

Technical Memorandum

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Via Email: jfitch@scarboroughmaine.org
To: Jami Fitch, Sustainability Coordinator, Town of Scarborough
From: Leila Pike, P.E. (GEI), Ilan Gasko, E.I. (GEI)
Date: Revised August 6, 2025 (June 9, 2025)
Re: Adaptation Prioritization Methodology for Public Roadways
 Flood Vulnerability Assessment
 Scarborough, Maine
Project No.: 2403961

GEI Consultants, Inc. (GEI) conducted a risk-based prioritization assessment for roadways identified as at-risk of coastal flooding as part of the flood vulnerability assessment for the Town of Scarborough, Cumberland County, Maine (the “Town”) (Figure 1). This work builds off the data review and flood vulnerability analysis efforts that were documented in previous memos provided to the Town (GEI, 2025a,b). The prior memos detail the data, methods, and results of the flood exposure analysis for the Town. The goal of this memo is to document the method used to prioritize roadways for adaptation based on their flood exposure and consequences.

The flood exposure study identified 111 publicly owned roads that would be at risk of coastal flooding under the flood scenarios included in this study. Through the risk-based prioritization process, the roads were ranked for adaptation prioritization based on their flood exposure and agreed upon consequence metrics. The top 30 “ranked” roads are presented within this memo and the full list of ranked roads is provided in Appendix A.

Estimating the risk for the roads was based upon the probability of flood exposure and the consequence of flood exposure, using the following standard risk-based formula:

$$\text{Risk} = \text{Probability of Flooding} \times \text{Consequence}$$

The prioritization process used the following four steps:

1. Identify roads subject to flooding.
2. Estimate probability of exceedance.
3. Calculate consequence of flooding score.
4. Calculate risk.

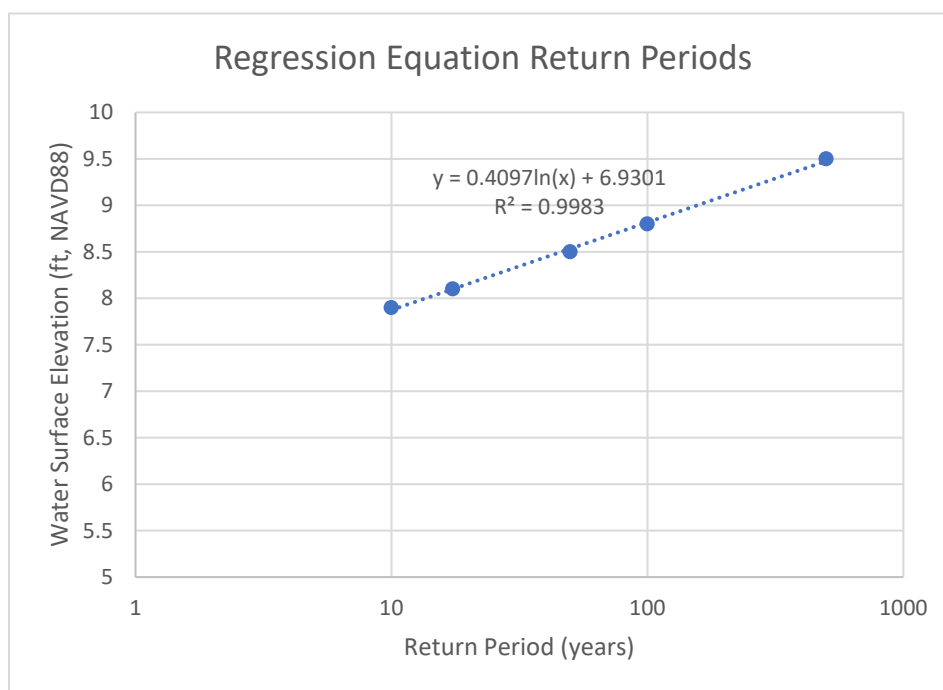
This memo focuses on Steps 2 through 4. Refer to the Flood Vulnerability Analysis Results Memo for more information on Step 1 (GEI, 2025b).

1. Probability of Exceedance

The probability of exceedance of a given water level included in this study was estimated based on a regression analysis of the annual return interval of the coastal storm surge still water elevations. A regression equation fit to the water surface elevations associated with the 10%, 2%, 1%, and 0.2%-annual chance storms was used to estimate the annual exceedance probability of the Mean Higher-High Water (MHHW) and Highest Astronomical Tide (HAT) water levels for present-day water levels. For future time frames, the annual exceedance probability was estimated by translating future estimated water levels into present-day water levels (i.e., by removing the sea level rise addition), and then applying the regression equation.

The regression plot is shown in Figure 1-1.

Figure 1-1. Water Surface Elevation Regression Equation Plot



Using the method described above, exceedance probabilities were approximated for water surface elevations of each of the ten scenarios in this study. Return periods for water surface elevations in 2030, 2050, and 2100 were calculated by subtracting the “Commit to Manage” sea level rise estimates from the flood scenario water surface elevation value to obtain an approximation of what that value would be with present day sea levels, except for the Flood Scenario 10 water surface elevation value of 16.9 ft. This elevation was based on the high rate of sea level rise for 2100 and so the high rate of sea level rise was subtracted to estimate translated present-day water levels.

For example, the water surface elevation of 8.0 ft for Flood Scenario 2 corresponds closely with the present-day 10% annual chance coastal storm event water elevation of 7.9 ft, so the annual exceedance probability was approximated to be 10%. To estimate the annual exceedance probability of an 8.0 ft water surface elevation occurring in 2030, 0.8 ft was subtracted from 8.0 ft to translate the water surface

elevation to present-day levels. The resulting elevation of 7.2 ft was input into the regression equation to obtain a return period of 1.9 years and a resulting annual exceedance probability of 51.8%. This method was continued for the remaining time frames and flood scenarios.

A summary of the probability of exceedance for present and future time frames for the water levels included in this study is provided in Table 1-1.

Table 1-1. Summary of Probabilities of Exceedance

Flood Scenario	Water Surface Elevation (ft)	Present Day Probability of Exceedance (%)	2030 Probability of Exceedance (%)	2050 Probability of Exceedance (%)	2100 Probability of Exceedance (%)
1	7.3	40.6	100.0	100.0	100.0
2	8.0	10.0	51.8	100.0	100.0
3	8.8	1.0	10.0	40.6	100.0
4	9.6	0.2	1.0	5.8	100.0
5	10.3	0.0	0.2	1.0	100.0
6	10.8	0.0	0.0	0.2	100.0
7	11.4	0.0	0.0	0.2	31.8
8	12.8	0.0	0.0	0.0	1.0
9	13.9	0.0	0.0	0.0	0.2
10	16.9	0.0	0.0	0.0	0.2

2. Consequence of Flooding

The consequence of flooding for the roads identified as likely to be at-risk of flooding in this study was estimated based on five potential impacts: area, public safety, damage potential, environmental, and economic. The consequence score for each of the impacts ranged from 1 (no or very little consequence) to 5 (very high consequence). The consequences included in this study and the assigned scores were based on similar studies for low-lying roads, feedback from the Vulnerability Assessment Working Group, and our professional judgement. A consequence scoring matrix for the five consequence impacts included in this study is provided in Table 2-1.

A composite consequence score for a given roadway was calculated by multiplying the average of the scores for that roadway by 100. The higher the score, the greater the consequence of flooding for a particular roadway. An example is shown for Payne Road in Table 2-2.

$$\text{Composite Consequence Score} = \frac{\sum \text{Impact Score}}{25} \times 100$$

Table 2-1. Consequence Score Guidance Matrix

Consequence Score	Area Impact (# Buildings) ¹	Public Safety Impact ²	Damage Potential ³	Environmental Impact ⁴	Economic Impact ⁵
5 (Very High)	>150	Official evacuation route	- Has experienced damage in the past - In FEMA VE Zone - Utility infrastructure below roadway	>= 8 habitats impacted	In TCV1, Industrial Zone, Industrial Overlay; or AADT > 5,000
4 (High)	75-150	- Access to critical infrastructure or services - Unofficial evacuation route	In FEMA VE Zone	6-7 habitats impacted	AADT > 1,000
3 (Medium)	25-75	No alternate route	Revetment along roadway with scour potential	4-5 habitats impacted	In Beach Mixed Use or Town and Village Center Zone 4
2 (Low)	5-25	- Alternate route - No alternate access, but impacts property that would already be flooded	Stillwater inundation	1-3 habitats impacted	In Town and Village Transition and Fringe Zones or Coastal Mixed Use
1 (None)	<5	No impact (e.g., end of dead-end street)	High-tide inundation, no revetment, or other coastal structures	No habitats impacted	In Residential and Rural Farming Zones

Notes:

1. Number of buildings impacted estimated based on flood inundation extents for each scenario and the Structure GIS layer (Scarborough, 2024).
2. Official evacuation routes based on the Maine Emergency Management Agency's (MEMA) Maine Hurricane Evacuation Dashboard (MEMA, 2024); critical infrastructure or services include pump stations and sewer lines.
3. FEMA VE zones represent wave velocity zones which would likely have larger damage potential. The area for these zones was obtained from the FEMA Flood Insurance Study (FIS) for Cumberland County (FEMA, 2024).
4. Number of habitats impacted based on combined habitat GIS layers created as part of Southern Maine Planning & Development Commission's (SMPDC) Climate Ready Coast – Southern Maine study (SMPDC, 2023), and include the following habitat layers: current tidal marshes; future coastal habitat; undeveloped habitat blocks and connectors; freshwater wetlands and vernal pools; aquifers and source protection; rare, threatened, endangered, or exemplary habitats and natural communities; riparian habitat and connectors; fin fish; submerged aquatic vegetation and shellfish growing areas; seabird nesting and shorebird areas; tidal waterfowl and wading bird habitats; conserved lands; candidate deer wintering habitats.
5. Zones based on Scarborough zoning data (Scarborough, 2025). Average Annual Daily Traffic (AADT) values obtained from Maine Department of Transportation data (MaineDOT, 2023, 2024).

Table 2-2. Payne Road Consequence Score Example

Area Impact (# Buildings)	Public Safety Impact	Damage Potential	Environmental Impact	Economic Impact	Composite Consequence Score
3	4	3	3	5	72

3. Risk Scores

A risk score for roads at risk of flooding in this study was calculated by multiplying the probability of flood exposure with the road's consequence score:

$$Risk = Probability\ of\ Flooding \times Consequence$$

The risk score in this study is based on current conditions of the roadway infrastructure and likelihood of flooding. The probability of flood exposure and consequences included in this study are subject to change over the lifetime of roadway assets, depending on changes in the environment, sea level rise projections, or infrastructure improvements, among other conditions.

The risk scores for roadways in this study were subsequently weighted based on the timeframe when a particular roadway would experience flooding. More weight was given towards roadways likely to experience flooding sooner. A weighted risk score was calculated using the following equation:

$$Weighted\ Risk\ Score = \sum (Probability\ of\ Flooding_y \times Consequence \times Weighting\ Factor_y)$$

Where:

y = time horizon (present, 2030, 2050, 2100)

Present-day weighting factor = 35%

2030 weighting factor = 30%

2050 weighting factor = 25%

2100 weighting factor = 10%

An example for how the weighted risk score for Payne Road was calculated is provided in Table 3-1.

Table 3-1. Weighted Risk Score Example for Payne Road

Timeframe	Probability of Exceedance (%)	Composite Consequence Score	Calculated Risk Score	Timeline Weight	Weighted Risk Score
Present-Day	40.6	72	2,923	0.35	5,700
2030	100	72	7,200	0.30	
2050	100	72	7,200	0.25	
2100	100	72	7,200	0.10	

Note: Probability of exceedance values for Payne Road based on flood exposure in Scenario 1.

Using this method, a weighted risk score was calculated for the roadways included in this study. The top 30 roads based on the weighted flood risk score are provided in Table 3-2. The table lists the roads in

alphabetical order, not by the order of greatest weight. A summary of the weighted flood risk scores for all the public roadways included in this study is provided in Appendix A.

The weighted flood risk scores and rankings are intended as a tool to help the Town make decisions as to which roads should be prioritized for adaptation. The ultimate decision on which roads should be prioritized depends on more than the weighted risk score, such as: public support, funding availability, nearby infrastructure projects, and other factors. Additionally, the order presented below is not intended to represent the order that roads should be adapted.

Table 3-2. Top 30 Ranked Roads Based on Weighted Risk Score, Alphabetical Order

Road Name		
Avenue 1	E Grand Ave	Pine Point Rd*
Avenue 2	Ferry Rd	Route 1
Avenue 5	Jones Creek Dr	Route 9*
Avenue 6	Kent St	Sawyer St
Avenue 7	King St	Shipwreck Rd
Bayview Ave	Milliken Rd	Snow Canning Rd
Black Point Rd	Morning St	Spurwink Rd
Champion St	Ocean Ave	Vesper St
Clay Pits Rd	Old Neck Rd	Winnocks Neck Rd
Driftwood Ln	Payne Rd	Winnocks Neck to Plummer Island

Note: Route 9 refers to the section of Route 9 near the Scarborough Marsh Audubon Center currently planned for adaptation as part of the MaineDOT Route 1 and Route 9 Adaptation Project. Pine Point Road refers to the section of Route 9 near Jones Creek.

4. Limitations

This memo presents the initial risk-based prioritization of roadways identified as at-risk of coastal flooding as part of the flood vulnerability assessment for the Town of Scarborough. The risk scores and prioritization are based on flood exposure results detailed in previous work by GEI, and consequences based on readily available online information, published references, data provided by the Town of Scarborough, input from the Working Group, and our professional judgement.

The GIS data used for this analysis represent a snapshot in time of locations and configurations of roadways and other assets. The flood extents are based on static water elevations (i.e., “bathtub models”). The sea level rise values used were based on information from the MCC (2024). Tidal datums are based on data from NOAA stations 8418445 and 8418150 (NOAA, 2024a,b). Coastal storm event stillwater elevations included in this study are based on the FEMA FIS for Cumberland County (FEMA, 2024). Actual tides, storm surge elevations, and rates of sea level rise will vary from what has been presented in this report.

The probability of flood exposure and consequences included in this study are subject to change over the lifetime of roadway assets, depending on changes in the environment, sea level rise projections, or infrastructure improvements, among other conditions.

The purpose of this risk-based prioritization was to assess which roadways the Town should prioritize for adaptation consideration. The risk scores in this study should be considered relative to one another, and the rankings should not be taken as the strict order to pursue roadway adaptation projects. This prioritization exercise is meant to provide another tool for the decision-making process for roadway adaptation projects, and should be balanced with other decisions, such as: public support, funding availability, nearby infrastructure projects, and other factors.

Reuse of this report for any purposes, in part or in whole, is at sole risk of the user.

5. References

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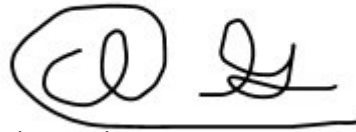
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Sincerely,

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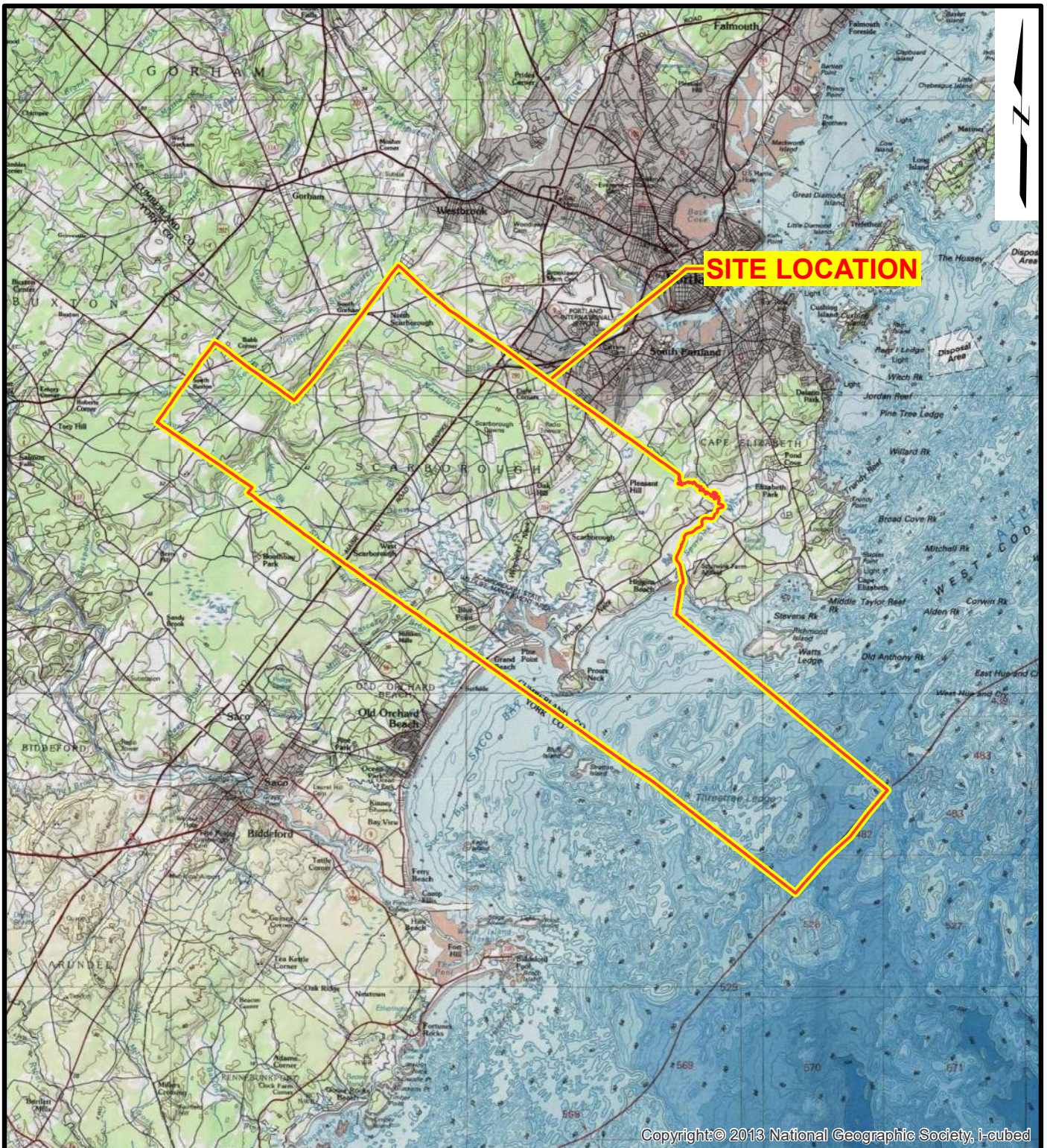
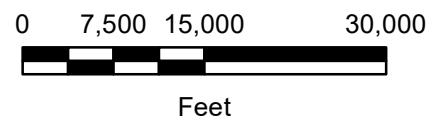
Attachments

Figure 1	Site Location
Appendix A	Ranking of Public Roads Based on Flood Risk

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Figures

Figure 1 Site Location



Flood Vulnerability Assessment
Scarborough, Maine

Town of Scarborough
Scarborough, Maine



Project 2403961

SITE LOCATION

August 2025

Fig. 1

Appendix A Ranking of Public Roads Based on Flood Risk

Table A.1. Ranking of Public Roads Based on Flood Risk

Road Name	Probability of Flooding ¹						Consequences						Weighted Risk Score ⁸
	Flood Scenario Impacted	Water Surface Elevation (ft, NAVD88)	Present-Day AEP (%)	2030 AEP (%)	2050 AEP (%)	2100 AEP (%)	Area Impact ²	Public Safety Impact ³	Damage Potential ⁴	Environmental Impact ⁵	Economic Impact ⁶	Composite Consequence Score ⁷	
Top 30 roads with highest priority, ranked in order of priority													
Route 9 ⁹	1	7.3	40.6	100.0	100.0	100.0	2	5	3	4	5	76	6,020
Route 1	1	7.3	40.6	100.0	100.0	100.0	2	5	2	4	5	72	5,703
Payne Rd	1	7.3	40.6	100.0	100.0	100.0	3	4	3	3	5	72	5,703
Black Point Rd	2	8.0	10.0	51.8	100.0	100.0	5	5	4	5	5	96	5,188
Pine Point Rd ⁹	2	8.0	10.0	51.8	100.0	100.0	5	5	3	5	5	92	4,972
Sawyer St	1	7.3	40.6	100.0	100.0	100.0	1	2	3	5	4	60	4,753
King St	1	7.3	40.6	100.0	100.0	100.0	4	3	1	2	4	56	4,436
Winnocks Necks to Plummer Island	1	7.3	40.6	100.0	100.0	100.0	2	3	3	5	1	56	4,436
Snow Canning Rd	1	7.3	40.6	100.0	100.0	100.0	1	2	1	3	5	48	3,802
Champion St	1	7.3	40.6	100.0	100.0	100.0	2	4	2	2	1	44	3,485
Jones Creek Dr	2	8.0	10.0	51.8	100.0	100.0	4	3	1	2	4	56	3,026
Old Neck Rd	2	8.0	10.0	51.8	100.0	100.0	4	3	2	3	1	52	2,810
Avenue 6	2	8.0	10.0	51.8	100.0	100.0	2	2	1	2	3	40	2,162
Ocean Ave	3	8.8	1.0	10.0	40.6	100.0	5	4	3	4	4	80	1,880
E Grand Ave	3	8.8	1.0	10.0	40.6	100.0	5	4	4	2	4	76	1,786
Milliken Rd	2	8.0	10.0	51.8	100.0	100.0	1	2	1	2	1	28	1,513
Bayview Ave	3	8.8	1.0	10.0	40.6	100.0	4	4	5	2	1	64	1,504
Winnocks Neck Rd	3	8.8	1.0	10.0	40.6	100.0	3	3	1	5	4	64	1,504
Clay Pits Rd	3	8.8	1.0	10.0	40.6	100.0	3	3	3	4	1	56	1,316
Ferry Rd	3	8.8	1.0	10.0	40.6	100.0	3	2	1	3	4	52	1,222
Vesper St	3	8.8	1.0	10.0	40.6	100.0	4	2	3	3	1	52	1,222
Driftwood Ln	3	8.8	1.0	10.0	40.6	100.0	3	2	1	2	4	48	1,128
Shipwreck Rd	3	8.8	1.0	10.0	40.6	100.0	3	2	4	2	1	48	1,128
Morning St	3	8.8	1.0	10.0	40.6	100.0	3	2	3	2	1	44	1,034
Avenue 5	3	8.8	1.0	10.0	40.6	100.0	1	2	1	2	4	40	940
Kent St	3	8.8	1.0	10.0	40.6	100.0	2	2	3	2	1	40	940
Avenue 7	3	8.8	1.0	10.0	40.6	100.0	1	2	1	2	3	36	846
Spurwink Rd	5	10.3	0.0	0.2	1.0	100.0	5	5	1	4	5	80	825
Avenue 1	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Avenue 2	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Remaining roads ranked in order of priority													
Avenue 3	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Avenue 4	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Sargent Rd	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Seavey Landing Rd	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Tasker Ave	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Woodside Dr	3	8.8	1.0	10.0	40.6	100.0	2	2	1	2	1	32	752
Manson Libby Rd	5	10.3	0.0	0.2	1.0	100.0	2	4	3	3	5	68	701
Southgate Rd	5	10.3	0.0	0.2	1.0	100.0	2	3	3	3	5	64	660
Oak St	3	8.8	1.0	10.0	40.6	100.0	1	2	1	2	1	28	658
Old County Rd	5	10.3	0.0	0.2	1.0	100.0	3	4	3	2	1	52	536
Scottow Hill Rd	4	9.6	0.2	1.0	5.8	100.0	2	2	1	2	4	44	520
Tall Pines Rd	6	10.8	0.0	0.0	0.2	100.0	4	2	3	2	1	48	482
Dunstan Landing Rd	4	9.6	0.2	1.0	5.8	100.0	1	4	1	3	1	40	472
Partridge Ln	4	9.6	0.2	1.0	5.8	100.0	3	2	2	2	1	40	472
Beech Ridge Rd	6	10.8	0.0	0.0	0.2	100.0	2	2	1	2	4	44	442
Woodrock Dr	4	9.6	0.2	1.0	5.8	100.0	3	2	1	2	1	36	425
Coulthard Farms Rd	6	10.8	0.0	0.0	0.2	100.0	2	2	3	2	1	40	402
Nonesuch Cove Rd	6	10.8	0.0	0.0	0.2	100.0	3	3	1	2	1	40	402
Baywoods Dr	4	9.6	0.2	1.0	5.8	100.0	2	2	1	2	1	32	378
Melbourne Dr	4	9.6	0.2	1.0	5.8	100.0	1	2	1	2	1	28	331
Cedar Cir	5	10.3	0.0	0.2	1.0	100.0	2	2	1	2	1	32	330
Fern Cir	5	10.3	0.0	0.2	1.0	100.0	2	2	1	2	1	32	330
Hawthorn Cir	5	10.3	0.0	0.2	1.0	100.0	2	2	1	2	1	32	330
Hemlock Cir	5	10.3	0.0	0.2	1.0	100.0	2	2	1	2	1	32	330
Ashton St	7	11.4	0.0	0.0	0.2	31.8	2	2	3	2	1	40	129
Beach St	7	11.4	0.0	0.0	0.2	31.8	2	2	3	1	1	36	116
Thomas Dr	7	11.4	0.0	0.0	0.2	31.8	3	2	1	2	1	36	116
Bliss St	7	11.4	0.0	0.0	0.2	31.8	2	2	1	2	1	32	103
Dunefield Ln	7	11.4	0.0	0.0	0.2	31.8	2	2	1	1	1	28	90
Granite St	7	11.4	0.0	0.0	0.2	31.8	2	2	1	1	1	28	90
Pine St	7	11.4	0.0	0.0	0.2	31.8	2	2	1	1	1	28	90
Spruce Cir	7	11.4	0.0	0.0	0.2	31.8	2	2	1	1	1	28	90
Fogg Rd	8	12.8	0.0	0.0	0.0	1.0	3	4	3	3	4	68	7

Table A.1. Ranking of Public Roads Based on Flood Risk

Road Name	Probability of Flooding ¹						Consequences						Weighted Risk Score ⁸
	Flood Scenario Impacted	Water Surface Elevation (ft, NAVD88)	Present-Day AEP (%)	2030 AEP (%)	2050 AEP (%)	2100 AEP (%)	Area Impact ²	Public Safety Impact ³	Damage Potential ⁴	Environmental Impact ⁵	Economic Impact ⁶	Composite Consequence Score ⁷	
Remaining roads ranked in order of priority													
Washington Ave	8	12.8	0.0	0.0	0.0	1.0	3	4	3	2	5	68	7
Pleasant Hill Rd	8	12.8	0.0	0.0	0.0	1.0	5	3	1	2	5	64	6
Old Mill Rd	8	12.8	0.0	0.0	0.0	1.0	3	2	3	1	4	52	5
Bay St	8	12.8	0.0	0.0	0.0	1.0	2	2	3	2	1	40	4
Clearwater Dr	8	12.8	0.0	0.0	0.0	1.0	3	3	1	2	1	40	4
Sea Rose Ln	8	12.8	0.0	0.0	0.0	1.0	2	2	3	2	1	40	4
Ross Rd	8	12.8	0.0	0.0	0.0	1.0	1	2	1	2	4	40	4
Bayberry Ln	8	12.8	0.0	0.0	0.0	1.0	3	2	1	2	1	36	4
Pinewood Cir	8	12.8	0.0	0.0	0.0	1.0	3	2	1	2	1	36	4
Roundabout Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	3	1	36	4
Wynmoor Dr	8	12.8	0.0	0.0	0.0	1.0	3	2	1	2	1	36	4
Rose Hill Way	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	2	36	4
Eleventh St	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Hackmatack Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Hampton Cir	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Iris Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Phinneas Ln	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Pintail Point Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Rhonda Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
River Sands Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Wood Ln	8	12.8	0.0	0.0	0.0	1.0	2	2	1	2	1	32	3
Coach Lantern Ln E	8	12.8	0.0	0.0	0.0	1.0	2	2	1	1	1	28	3
Coach Lantern Ln W	8	12.8	0.0	0.0	0.0	1.0	2	2	1	1	1	28	3
Dover St	8	12.8	0.0	0.0	0.0	1.0	2	2	1	1	1	28	3
Grandview Dr	8	12.8	0.0	0.0	0.0	1.0	2	2	1	1	1	28	3
Kimball Dr	8	12.8	0.0	0.0	0.0	1.0	1	2	1	2	1	28	3
Ninth St	8	12.8	0.0	0.0	0.0	1.0	2	2	1	1	1	28	3
Old Colony Ln	8	12.8	0.0	0.0	0.0	1.0	1	2	1	2	1	28	3
Sandy Point Rd	8	12.8	0.0	0.0	0.0	1.0	1	2	1	2	1	28	3
Gorham Rd	10	16.9	0.0	0.0	0.0	0.2	1	5	1	2	5	56	1
Lincoln Ave	10	16.9	0.0	0.0	0.0	0.2	3	3	1	1	4	48	1
Pillsbury Dr	3	13.9	0.0	0.0	0.0	0.2	4	2	1	2	1	45	1
Greenwood Ave	9	13.9	0.0	0.0	0.0	0.2	4	3	1	2	1	44	1
Pearl St	10	16.9	0.0	0.0	0.0	0.2	2	2	3	2	1	40	1
Eastern Road Marsh	10	16.9	0.0	0.0	0.0	0.2	1	1	1	5	1	36	1
Catherine Dr	9	13.9	0.0	0.0	0.0	0.2	2	2	1	3	1	36	1
Horseshoe Dr	9	13.9	0.0	0.0	0.0	0.2	3	2	1	2	1	36	1
Val Ter	10	16.9	0.0	0.0	0.0	0.2	2	2	1	2	1	32	1
Whistler Lndg	10	16.9	0.0	0.0	0.0	0.2	2	2	1	2	1	32	1
Willowdale Rd	9	13.9	0.0	0.0	0.0	0.2	2	2	1	2	1	32	1
Indian Woods Rd	10	16.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Plover Ln	10	16.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Prospector Ln	10	16.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Tenney Ln	10	16.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Woodview Dr	10	16.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Bornheimer Pl	9	13.9	0.0	0.0	0.0	0.2	1	2	1	2	1	28	1
Kingfisher Dr	10	13.9	0.0	0.0	0.0	0.2	1	2	1	1	1	24	0

Notes:

1. Probability of flooding based on the estimated annual return period of water surface elevations and the flood exposure analysis study (GEI, 2025b).
2. Area Impact score based on the estimated number of buildings to experience flooding.
3. Public Safety Impact score based on evacuation route status, availability of alternate routes, and access to critical infrastructure of services.
4. Damage Potential based on historical damage, location relative to a FEMA VE zone, and presence of underground utilities or shoreline stabilization infrastructure.
5. Environmental Impact score based on the estimated number of habitats that would experience flooding.
6. Economic Impact based on the Scarborough zoning districts and the average annual daily traffic (AADT) count.
7. Composite Consequence Score calculated by average of the five consequences and multiplying by 100.
8. Weighted Risk Score = $\sum (\text{Probability of Flooding} \times \text{Composite Consequence Score} \times \text{Weighting Factor}_y)$,
where y represent the timeframe and the weighting factor equals 35% for present-day, 30% for 2030, 25% for 2050, and 10% for 2100.
9. Route 9 refers to the section of Route 9 near the Scarborough Marsh Audubon Center currently planned for adaptation as part of the MaineDOT Route 1 and Route 9 Adaptation Project. Pine Point Road refers to the section of Route 9 near Jones Creek.