



Scarborough Flood Vulnerability Assessment Project Meeting #1

July 17th, 2024

Project Meeting Agenda

Meeting Agenda

Project Name: Scarborough Flood Vulnerability Assessment

Date: July 17th, 2024

Time: 9:00 AM

GEI Project Number: 2403961

Invited Participants:

GEI Project Team	Scarborough Project Team	
Leila Pike	Jami Fitch	Deb Perkins-Smith
Ilan Gasko	Angela Blanchette	Chan Sinnett
	Rich Kindelan	April Sither
	Doug Howard	Susan Bayley Clough
	Emerson Goodrich	Portia Hirschman
	Karen Martin	Lucy LaCasse
	Todd Souza	Crescie Maurer
	Autumn Spear	Pete Slovinsky

AGENDA

1. **Welcome**
2. **Review updates to the proposed flood scenarios for vulnerability assessment**
3. **Review GIS and asset data**
4. **Preliminary vulnerability assessment results: viewer and tables**
5. **Draft data review memo**
6. **Next steps for vulnerability analysis**
7. **GIS data collection fieldwork**
8. **Discuss overall project schedule, including:**
 - Next Deliverables
 - Next Community Event
 - Next Project Meeting
9. **Adjourn**

Flood Scenario Updates

- **New** Maine Climate Council Sea Level Rise Recommendations based on updated Science
- In general, sea level rise estimates predict *slightly less* of a rise than the 2017 report

Maine’s “commit to manage” sea level rise targets (1.5 feet by 2050 and 4 feet by 2100) remain unchanged from the 2020 STS report. Maine’s “commit to manage” sea level rise scenario (1.5 feet by 2050 and 4 feet by 2100, relative to 2000 average or “mean” sea level) remains within the statistically likely range of the equivalent sea level rise scenario in updated projections.

The timing of the “prepare to manage” targets (3 feet by 2050 and 8.8 feet by 2100) should be shifted to two decades later. Updated projections indicate that the timeframe of Maine’s “prepare to manage” sea level rise scenario (3 feet by 2050 and 8.8 feet by 2100, relative to 2000 mean sea level) should be shifted two decades later, to 3 feet by 2070 and 8.8 feet in the 2120s.



Flood Scenario Updates

- Updated scenarios using Present-day, 2030, 2050, 2100 “Commit” and “Prepare” sea level rise scenarios – removed 2070 from analysis
- Went through “grouping” process:

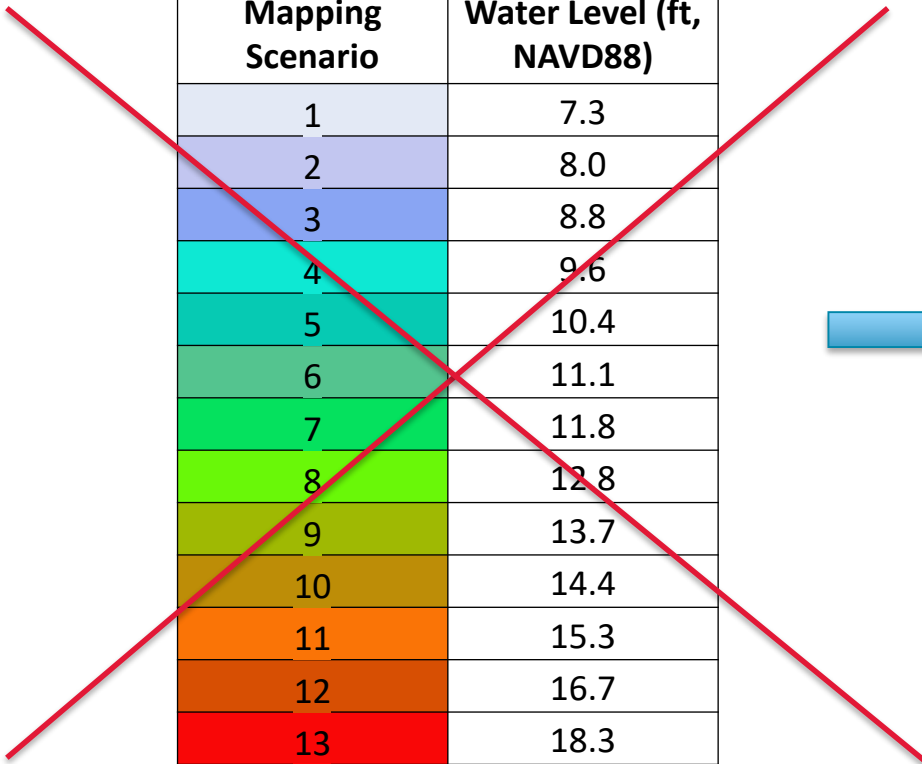
Sea Level Rise		Water Surface Elevations						
		"High Tides"		Coastal Storm Events				
Planning Scenario	SLR (ft)	MHHW	HAT	10 yr	50 yr	100 yr	Max Tide January 13, 2024	500 yr
Existing Sea Levels	0	4.6	6.5	7.9	8.5	8.8	9.3	9.5
2030: Commit/Prepare	0.8	5.4	7.3	8.7	9.3	9.6	10.1	10.3
2050: Commit	1.5	6.1	8	9.4	10	10.3	10.8	11
2050: Prepare	1.9	6.5	8.4	9.8	10.4	10.7	11.2	11.4
2100: Commit	4	8.6	10.5	11.9	12.5	12.8	13.3	13.5
2100: Prepare	7.4	12	13.9	15.3	15.9	16.2	16.7	16.9

Mapping Scenario
1
2
3
4
5
6
7
8
9
10



Flood Scenario Updates

Previous Scenarios



Mapping Scenario	Water Level (ft, NAVD88)
1	7.3
2	8.0
3	8.8
4	9.6
5	10.4
6	11.1
7	11.8
8	12.8
9	13.7
10	14.4
11	15.3
12	16.7
13	18.3



New Scenarios

Mapping Scenario	Water Level (ft, NAVD88)
1	7.3
2	8.0
3	8.8
4	9.6
5	10.3
6	10.8
7	11.4
8	12.8
9	13.9
10	16.9



Flood Scenario Updates

Mapping Scenario	Water Level (ft, NAVD88)	Flood Risk Time Horizon	
		Coastal Storm Event	"High Tide"
1	7.3	Now	2030
2	8.0	Now	2050
3	8.8	Now	2050
4	9.6	Now	2100
5	10.3	2030	2100
6	10.8	2050	2100
7	11.4	2050	2100
8	12.8	2100	2100
9	13.9	2100	2100
10	16.9	2100	2100



GIS/Asset Data Update

Transportation Infrastructure

- Roads
- ~~EV Charging~~ (*not at risk*)
- **Parking Lots** (still need data)
- Rail Lines
- ~~School Bus Routes and Stops~~ (*not digital*)
- Sidewalks
- Bridges

Power Utilities

- Light poles/streetlights
- ~~Substations~~ (*not at risk*)

Sewer Utilities

- Manholes
- Sewer Pump Stations
- Treatment Plant
- **Septic Tanks** (still in progress)

Public Health & Safety

- DEP Remediation Sites
- Fire Hydrants
- Fire Stations
- Hospitals
- DEP Registered Tanks
- Police Stations
- **Wells**
- Evacuation Routes

Buildings/Structures

- Structures (buildings, etc.)
- Municipal Property
- ~~Tax Parcel Information~~
 - ~~Residential~~
 - ~~Commercial~~
 - ~~Non-Profit~~
 - ~~Institutional~~
 - ~~Municipal~~

Drainage Utilities

- Dams
- Catch Basins
- Culverts
- Outfalls
- Outlet Control Structures

Conservation and Recreation

- Beaches
- Parks and Open Spaces
- Sand Dunes
- Walking Trails
- Wetlands

Coastal Structures

- Boat Ramps
- Coastal Structures



Inundation Boundary Viewer

- Unofficial viewer (not the StoryMap) for the Working Group to explore inundation boundaries

tinyurl.com/scarbfloods



Preliminary Vulnerability Assessment Results:

Public Roads (Scenarios 1-3)

Discuss Sawyer Street

Road (Public) Flood Exposure Summary (Length Inundated, ft)										
ROAD NAME	1	2	3	4	5	6	7	8	9	10
<i>Total Length of Roads Inundated, miles</i>	<i>0.5</i>	<i>1.2</i>	<i>2.7</i>	<i>4.1</i>	<i>5.4</i>	<i>6.5</i>	<i>8.2</i>	<i>14.6</i>	<i>18.5</i>	<i>25.1</i>
Black Rock Rd	478	727	1,067	1,429	1,561	1,585	1,653	2,111	2,382	2,382
Champion St	160	246	402	468	468	468	468	468	468	468
King St	241	375	758	1,618	1,659	1,678	1,699	2,955	2,955	2,955
Payne Rd	230	584	1,182	1,292	1,482	1,600	1,715	2,045	2,349	2,574
Sawyer St	656	802	887	949	979	998	1,021	1,079	1,114	1,204
Snow Canning Rd	922	1,115	1,213	1,297	1,319	1,335	1,348	1,382	1,432	1,621
Winnocks Neck Rd	22	162	502	1,485	2,592	2,882	3,056	4,385	6,002	6,248
Avenue 6	-	5	23	217	223	223	223	223	223	223
Black Point Rd	-	1,106	1,697	2,171	2,707	3,043	3,375	7,903	8,888	12,103
Jones Creek Dr	-	181	853	1,286	1,698	1,989	2,246	2,246	2,246	2,246
Milliken Rd	-	70	121	174	246	307	360	403	435	666
Old Neck Rd	-	241	459	827	1,194	1,521	2,386	3,451	3,823	3,823
Pine Point Rd	-	573	1,749	1,898	2,091	2,253	3,382	5,725	5,879	6,198
Avenue 1	-	-	206	296	325	361	374	602	674	674
Avenue 2	-	-	206	245	363	382	396	435	435	435
Avenue 3	-	-	236	266	359	410	413	413	413	413
Avenue 4	-	-	288	372	372	372	372	372	372	372
Avenue 5	-	-	254	433	492	543	594	781	815	815
Avenue 7	-	-	169	190	217	228	228	228	228	228
Bayview Ave	-	-	285	360	603	692	783	884	934	1,373
Clay Pits Rd	-	-	662	1,046	1,291	1,738	1,994	2,378	2,543	2,785
Kent St	-	-	19	76	76	76	76	76	76	76
Sargent Rd	-	-	73	105	147	179	228	387	447	646
Seavey Landing Rd	-	-	31	74	108	136	192	450	499	612
Shipwreck Rd	-	-	73	363	496	547	547	547	547	547
Starbird Rd	-	-	538	626	685	726	782	907	925	1,009
Tasker Ave	-	-	112	154	253	295	315	332	332	332
Vesper St	-	-	411	616	660	691	705	737	756	930
Woodside Dr	-	-	6	37	83	137	181	275	355	622



Preliminary Vulnerability Assessment Results:

DOT Bridge

Bridge Flood Exposure Summary (X Inundated, - Dry)											
Bridge #	Name	1	2	3	4	5	6	7	8	9	10
# Bridges Inundated		-	2	2	2	2	2	7	9	10	12
6014	TOWN LINE	-	X	X	X	X	X	X	X	X	X
BPR	BLACK POINT ROAD	-	X	X	X	X	X	X	X	X	X
264	CENTER PAYNE ROAD	-	-	-	-	-	-	X	X	X	X
2140	CAUSEWAY	-	-	-	-	-	-	X	X	X	X
2240	DUNSTAN RIVER	-	-	-	-	-	-	X	X	X	X
3712	NEW RIVER	-	-	-	-	-	-	X	X	X	X
RR2	CSX RAILROAD	-	-	-	-	-	-	X	X	X	X
3573	PHILLIPS	-	-	-	-	-	-	-	X	X	X
RR1	CSX RAILROAD	-	-	-	-	-	-	-	X	X	X
2796	SPURWINK	-	-	-	-	-	-	-	-	X	X
2671	PLEASANT HILL	-	-	-	-	-	-	-	-	-	X
ET1	EASTERN TRAIL	-	-	-	-	-	-	-	-	-	X



Preliminary Vulnerability Assessment Results:

Buildings/ Structures

Structure Flood Exposure Summary (# Inundated)										
	1	2	3	4	5	6	7	8	9	10
# of Structures Inundated	61	112	220	321	422	499	588	924	1,091	1,369

Municipal Property Flood Exposure Summary (Area Inundated Above HAT, acres)										
Description	1	2	3	4	5	6	7	8	9	10
<i>Total Area Inundated (acres)</i>	-	-	-	0.4	1.2	2.8	4.4	9.9	14.7	18.8
Historic Hunnewell House	-	-	-	0.2	0.3	0.7	1.3	1.7	1.7	1.7
Scarborough Fire Department	-	-	-	0.1	0.1	0.3	0.4	0.7	0.7	0.7
Dunstan Landing Boat Launch	-	-	-	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Scarborough Public Works	-	-	-	-	0.7	1.7	2.5	7.3	12.0	13.9
Scarborough Public Schools Bus Lot	-	-	-	-	-	-	-	-	0.1	2.1
Higgins Beach Parking	-	-	-	-	-	-	-	-	-	0.2



Preliminary Vulnerability Assessment Results:

Sewer: Pump Stations

Pump Stations Flood Exposure Summary (X Inundated, - Dry)												
Facility ID	Station ID	Location	1	2	3	4	5	6	7	8	9	10
# Pump Stations Inundated			2	3	3	6	7	10	14	19	20	27
PS-36	Public-7	Higgins Beach	X	X	X	X	X	X	X	X	X	X
PS-54	Public-1	Pine Point	X	X	X	X	X	X	X	X	X	X
PS-52	Public-3	Wild Duck-Dunstan	-	X	X	X	X	X	X	X	X	X
PS-2	Private-11	Higgins Creek Condos	-	-	-	X	X	X	X	X	X	X
PS-60	NA	Town Co-Op	-	-	-	X	X	X	X	X	X	X
PS-61	NA	Town Ferry Beach	-	-	-	X	X	X	X	X	X	X
PS-41	Public-10	Clay Pits Road	-	-	-	-	X	X	X	X	X	X
PS-12	Private-7	Cedarbrook East	-	-	-	-	-	X	X	X	X	X
PS-43	Public-15	Partridge Lane	-	-	-	-	-	X	X	X	X	X
PS-51	Public-12	Libby Road	-	-	-	-	-	X	X	X	X	X
PS-37	Public-16	River	-	-	-	-	-	-	X	X	X	X
PS-39	Public-21	Pleasant Hill	-	-	-	-	-	-	X	X	X	X
PS-44	Public-11	Old County Road	-	-	-	-	-	-	X	X	X	X
PS-53	Public-2	Pine Point-Eastern Trail	-	-	-	-	-	-	X	X	X	X
PS-13	Private-31	Whistler's Landing	-	-	-	-	-	-	-	X	X	X
PS-21	NA	Sandpiper Cove #3	-	-	-	-	-	-	-	X	X	X
PS-40	Public-9	Fogg Road	-	-	-	-	-	-	-	X	X	X
PS-42	Public-13	Tall Pines Road	-	-	-	-	-	-	-	X	X	X
PS-55	Public-6	Old Neck	-	-	-	-	-	-	-	X	X	X
PS-38	Public-8	Prout's Neck	-	-	-	-	-	-	-	-	X	X
PS-10	Private-30	The Highlands	-	-	-	-	-	-	-	-	-	X
PS-25	Private-17	Ocean Woods Condominiums	-	-	-	-	-	-	-	-	-	X
PS-33	NA	Industrial Park	-	-	-	-	-	-	-	-	-	X
PS-50	Public-14	Industrial Park	-	-	-	-	-	-	-	-	-	X
PS-7	Private-19	Old Colony Estates	-	-	-	-	-	-	-	-	-	X
PS-8	Private-10	Grondin Pond	-	-	-	-	-	-	-	-	-	X
PS-9	Private-3	Black Point Meadows	-	-	-	-	-	-	-	-	-	X



Preliminary Vulnerability Assessment Results:

Beaches

Beach Width Flood Exposure Summary (Dry Width Available, ft)											
BEACH	Statistic	1	2	3	4	5	6	7	8	9	10
East Grand	Mean	47.0	41.4	35.0	30.0	26.9	24.8	22.4	13.0	0.7	-
	Max	90.0	85.0	73.0	65.0	60.0	56.0	52.0	26.0	9.0	-
	Min	26.0	21.0	18.0	16.0	13.0	12.0	9.0	-	-	-
Ferry Beach	Mean	11.8	8.8	6.3	3.2	1.8	1.4	1.0	0.1	-	-
	Max	89.0	72.0	64.0	26.0	10.0	10.0	9.0	5.0	1.0	-
	Min	-	-	-	-	-	-	-	-	-	-
Higgins	Mean	36.5	20.3	8.4	4.8	2.5	1.4	0.7	0.1	-	-
	Max	133.0	100.0	37.0	25.0	14.0	11.0	8.0	3.0	-	-
	Min	-	-	-	-	-	-	-	-	-	-
Pine Point	Mean	35.0	29.6	23.8	19.3	15.5	13.2	10.4	5.2	1.1	-
	Max	56.0	49.0	42.0	40.0	39.0	37.0	36.0	25.0	12.0	-
	Min	19.0	14.0	9.0	-	-	-	-	-	-	-
Scarborough	Mean	44.5	38.9	32.0	21.7	16.2	13.5	11.0	5.6	2.6	0.2
	Max	105.0	96.0	75.0	62.0	51.0	47.0	41.0	20.0	13.0	7.0
	Min	-	-	-	-	-	-	-	-	-	-
Western Beach	Mean	78.6	73.5	67.7	60.6	46.2	37.3	29.0	12.8	6.1	0.1
	Max	151.0	146.0	139.0	133.0	125.0	115.0	93.0	56.0	35.0	5.0
	Min	10.0	6.0	4.0	1.0	-	-	-	-	-	-



Draft Data Review Memo

- Draft memo summarizing data reviewed for use in the vulnerability assessment
- Identifies available data, data limitations, data gaps
- Will be followed with a Vulnerability Assessment memo summarizing methods and results for analysis
- Information eventually available via StoryMap



Next Steps for Vulnerability Analysis

- Refine GIS asset data (septic tanks, pump station “sewer-sheds,” parking lots, etc.
- Add in the influence of wave action using “rules of thumb” methods and generalized wave heights
- Prepare Vulnerability Assessment memo and StoryMap



Next Steps for Vulnerability Analysis

Flooding due to precipitation events:

- Existing modeling studies not readily available
- Gage measurements on non-tidal local streams/rivers not readily available
- Would need modeling study to correlate precipitation to water levels – both overland flow and increased rivers/stream



GIS data collection fieldwork

- One day of photos and spot elevations to refine Vulnerability Analysis
- Options:
 - Pump Stations: ground elevations, elevations when inundation would impact operability
 - Wait until Adaptation Projects selected – collect spot survey to assist in project designs

Where else would more detailed information be valuable?



Project Schedule

PROJECT SCHEDULE Scarborough Vulnerability Assessment Scarborough, Maine

Weeks

TASK

By mid to the end of July, initial vulnerability results (data) / next project meeting, followed by first public presentation.



Public Presentation
Scheduled for August 12th

Meeting: Project Kick-Off Meeting

Task 2: Data Review and Collection

a) Data review and memo

b) GIS data

c) DEM

d) Initial flood inundation layers

Meeting: Project Update Meeting #1

Public Meeting #1 (range of dates)

e) Field survey

f) Revised GIS layers

g) Draft vulnerability assessment memo

Meeting: Project Update Meeting #2

Neighborhood Public Meetings (#2 & #3) (range of dates)

Meeting: Project Update Meeting #3

Task 4: Ordinance Review

Task 5: Adaptation Strategies

a) Draft adaptation strategies memo

b) Pilot project concept designs

Meeting: Project Update Meetings #4, #5, #6

Task 8: StoryMap and Executive Summary

a) ArcGIS StoryMap

b) Executive Summary

Meeting: Project Update Meetings #7

Final Public Meeting at Town Council (range of dates)

LEGEND

GEI Task

GEI Sub-Task

Meetings

Public Engagement Events



PROJECT SCHEDULE

Scarborough Vulnerability Assessment

Scarborough, Maine



Project Schedule

PROJECT SCHEDULE Scarborough Vulnerability Assessment Scarborough, Maine

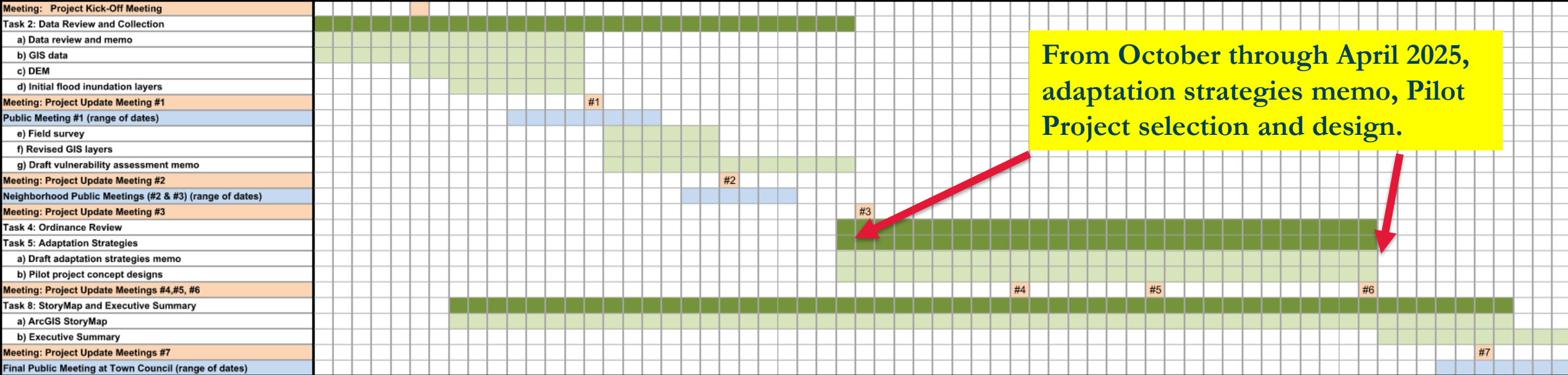
Weeks

TASK

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65

4/8/24 4/15/24 4/22/24 4/29/24 5/6/24 5/13/24 5/20/24 5/27/24 6/3/24 6/10/24 6/17/24 6/24/24 7/1/24 7/8/24 7/15/24 7/22/24 7/29/24 8/5/24 8/12/24 8/19/24 8/26/24 9/2/24 9/9/24 9/16/24 9/23/24 9/30/24 10/7/24 10/14/24 10/21/24 10/28/24 11/4/24 11/11/24 11/18/24 11/25/24 12/2/24 12/9/24 12/16/24 12/23/24 12/30/24 1/6/25 1/13/25 1/20/25 1/27/25 2/3/25 2/10/25 2/17/25 2/24/25 3/3/25 3/10/25 3/17/25 3/24/25 3/31/25 4/7/25 4/14/25 4/21/25 4/28/25 5/5/25 5/12/25 5/19/25 5/26/25 6/2/25 6/9/25 6/16/25 6/23/25 6/30/25

From October through April 2025,
adaptation strategies memo, Pilot
Project selection and design.



LEGEND

GEI Task

GEI Sub-Task

Meetings

Public Engagement Events

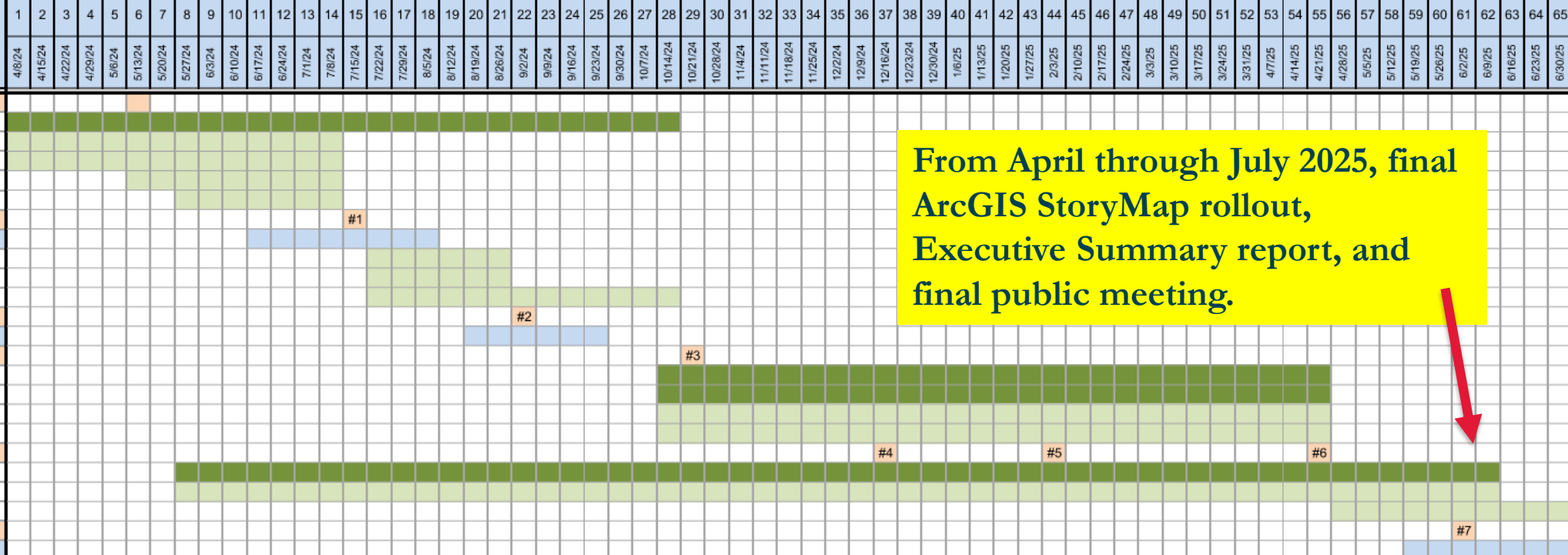


Project Schedule

PROJECT SCHEDULE Scarborough Vulnerability Assessment Scarborough, Maine

Weeks

TASK



From April through July 2025, final ArcGIS StoryMap rollout, Executive Summary report, and final public meeting.

LEGEND

GEI Task

GEI Sub-Task

Meetings

Public Engagement Events



Current Deliverables

Data Review Memo: Task 2.1

- Summary of flood vulnerability data reviewed and used as part of this study.
- Goal deadline: end of July, before Project Meeting #1.



Initial Web-Based Flood Inundation Viewer (not for public)

- To convey flood extents to project team.
- Goal deadline: end of July, before Project Meeting #1.



Next Deliverables

Draft Flood Vulnerability Analysis Results Memo: Task 2.7

- Summary of flood vulnerability methods and results.
- Goal deadline: end of October, around Project Meeting #3.

Draft ArcGIS StoryMap: Task 7

- Draft ArcGIS StoryMap of flood vulnerability analysis and results for review by the Project Working Group
- Goal deadline: end of October, around Project Meeting #3.



Next Community Events

Initial public meeting to provide an overview of the project.

- August 12th, 6pm: Scarborough Town Council Chambers

Neighborhood-specific meetings for Pine Point and Higgins Beach neighborhoods.

- Mid-August to Mid-September timeframe – need to be scheduled.



Next Project Meeting

Project Update Meeting #2:

- Virtual meeting the week of September 2nd or September 9th.

Purpose:

- Provide update of Flood Vulnerability Assessment status.
- Provide update of field work progress (if any).
- Coordinate remaining public engagement events.



Thank you!
Questions?



GEI
Consultants

Consulting
Engineers and
Scientists

Leila Pike, P.E. (GEI)
lpike@geiconsultants.com

Ilan Gasko, E.I. (GEI)
igasko@geiconsultants.com