <a href="https://www.des.nh.gov/water/drinking-water">https://www.des.nh.gov/water/drinking-water</a>		
							Minimal (White - Very High (Red)	NHDHHS Acute Respiratory Activity by County (weekly map)	<a href="https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/influenza-flu/influenza-activity">https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/influenza-flu/influenza-activity</a>	NHDHHS Infectious Disease Control <a href="https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control">https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control</a>		
							No Risk (Yellow) to Very High Risk (Red)	NHDHHS Arboviral Risk Map by Town (annual)	<a href="https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents/2/arbomap-2022.pdf">https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents/2/arbomap-2022.pdf</a>	NH DHHS Mosquito Surveillance and Control <a href="https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/mosquito-borne-illnesses/mosquito">https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/mosquito-borne-illnesses/mosquito</a>		
Rate Per 100,000 persons - Latest 2017-2021 (4 years) = 131 (Merr Cty) and 101 (Hills Cty)	NH DHHS Reported Cases of Lyme Disease by County 2017-2021	<a href="https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents/2/lymecounty-2017-2021.pdf">https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents/2/lymecounty-2017-2021.pdf</a>	NHDHHS Tickborne Diseases <a href="https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/tickborne-diseases">https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/tickborne-diseases</a>									

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Natural Technological and Human Hazard Categories	Severity of Impact to the Town				Overall Risk SCORE	RANKED TOP Natural Hazards	HMC, Identify the Highest Magnitude that could occur in Epsom for each of these Natural Hazard extent scales. Click on the hyperlinks How Bad Could It Get in Epsom? Use the scientific, measurable Scales to identify. Assume the Natural Hazard WILL OCCUR. Note the Highest Magnitude/Extent you think could occur in TOWN (in Next 10 Years) using the PRIMARY Scale (see SECONDARY & TERTIARY scales for further information).					
	Probability of Occurrence in 10 Years	Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact			Highest Magnitude of Hazard in Epsom within Next 10 Years	Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/Extent Measurement Scale or Index	PRIMARY Magnitude/Extent Scale or Index Hyperlink	SECONDARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	TERTIARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)
	See scale below 1 Unlikely 2 Possible 3 Likely 4 Highly Likely	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic			Probability x Average Severity Relative Threat SCORE 1 - 16					
SOLAR STORMS AND SPACE WEATHER Solar Winds, Geomagnetic Storms (Aurora Borealis), Solar Radiation, Radio Blackout, etc	3	2	3	4	9.0		G1 Minor to G5 Extreme	NOAA Geomagnetic Storms Scale	<a href="https://www.swpc.noaa.gov/noaa-scales-explanation">https://www.swpc.noaa.gov/noaa-scales-explanation</a>			
							S1 Minor to S5 Extreme	NOAA Solar Radiation Storms Scale	<a href="https://www.swpc.noaa.gov/noaa-scales-explanation">https://www.swpc.noaa.gov/noaa-scales-explanation</a>			
							R1 Minor to R5 Extreme	NOAA Radio Blackouts Scale	<a href="https://www.swpc.noaa.gov/noaa-scales-explanation">https://www.swpc.noaa.gov/noaa-scales-explanation</a>			
WILDFIRE Brushfire, Outdoor Fires, Accidental, etc	4	3	3	3	12.0	3	Low (Green) to Extreme (Red) Fire Danger	National Fire Danger Rating System	<a href="https://www.nh.gov/nhdf/com/munity/daily-fire-danger.htm">https://www.nh.gov/nhdf/com/munity/daily-fire-danger.htm</a> <a href="https://www.wfas.net/index.php/fire-danger-rating-fire-potential-danger-32/class-rating-fire-potential-danger-51">https://www.wfas.net/index.php/fire-danger-rating-fire-potential-danger-32/class-rating-fire-potential-danger-51</a>			
EXTREME TEMPERATURES												
COLD WAVE Wind Chill, Freezing	3	4	3	2	9.0		<5 minutes to > 2 hours for Frostbite Times	NOAA Wind Chill Temperature Index	<a href="https://www.noaa.gov/jetstream/global/wind-chill">https://www.noaa.gov/jetstream/global/wind-chill</a>	NWS Frost and Wind Chill Alerts <a href="https://www.weather.gov/safety/cold-wind-chill-warning">https://www.weather.gov/safety/cold-wind-chill-warning</a>		
HEAT WAVE Excessive Heat	3	4	3	2	9.0		Class IV Very Warm to Class I Extremely Hot	NOAA Heat Index	<a href="https://www.noaa.gov/jetstream/global/heat-index">https://www.noaa.gov/jetstream/global/heat-index</a>	NWS Excessive Heat Alerts <a href="https://www.weather.gov/safety/heat-ww">https://www.weather.gov/safety/heat-ww</a>	See also <a href="http://www.heat.gov">www.heat.gov</a> for information and heat projection maps	
FLOODING												
DAM FAILURE Water Overtop, Breach, Beaver, etc.	2	3	3	3	6.0		Non-Menace to High Hazard Dam Class	NHDES Dam Hazard Classifications	<a href="https://www.des.nh.gov/documents/db-15-classification-dams-new-hampshire">https://www.des.nh.gov/documents/db-15-classification-dams-new-hampshire</a>			
INLAND FLOODING Rain, Snow Melt, Flash Floods- Cause Ditch Erosion, Washouts, Pond Overtop, etc	3	3	3	2	8.0		100 Year to 500 Year Flooding	Special Flood Hazard Areas (SFHAs) on 2010 & Preliminary Digital Flood Rate Insurance Maps (Zones A, AE, X)	<a href="https://msc.fema.gov/portal/home">https://msc.fema.gov/portal/home</a>	NH OPD Current NH Floodplain Mapping Activities <a href="https://www.nheconomy.com/office-of-planning-and-development/what-we-do/floodplain-management-program/floodplain-maps">https://www.nheconomy.com/office-of-planning-and-development/what-we-do/floodplain-management-program/floodplain-maps</a>	FEMA Flood Zone Designation Descriptions (2010) <a href="https://efotg.sc.gov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf">https://efotg.sc.gov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf</a>	
							>5% Marginal to >70% High Rainfall Risk	NOAA Excessive Rainfall Risk Categories	NOAA Excessive Rainfall Outlook <a href="https://www.wpc.ncep.noaa.gov/qpf/excessive_rainfall_outlook_ero.php">https://www.wpc.ncep.noaa.gov/qpf/excessive_rainfall_outlook_ero.php</a>	FEMA Flood Zone Designation Descriptions (2010) <a href="https://efotg.sc.gov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf">https://efotg.sc.gov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf</a>		
RIVER HAZARDS Flood, Ice Jams, Scouring, Erosion, Channel Movement, Debris, etc	4	3	3	3	12.0	3	Much Below Normal Flow (Red) to Much Above Normal Stream Flow (Blue)	National Water Dashboard (USGS Stream Gages, Groundwater Monitors)	<a href="https://dashboard.waterdata.usgs.gov/app/nwd/en/?region=lower48&amp;aoi=default">https://dashboard.waterdata.usgs.gov/app/nwd/en/?region=lower48&amp;aoi=default</a>	USGS Suncoak River N Chichester Hydrograph <a href="https://water.weather.gov/ahps2/hydrograph.php?wfo=gyx&amp;gage=nchn3">https://water.weather.gov/ahps2/hydrograph.php?wfo=gyx&amp;gage=nchn3</a>		

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							6' Low Stage to 16' Major Flood Stage Suncook N Chichester	USGS Suncook River at North Chichester Flood Stage (River Gage #01089500, NOAA #NCHN3)	<a href="https://waterdata.usgs.gov/monitoring-location/01089500/#parameterCode=00065&amp;period=P7D">https://waterdata.usgs.gov/monitoring-location/01089500/#parameterCode=00065&amp;period=P7D</a>	USGS Suncook River N Chichester Hydrograph <a href="https://water.weather.gov/ahps2/hydrograph.php?wfo=gvx&amp;gagne=nchn3">https://water.weather.gov/ahps2/hydrograph.php?wfo=gvx&amp;gagne=nchn3</a>	Flood Categories (in feet) Major Flood Stage: 16 Moderate Flood Stage: 12 Flood Stage: 7 Action Stage: 6	
WARM WEATHER STORMS												
HIGH WINDS	4	3	4	4	14.7	2	0 Calm to 12 Hurricane Force Wind	Beaufort Wind Scale (Land)	<a href="https://www.weather.gov/pqr/wind">https://www.weather.gov/pqr/wind</a>			
THUNDERSTORMS	4	3	3	3	12.0	3	1 Marginal to 5 High Thunderstorm Risk	NOAA Severe Thunderstorm Risk Categories	<a href="https://www.spc.noaa.gov/misc/about.html">https://www.spc.noaa.gov/misc/about.html</a>			NOAA Precipitation Frequency and Depth <a href="https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=n">https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=n</a>
DOWNBURSTS	3	3	3	3	9.0		<2.5 miles wide Microburst to >2.5 miles wide Macroburst	NOAA Downbursts	<a href="https://www.noaa.gov/jetstream/wind_damage">https://www.noaa.gov/jetstream/wind_damage</a>			
LIGHTNING	4	3	4	4	14.7	2	LAL 1 No Thunderstorms to LAL 6 Dry Lightning Activity	NWS Lightning Activity Level (LAL)	<a href="https://graphical.weather.gov/definitions/defineLAL.html">https://graphical.weather.gov/definitions/defineLAL.html</a>			
TORNADOES	4	4	4	4	16.0	1	EF0 65-85mph to EF5 >200 mph	NOAA Enhanced Fujita Scale	<a href="https://www.spc.noaa.gov/efscale/">https://www.spc.noaa.gov/efscale/</a>	NOAA Enhanced F Scale for Tornado Damage 2007 <a href="https://www.spc.noaa.gov/faq/tornado/ef-scale.html">https://www.spc.noaa.gov/faq/tornado/ef-scale.html</a>		
HAIL	4	3	3	3	12.0	3	1/4" Pea Size to 4.5" Grapefruit Size Hail Stones	NOAA Hail Size	<a href="https://www.weather.gov/boi/hailsize">https://www.weather.gov/boi/hailsize</a>	NWS Hail Size Infographic <a href="https://www.weather.gov/vef/T/hunderstorm_Infographics">https://www.weather.gov/vef/T/hunderstorm_Infographics</a>		
							H0 5mm Hard Hail Storm to H10 >100mm Super Hail Storm	TORRO Hailstorm Intensity Scale Adapted	<a href="https://www.torro.org.uk/research/hail/hscale">https://www.torro.org.uk/research/hail/hscale</a>	Tornado and Storm Research Organization (TORRO) international		
TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms	2	3	3	2	5.3		Category 1 74-95 mph Minimal to Category 5 >157 mph Catastrophic Winds	NOAA Saffir-Simpson Hurricane Wind Scale	<a href="https://www.nhc.noaa.gov/aboutsshws.php">https://www.nhc.noaa.gov/aboutsshws.php</a>			
COLD WEATHER STORMS												
WINTER STORMS, BLIZZARD (winds >35 mph, visibility <0.25 mile, >3 hours),	4	3	3	3	12.0	3	1 Notable to 5 Extreme Snowfall	Northeast Snowfall Impact Scale (NESIS)	<a href="https://www.ncei.noaa.gov/access/monitoring/rsi/nesis">https://www.ncei.noaa.gov/access/monitoring/rsi/nesis</a>			
							No Impacts to Extreme Winter Impacts	NWS Winter Storm Severity Index (WSSI)	<a href="https://www.weather.gov/ict/WSSI_Overview">https://www.weather.gov/ict/WSSI_Overview</a>			

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	Probability of Occurrence in 10 Years	Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact								
ICE STORM	4 See scale below 1 Unlikely 2 Possible 3 Likely 4 Highly Likely	3 See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	3 See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	3 See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	12.0 Probability x Average Severity Relative Threat SCORE 1 - 16	3		0 Damage to 5 Ice Damage	Sperry-Piltz Ice Accumulation Index	<a href="https://www.spia-index.com/">https://www.spia-index.com/</a>		
NOT APPLICABLE TO TOWN & REGION												
AVALANCHE	n/a	n/a	n/a	n/a	n/a		N/A	1 Low Danger to 5 Extreme Danger	North American Public Avalanche Danger Scale	<a href="https://avalanche.org/avalanche-encyclopedia/human/resources/north-american-public-avalanche-danger-scale/">https://avalanche.org/avalanche-encyclopedia/human/resources/north-american-public-avalanche-danger-scale/</a>		
COASTAL FLOODING	n/a	n/a	n/a	n/a	n/a		N/A	Elevated 1-3 feet to Extreme >9 feet	NOAA Storm Surge Threat Scale	<a href="https://www.weather.gov/mhx/HTIStormSurge">https://www.weather.gov/mhx/HTIStormSurge</a>	NOAA National Storm Surge Risk Maps by Hurricane Category <a href="https://experience.arcgis.com/experience/203f772571cb48b1b8b50fdcc3272e2c">https://experience.arcgis.com/experience/203f772571cb48b1b8b50fdcc3272e2c</a>	
TSUNAMI	n/a	n/a	n/a	n/a	n/a		N/A	Watch to Warning	NOAA Tsunami Program Alerts (Pacific)	<a href="https://www.tsunami.noaa.gov/pmel-theme/forecast-warning">https://www.tsunami.noaa.gov/pmel-theme/forecast-warning</a>		
VOLCANIC ACTIVITY	n/a	n/a	n/a	n/a	n/a		N/A	0 Magnitude to 8 Magnitude	NPS Volcanic Explosivity Index (VEI) Logarithmic	<a href="https://www.nps.gov/subjects/volcanoes/volcanic-explosivity-index.htm">https://www.nps.gov/subjects/volcanoes/volcanic-explosivity-index.htm</a>		
Technological and Human Hazards, Impacts from Natural Hazards	Not scored in HIRA											
AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes, Underground Lines, Debris, etc	not scored	not scored	not scored	not scored	not scored	not ranked						
LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications, Live Wire Danger, etc	not scored	not scored	not scored	not scored	not scored	not ranked						
CONFLAGRATION (FIRE)	not scored	not scored	not scored	not scored	not scored	not ranked						
HAZARDOUS MATERIALS Haz Mat Spills, Brownfields, Trucking, Known and Emerging Contaminants, etc	not scored	not scored	not scored	not scored	not scored	not ranked						
RADIOLOGICAL	not scored	not scored	not scored	not scored	not scored	not ranked						
TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate, Pedestrian, Bicycle, etc	not scored	not scored	not scored	not scored	not scored	not ranked						
MASS CASUALTY INCIDENT As a result of any hazard event	not scored	not scored	not scored	not scored	not scored	not ranked						
TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/ Unrest, Politically Motivated Attacks, Incendiary Devices, Sabotage, Vandalism, etc	not scored	not scored	not scored	not scored	not scored	not ranked						

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<b>CYBER EVENT</b> Computer Systems Attack, Website Overtake, Cloud Data Breach, Telephone Rerouting, Identity Theft, Phishing, Ransomware, Virus, Phone Scams, etc	not scored	not scored	not scored	not scored	not scored	not ranked						

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