City of Providence
Hazard Mitigation Plan
2013 Update

Public Workshop November 16, 2018 6:30 pm

Mayor Joseph A. Doorley Municipal Building

444 Westminster Street

Providence, RI

Craig Pereira, CFM, Senior Planner

Horsley Witten Group, Inc.

Why Hazard Mitigation Planning?

Disaster Mitigation Act of 2000, Interim Final Rule, 44 CFR Parts 201 and 206 states, “All communities must have an approved Multiple Hazards Mitigation Plan in order to qualify for future federal disaster mitigation grants”.

Hazard Mitigation: the reduction or elimination of long-term risk to life, property, and the environment.

City of Providence
Local Hazard Mitigation Committee

Marisa Albanese - National Grid
Michael Bates - City of Providence, Fire Dept.
James Boyd - RI Coastal Resources Management Council
Steve Curtis - Waterson Terminal Services, LLC
Clara Decerbo - City of Providence, PEMA
Jeffrey Emidy - RI Historical Preservation and Heritage Commission
Janet Freedman - RI Coastal Resources Management Council
Melinda Hopkins - RI Emergency Management Agency
Peter LePage - Providence Water Supply Board
Jeffrey Lykins - City of Providence, Inspections and Standards Dept.
Jared Rishel - Providence & Worcester Railroad
Jeffrey Varone - City of Providence, Fire Dept.

Leah Bamberger - City of Providence, Sustainability Dept.
Michael Borg - City of Providence, Public Works Dept.
Manuel Cordero - Citizen of Providence
Dave Aucoin – Narragansett Bay Commission
Margaret DeVos - Southside Community Land Trust
David Everett - City of Providence, Planning Dept.
Chris Harwood - Johnson & Wales University
Kevin Kugel - City of Providence, PEMA
Dawn Lewis - Hospital Association of RI
Stephen Morin - Brown University
Philip Stocking - American Red Cross

Consultant Team
Craig Pereira - Horsley Witten Group, Inc.
Dorian Boardman - Boardman Ecological Services
Matt Shultz - Woods Hole Group, Inc.

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Mitigation Process…what's been accomplished

- **Assess Risks**
- Establish Goals
- Identify Projects/Actions
- Update/Maintain Plan

Risk Assessment Rubric

- Based on frequency/severity of past events
- Local knowledge
- Previous plans and studies
- Modified methodology from existing plan for consistency
- FEMA's Calculated Priority Risk Index

Risk Assessment Rubric

Natural Hazards

Event	Probability	Severity = (Magnitude - Preparedness)				Risk (2013)	Risk (2018)
		Human Impact	Property Impact	Business Impact	Preparedness		
	Likelihood this will occur	*Possibility of death, injury, or illness*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Relative Threat*	*Relative Threat*
Score	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0-100%*	*0-100%*
	1 = Low	*1 = Low*	*1 = Low*	*1 = Low*	*1 = Low*		
	2 = Moderate	*2=Moderate*	*2=Moderate*	*2=Moderate*	*2 = Moderate*		
	3 = High	*3 = High*	*3 = High*	*3 = High*	*3 = High*		
	4 = Highly Likely						
Wind-Related Hazards							
Hurricane	3	3	3	3	2	83%	69%
Tornado	2	1	2	1	2	14%	25%
High Winds	4	1	2	1	2	42%	50%
Severe Thunderstorm	4	0	1	1	0	17%	17%
Lightning	3	0	1	1	2	N/A	25%
Hail	4	0	1	0	2	N/A	25%
Winter-Related Hazards							
Heavy Snow	4	2	2	2	2	58%	67%
Ice Storm	4	0	1	2	2	33%	42%
Extreme Cold[1]	3	3	1	1	3	50%	50%
Flood-Related Hazards							
Riverine Flooding	4	0	3	3	2	83%	67%
Flash Flooding	4	0	1	2	2	42%	42%
Heavy Rain, Inland/Urban Flooding	3	0	2	2	2	50%	50%
Coastal Flooding	2	0	1	1	2	N/A	17%
Dam Inundation[1]	2	2	2	2	3	39%	38%
Sea Level Rise[1]	2	1	1	1	3	N/A	25%
Fire-Related Hazards							
Wildfire[1]	2	2	2	2	3	N/A	38%
Urban Fire[1]	2	2	2	2	3	58%	38%
Geologic-Related Hazards							
Earthquake	2	1	1	1	1	22%	17%
Drought-Related Hazards							
Drought	4	1	1	1	1	22%	33%
Extreme Heat[1]	4	2	1	1	3	50%	58%
Communicable Disease-Related Hazards							
Epidemic[1]	1	2	1	1	2	67%	13%

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Risk Assessment Rubric

Human-Caused Hazards

Event	Probability	Severity = (Magnitude - Preparedness)				Risk (2013)	Risk (2018)
		Human Impact	Property Impact	Infrastructure Impact	Preparedness		
	Likelihood this will occur	*Possibility of death, injury, or illness*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Relative Threat*	*Relative Threat*
Score	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0-100%*	*0-100%*
	1 =Unlikely	*1 = Negligible*	*1 = Negligible*	*1 = Negligible*	*1 = Low*		
	2=Potential	*2 = Limited*	*2 = Limited*	*2 = Limited*	*2 = Moderate*		
	3 = Likely	*3=Significant*	*3=Significant*	*3 =Significant*	*3 = High*		
	4=Highly Likely						
Terrorism (intentional)							
Biological[1]	1	2	2	1	1	14%	13%
Chemical[1]	2	2	2	1	1	22%	25%
Cyber[1]	3	2	2	1	1	N/A	38%
Explosive[2]	1	3	2	3	1	25%	19%
Nuclear	1	3	3	3	1	28%	21%
Radiological[1]	1	1	2	1	1	22%	10%
Civil Disobedience/Unrest[1]	2	1	1	1	3	11%	25%
Other (accidental)							
Fire[1]	2	2	2	2	3	58%	38%
Hazardous Material Release[2]	2	1	2	2	1	33%	25%
Mass Casualty Incident[2]	2	3	2	2	1	44%	34%
Utility Failure[2]	3	1	1	1	2	42%	31%
Dam Inundation[1]	2	2	2	2	3	39%	38%
Special/VIP Events[2]	3	0	0	1	2	25%	19%

Risk Assessment Rubric

Technological Hazards

Event	Probability	Severity = (Magnitude - Preparedness)				Risk (2013)	Risk (2018)
		Human Impact	Property Impact	Infrastructure Impact	Preparedness		
	Likelihood this will occur	*Possibility of death, injury, or illness*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Relative Threat*	*Relative Threat*
Score	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 = N/A*	*0 - 100%*	*0 - 100%*
	1 = Unlikely	*1 = Negligible*	*1 = Negligible*	*1 = Negligible*	*1 = Low*		
	2=Potential	*2 = Limited*	*2 = Limited*	*2 = Limited*	*2 = Moderate*		
	3 = Likely	*3=Significant*	*3=Significant*	*3 =Significant*	*3 = High*		
	4 = Highly Likely						
Infrastructure Failure[1]	2	1	2	1	1	N/A	21%

Vulnerability Analyses

- FEMA 1% annual chance (100 Yr/Base Flood)
- FEMA .2% annual chance (500 Yr)
- Mean Higher High Water
- Mean Higher High Water plus 1-foot Sea Level Rise
- Hurricane Surge Inundation Areas

Vulnerability Analyses

FEMA 100 Yr/500 Yr annual chance

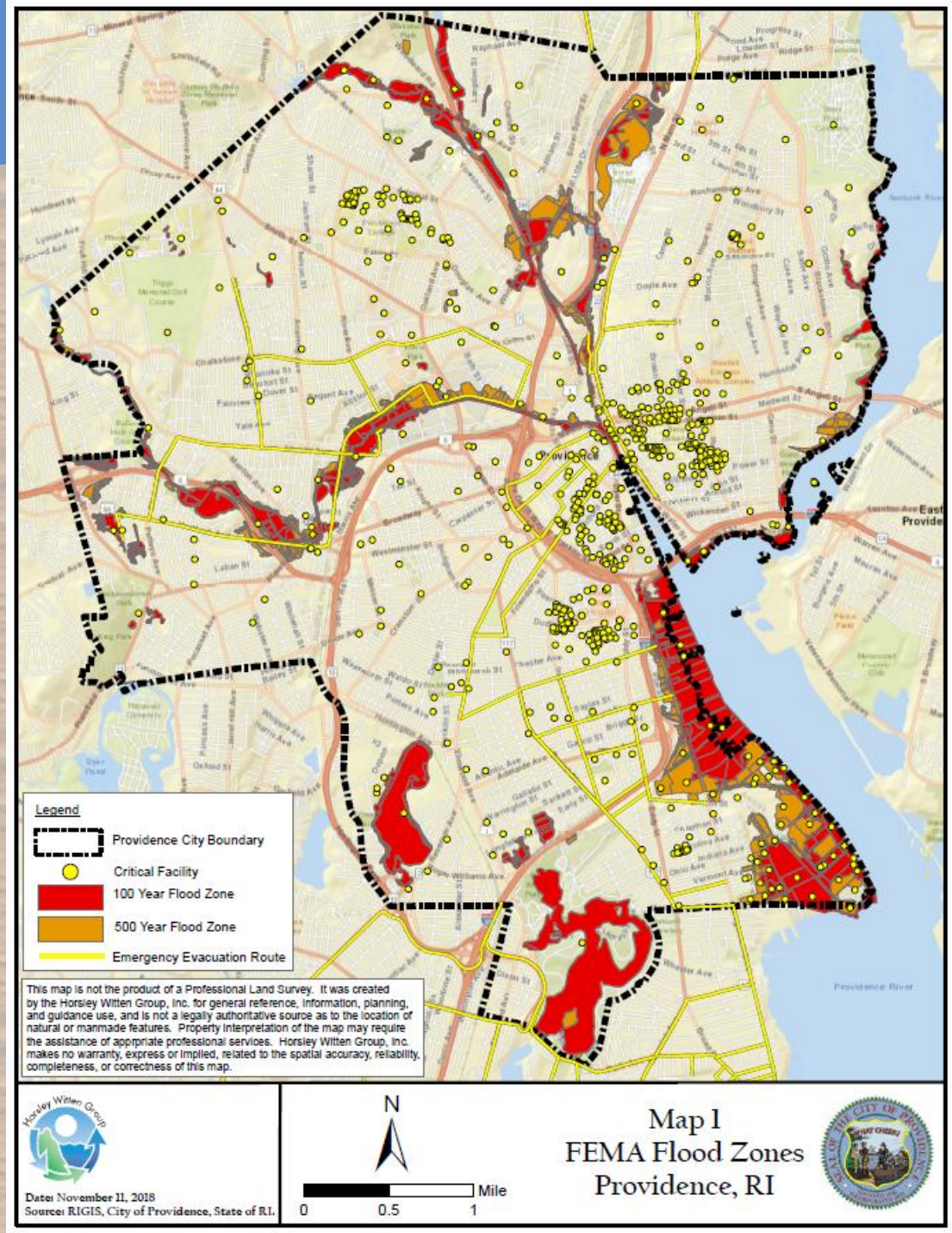
- Overlay onto parcels data set
- Report Summary:
  - ➢ Parcels affected by Land Use classification
  - ➢ Critical facilities affected

Vulnerability Analyses

FEMA 100 Year (1% annual chance)

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	614	$16,630,200	$138,088,500	$1,229,900	$155,948,600
Commercial	260	$275,820,300	$116,189,500	$14,965,900	$406,975,700
Office	56	$44,336,900	$183,221,200	$8,124,000	$235,682,100
Industrial	104	$64,668,100	$58,894,100	$8,527,800	$132,090,000
Utility/Energy	15	$33,942,300	$265,190,000	$12,791,600	$311,923,900
Healthcare/Hospital	11	$38,157,400	$319,661,100	$5,566,200	$363,384,700
State	38	$20,299,800	$13,272,100	$1,216,600	$34,788,500
College/University	18	$17,461,500	$115,657,600	$3,788,300	$136,907,400
Federal	3	$5,389,100	$3,319,500	$221,600	$8,930,200
Transportation	24	$11,580,400	$3,243,300	$1,161,700	$15,985,400
Water Infrastructure					$0
Wastewater Infrastructure	5	$13,501,400	$17,211,900	$1,751,100	$32,464,400
Emergency Response	2	$2,798,400	$54,365,900	$554,700	$57,719,000
Non-Profit	3	$8,979,900	$5,395,800	$207,100	$14,582,800
Cemetery	2	$63,312,700	$4,581,200	$303,400	$68,197,300
School	9	$13,250,200	$60,411,500	$630,500	$74,292,200
Charitable	5	$1,420,700	$11,286,400	$312,800	$13,019,900
Hotel/Motel					$0
Mixed Use	9	$1,172,600	$1,226,000	$53,600	$2,452,200
Civic/Public Assembly	7	$43,598,800	$650,956,200	$10,243,400	$704,798,400
Missing Data	64				
Total	**1,249**	$676,320,700	$2,022,171,800	$71,650,200	**$2,770,142,700**

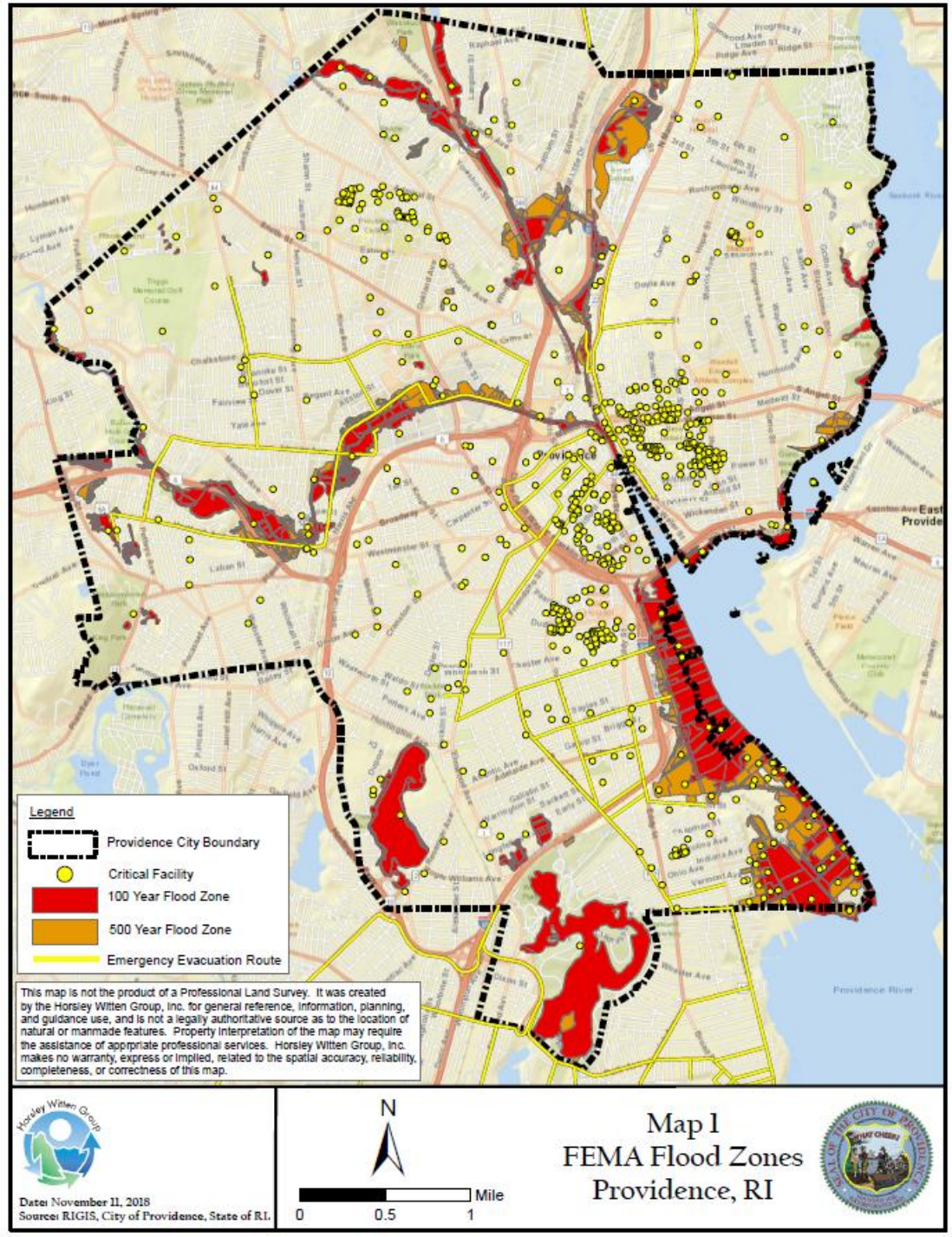


Vulnerability Analyses

FEMA 100 Year (1% annual chance)

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	9
Port	26
Hazardous Material	3
College/University	17
Public Assembly	1
Fire Station	1
Police Station	
Sewer Pump Station	3
Federal Building	
Library	
School	7
Energy/Power	5
Healthcare/Hospital	5
Shelter	1
Total	**78**



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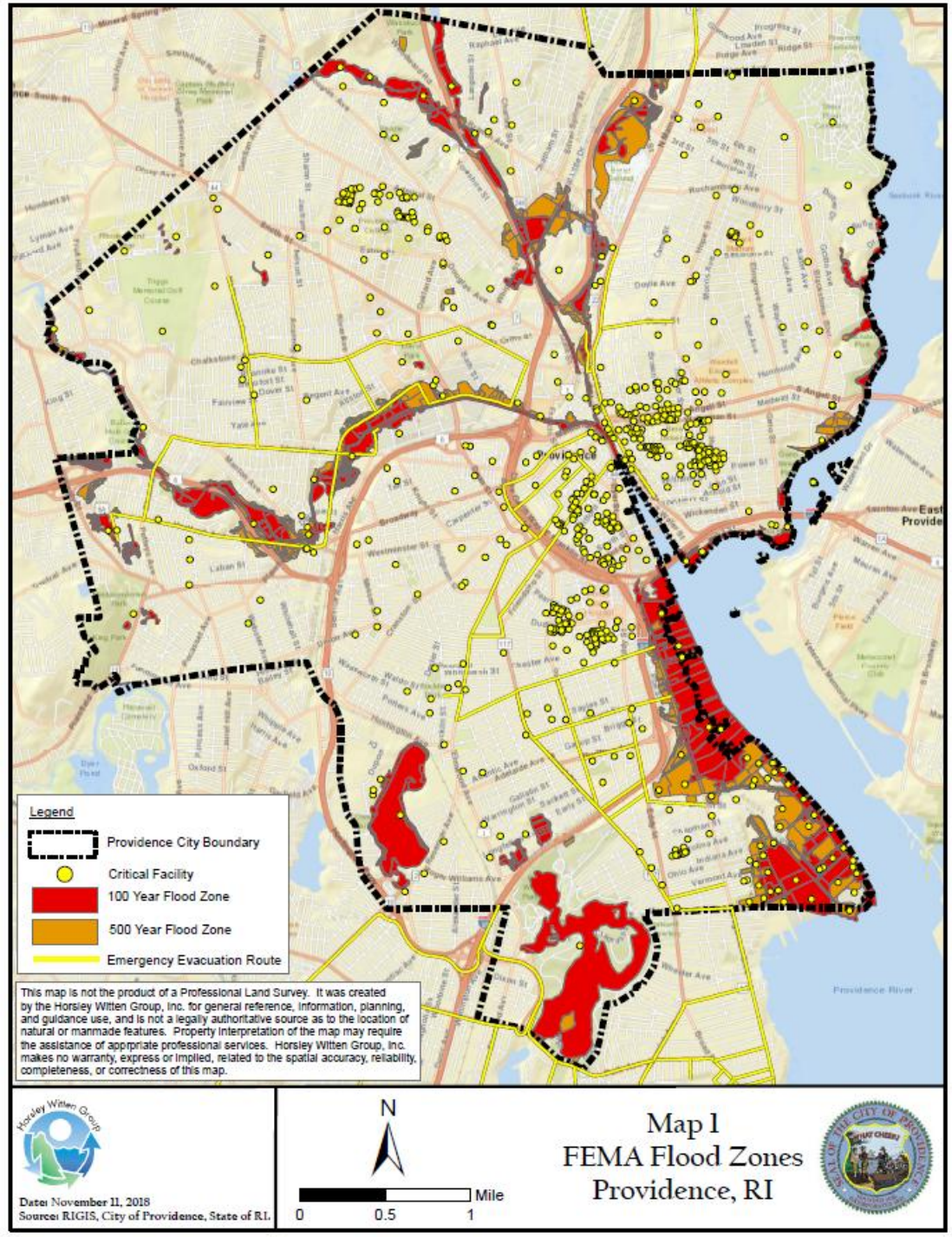
Vulnerability Analyses

FEMA 500 Year (.2% annual chance)

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	846	$32,795,400	$215,091,000	$3,369,300	$251,255,700
Commercial	364	$171,584,300	$113,667,600	$13,694,800	$298,946,700
Office	74	$53,946,400	$208,911,700	$9,718,700	$272,576,800
Industrial	160	$76,330,300	$73,790,800	$10,451,300	$160,572,400
Utility/Energy	19	$34,709,200	$265,190,000	$12,803,300	$312,702,500
Healthcare/Hospital	12	$38,635,800	$321,429,300	$5,655,400	$365,720,500
State	37	$22,101,800	$17,821,800	$1,325,000	$41,248,600
College/University	18	$17,489,500	$115,767,300	$3,788,300	$137,045,100
Federal	7	$7,764,700	$13,266,400	$877,300	$21,908,400
Transportation	26	$11,804,300	$3,243,300	$1,161,700	$16,209,300
Water Infrastructure	1	$3,170,500	$5,433,900	$1,025,600	$9,630,000
Wastewater Infrastructure	16	$15,377,500	$21,365,600	$2,252,000	$38,995,100
Emergency Response	3	$3,146,500	$68,260,900	$1,222,600	$72,630,000
Non-Profit	3	$8,979,900	$5,395,800	$207,100	$14,582,800
Cemetery	2	$63,312,700	$4,581,200	$303,400	$68,197,300
School	14	$21,534,700	$82,049,400	$1,263,500	$104,847,600
Charitable	10	$4,594,800	$15,472,800	$685,300	$20,752,900
Hotel/Motel	2	$4,788,400	$25,260,900	$962,200	$31,011,500
Mixed Use	20	$2,071,500	$3,232,800	$115,700	$5,420,000
Civic/Public Assembly	13	$163,795,300	$661,266,600	$12,044,600	$837,106,500
Missing Data	71				
Total	**1,718**	$725,138,100	$2,240,499,100	$82,927,100	**$3,081,359,700**

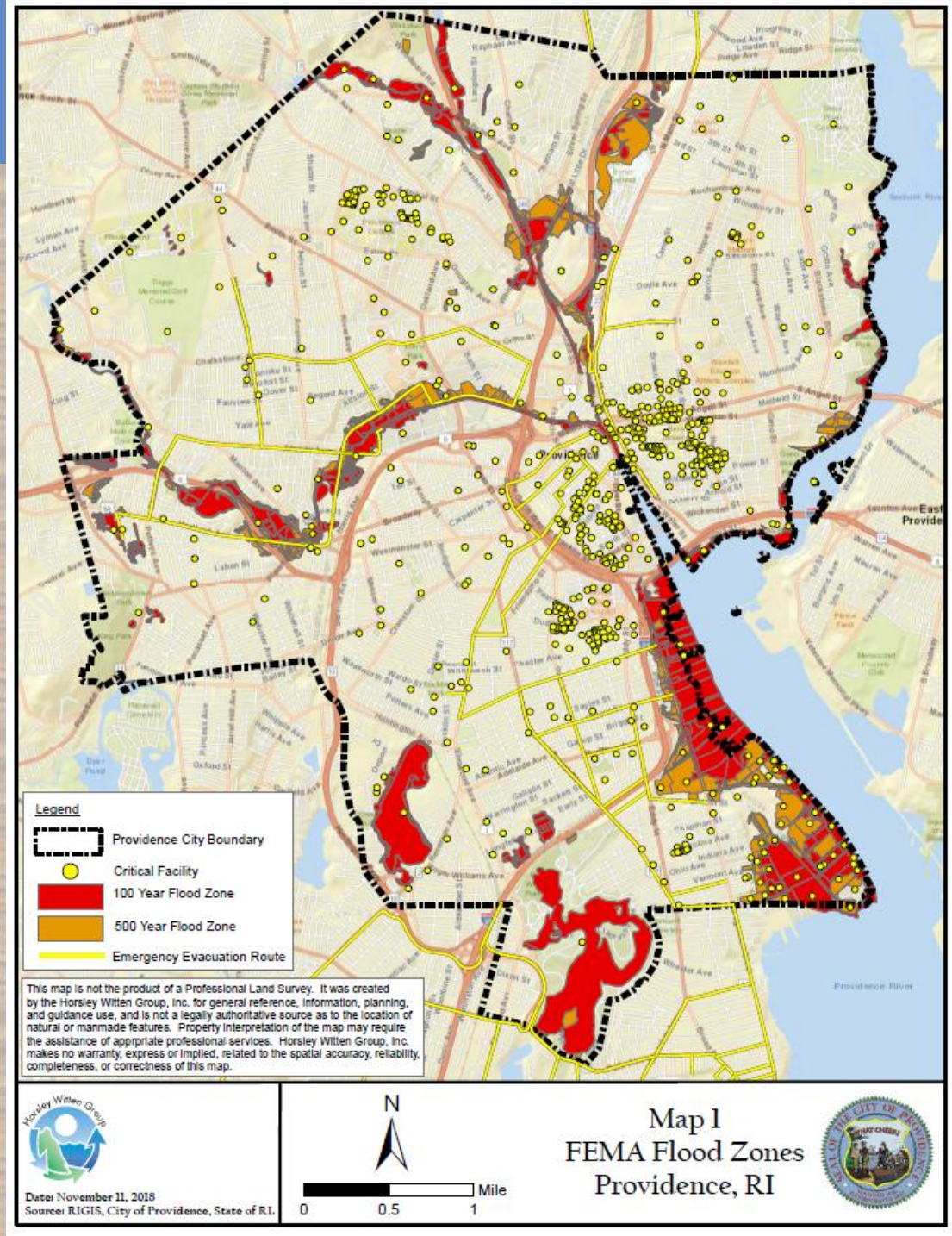


Vulnerability Analyses

FEMA 500 Year (.2% annual chance)

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	9
Port	30
Hazardous Material	4
College/University	16
Public Assembly	1
Fire Station	1
Police Station	1
Sewer Pump Station	6
Federal Building	
Library	
School	10
Energy/Power	5
Healthcare/Hospital	5
Shelter	1
Total	**89**



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Vulnerability Analyses

Mean Higher High Water (MHHW)

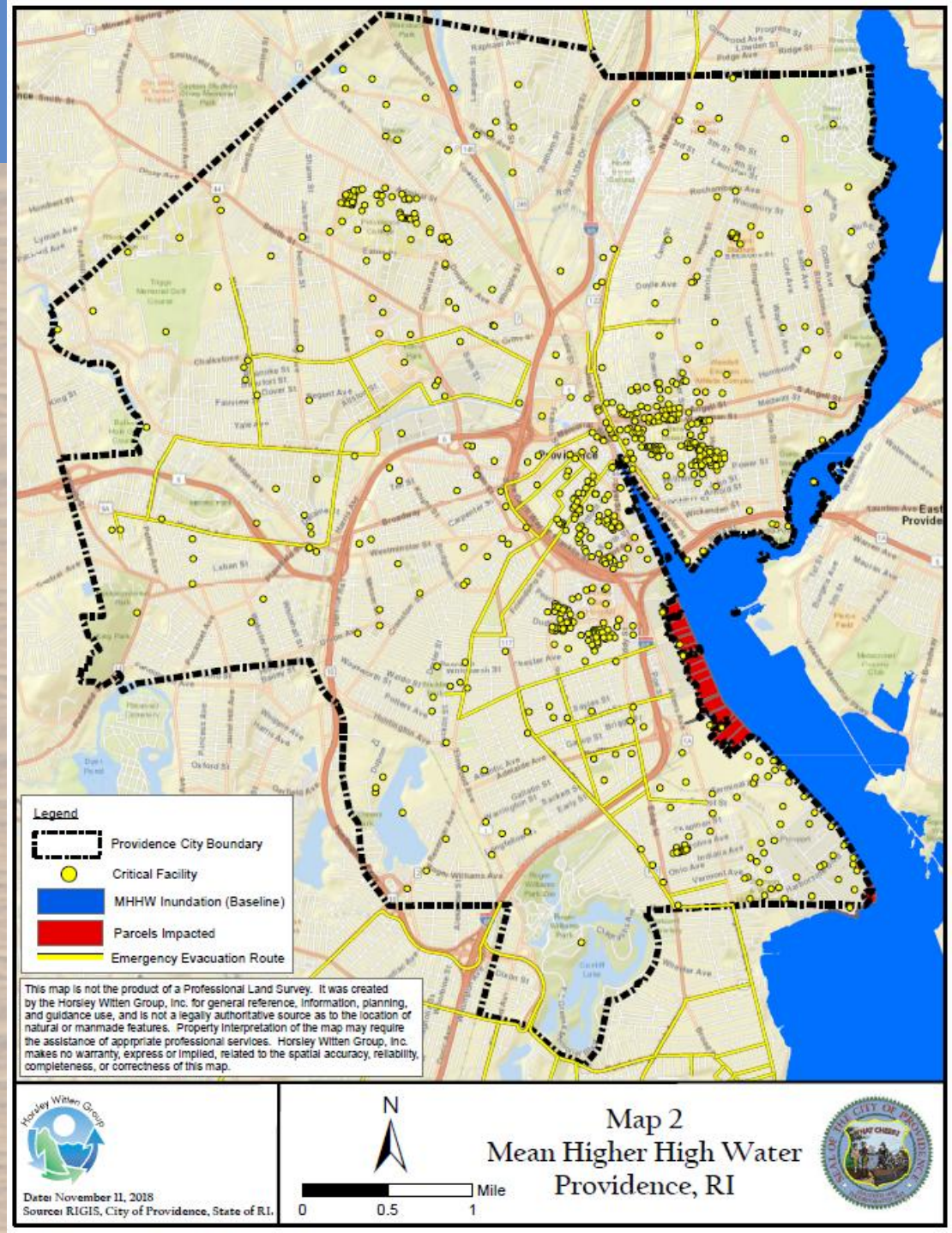
MHHW is the mean elevation of the higher of the two (2) daily high tides over a nineteen year period, in comparison to the mean high water (MHW), which is the average elevation of all high tides over the same period. MHHW is the chosen baseline for the RI SLR study since it reflects a realistic average tidal elevation that communities will experience regularly.

Vulnerability Analyses

Mean Higher High Water

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential					
Commercial	34	$30,410,100	$6,067,100	$1,737,300	$38,214,500
Office	8	$22,628,100	$4,677,200	$1,694,100	$28,999,400
Industrial	10	$20,010,200	$2,545,600	$2,564,400	$25,120,200
Utility/Energy	5	$21,795,900	$255,898,700	$12,024,300	$289,718,900
Healthcare/Hospital	5	$22,231,000	$193,318,800	$4,023,300	$219,573,100
State	7	$4,743,800	$20,800	$106,100	$4,870,700
College/University	4	$9,019,200	$5,458,600	$215,300	$14,693,100
Federal					
Transportation					
Water Infrastructure					
Wastewater Infrastructure	1	$6,217,200	$0	$0	$6,217,200
Emergency Response					
Non-Profit	1	$6,613,700	$0	$0	$6,613,700
Cemetery	1	$63,251,900	$4,581,200	$303,400	$68,136,500
School					
Charitable					
Hotel/Motel					
Mixed Use					
Civic/Public Assembly					
Missing Data	11				
Total	**87**	$206,921,100	$472,568,000	$22,668,200	**$702,157,300**

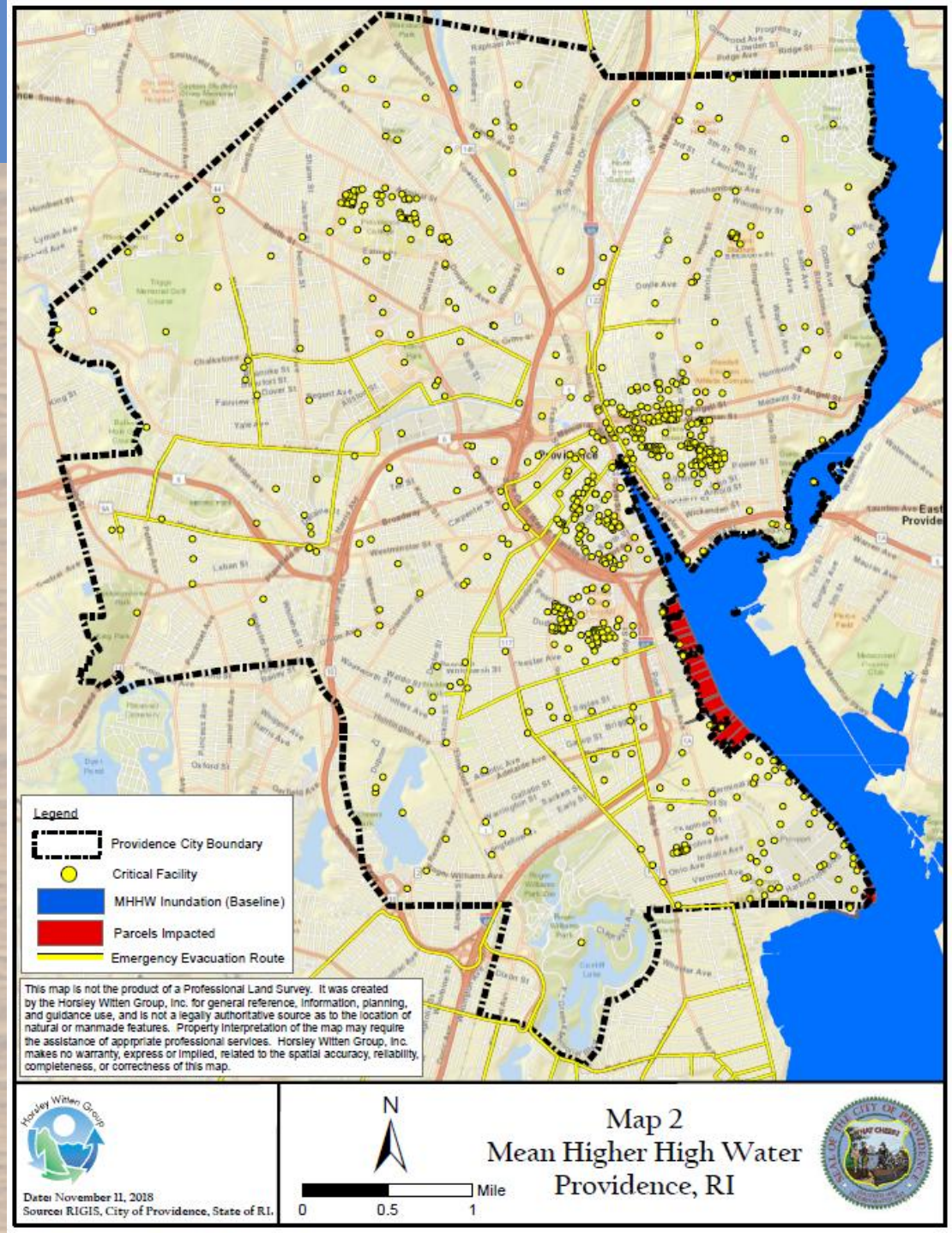


Vulnerability Analyses

Mean Higher High Water

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	
Port	16
Hazardous Material	1
College/University	4
Public Assembly	
Fire Station	
Police Station	
Sewer Pump Station	
Federal Building	
Library	
School	1
Energy/Power	1
Healthcare/Hospital	2
Shelter	
Total	**25**



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Vulnerability Analyses

Mean Higher High Water plus 1-foot Sea Level Rise

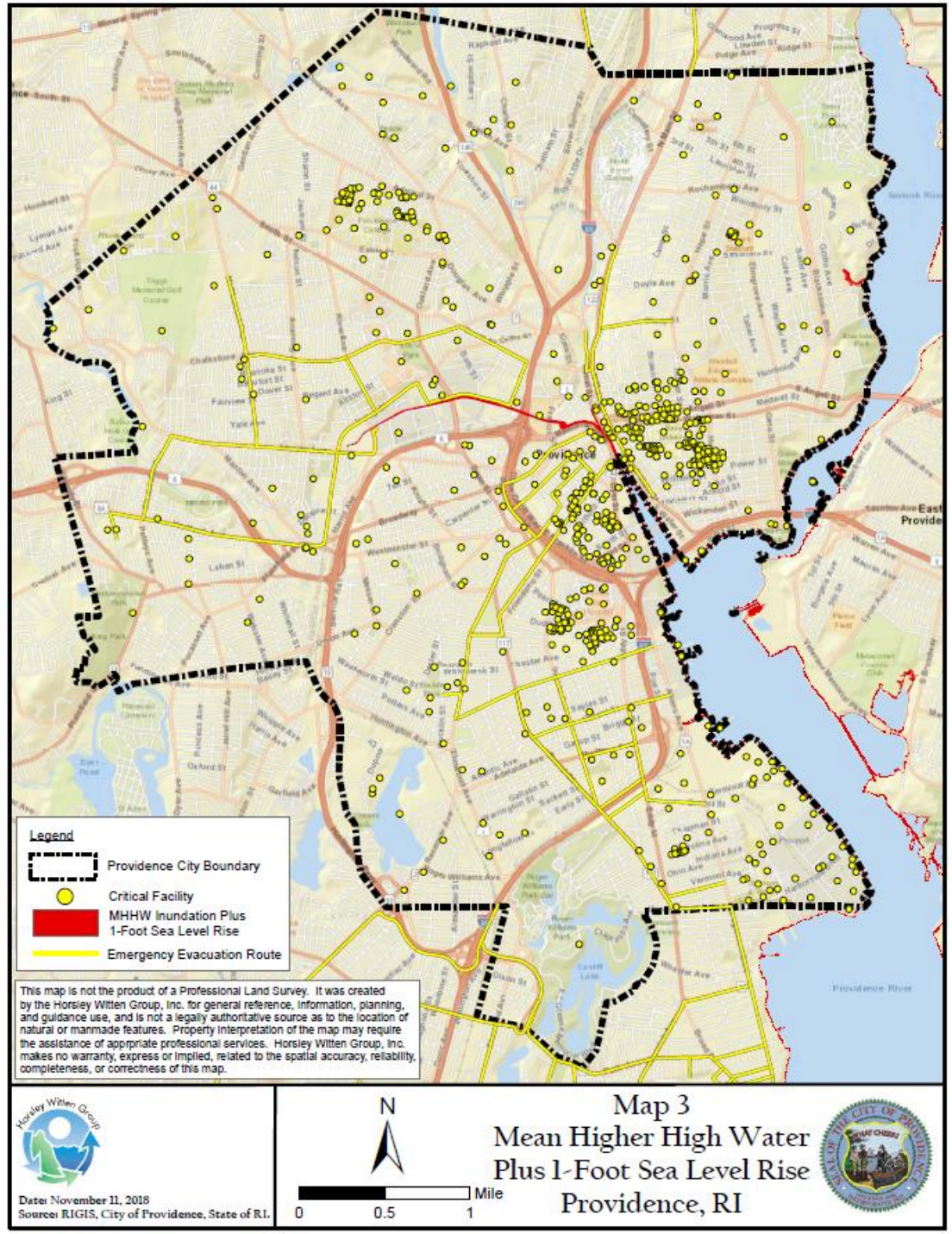
Historically, sea level has already risen about 11 inches in the past 100 years. A rise of nine (9) inches has been noted at North Kingstown based on data since 1930 when the Newport tide gauge was installed. With accelerated SLR already being observed in RI, models show that global sea levels are likely to rise one foot in the next 20 to 50 years.

Vulnerability Analyses

Mean Higher High Water plus 1-foot SLR

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	233	$0	$79,519,500	$29,500	$79,549,000
Commercial	45	$39,763,900	$17,617,500	$2,364,900	$59,746,300
Office	17	$25,173,000	$104,180,600	$4,992,400	$134,346,000
Industrial	15	$22,702,600	$17,353,000	$3,624,800	$43,680,400
Utility/Energy	6	$21,850,800	$255,898,700	$12,025,300	$289,774,800
Healthcare/Hospital	6	$24,763,400	$193,318,800	$4,023,300	$222,105,500
State	7	$4,743,800	$20,800	$106,100	$4,870,700
College/University	4	$9,019,200	$5,458,600	$215,300	$14,693,100
Federal					
Transportation	1	$3,053,700	$0	$60,000	$3,113,700
Water Infrastructure					
Wastewater Infrastructure	1	$6,217,200	$0	$0	$6,217,200
Emergency Response					
Non-Profit	1	$6,613,700	$0	$0	$6,613,700
Cemetery	1	$63,251,900	$4,581,200	$303,400	$68,136,500
School					
Charitable					
Hotel/Motel					
Mixed Use					
Civic/Public Assembly	1	$42,118,000	$646,159,800	$9,832,000	$698,109,800
Missing Data	24				
Total	**362**	$269,271,200	$1,324,108,500	$37,577,000	**$1,630,956,700**

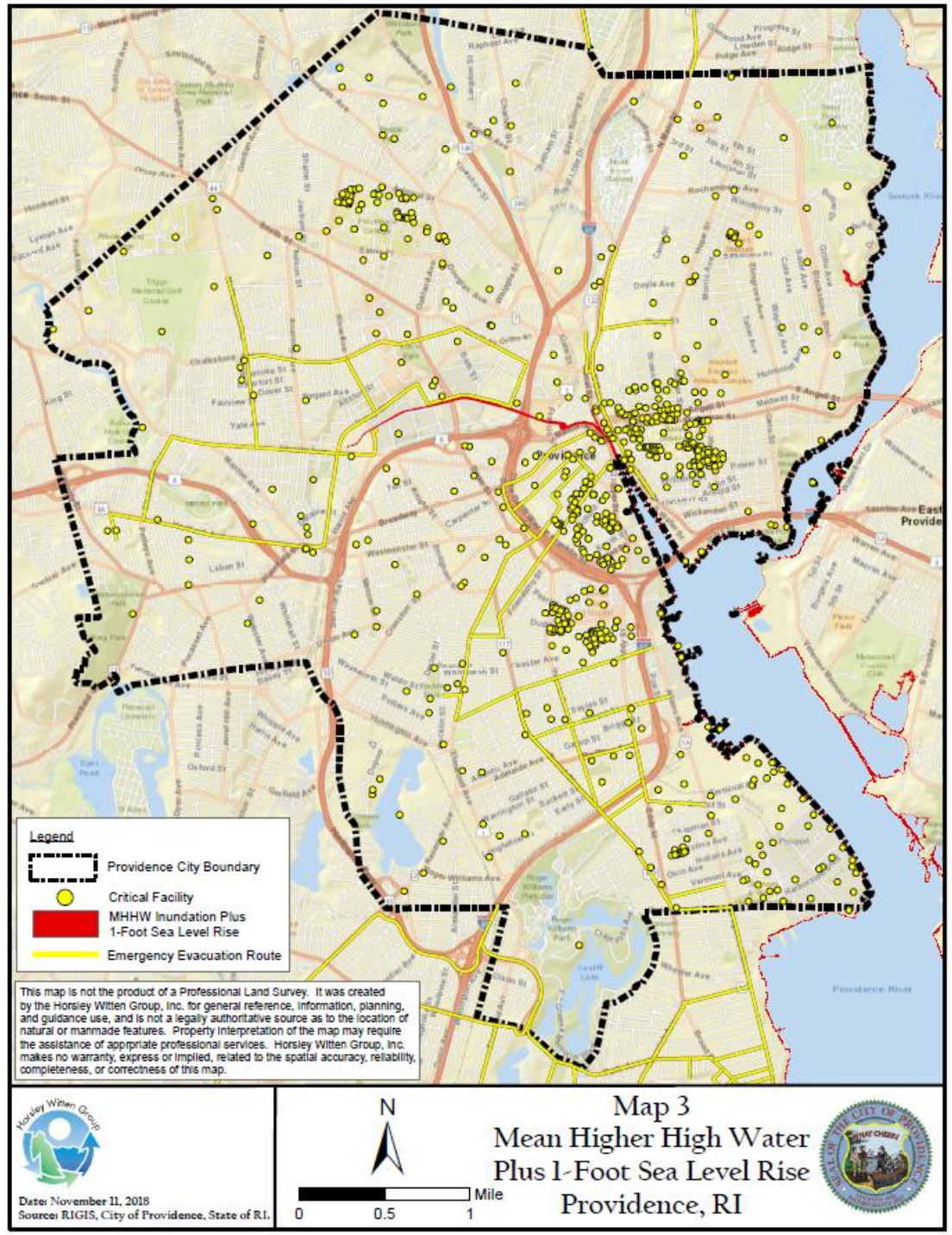


Vulnerability Analyses

Mean Higher High Water

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	
Port	16
Hazardous Material	1
College/University	4
Public Assembly	1
Fire Station	
Police Station	
Sewer Pump Station	
Federal Building	
Library	
School	
Energy/Power	1
Healthcare/Hospital	3
Shelter	
Total	**26**



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Vulnerability Analyses

Hurricane Surge Inundation Areas

Worst case Hurricane Surge Inundation areas for category 1 through 4 hurricanes striking the coast of Rhode Island. Hurricane surge values were developed by the National Hurricane Center using the SLOSH (Sea Lake and Overland Surge from Hurricanes) Model. This Surge Inundation layer was created by the U.S. Army Corps of Engineers, New England District.

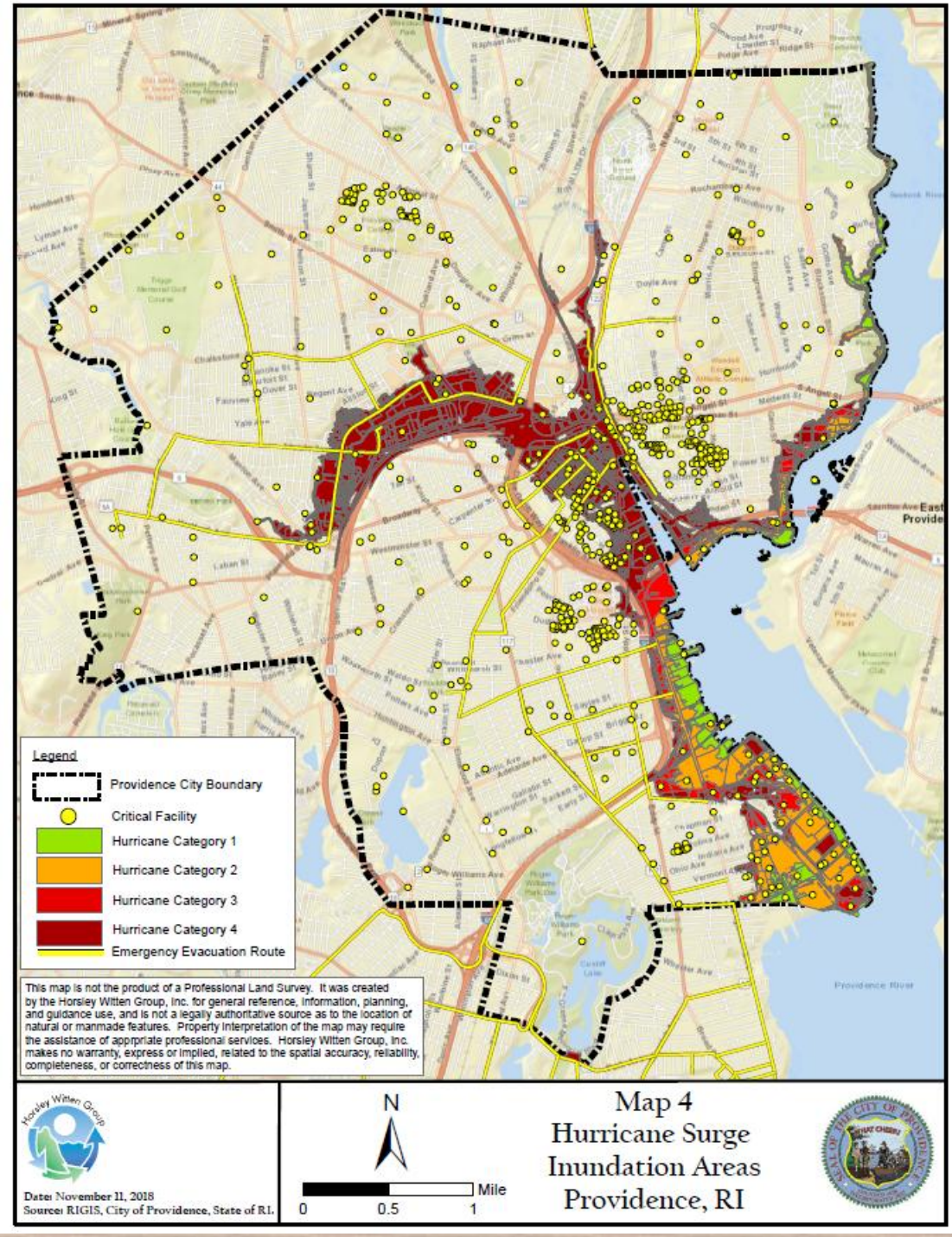
This layer was developed to assist emergency management officials in hurricane preparedness and operations.

Vulnerability Analyses

Hurricane – Category 1

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	1	$505,500	$826,700	$0	$1,332,200
Commercial	40	$48,496,100	$6,246,200	$2,667,000	$57,409,300
Office	9	$24,961,000	$4,771,000	$1,824,300	$31,556,300
Industrial	17	$34,940,800	$6,253,400	$3,569,400	$44,763,600
Utility/Energy	3	$11,181,600	$31,300	$177,500	$11,390,400
Healthcare/Hospital	6	$24,763,400	$193,318,800	$4,023,300	$222,105,500
State	6	$4,190,300	$20,800	$106,100	$4,317,200
College/University	10	$14,012,500	$84,988,700	$2,453,000	$101,454,200
Federal					
Transportation					
Water Infrastructure					
Wastewater Infrastructure	1	$6,217,200	$0	$0	$6,217,200
Emergency Response					
Non-Profit	1	$6,613,700	$0	$0	$6,613,700
Cemetery	1	$63,251,900	$4,581,200	$303,400	$68,136,500
School					
Charitable					
Hotel/Motel					
Mixed Use					
Civic/Public Assembly					
Missing Data	10				
Total	**105**	$239,134,000	$301,038,100	$15,124,000	**$555,296,100**

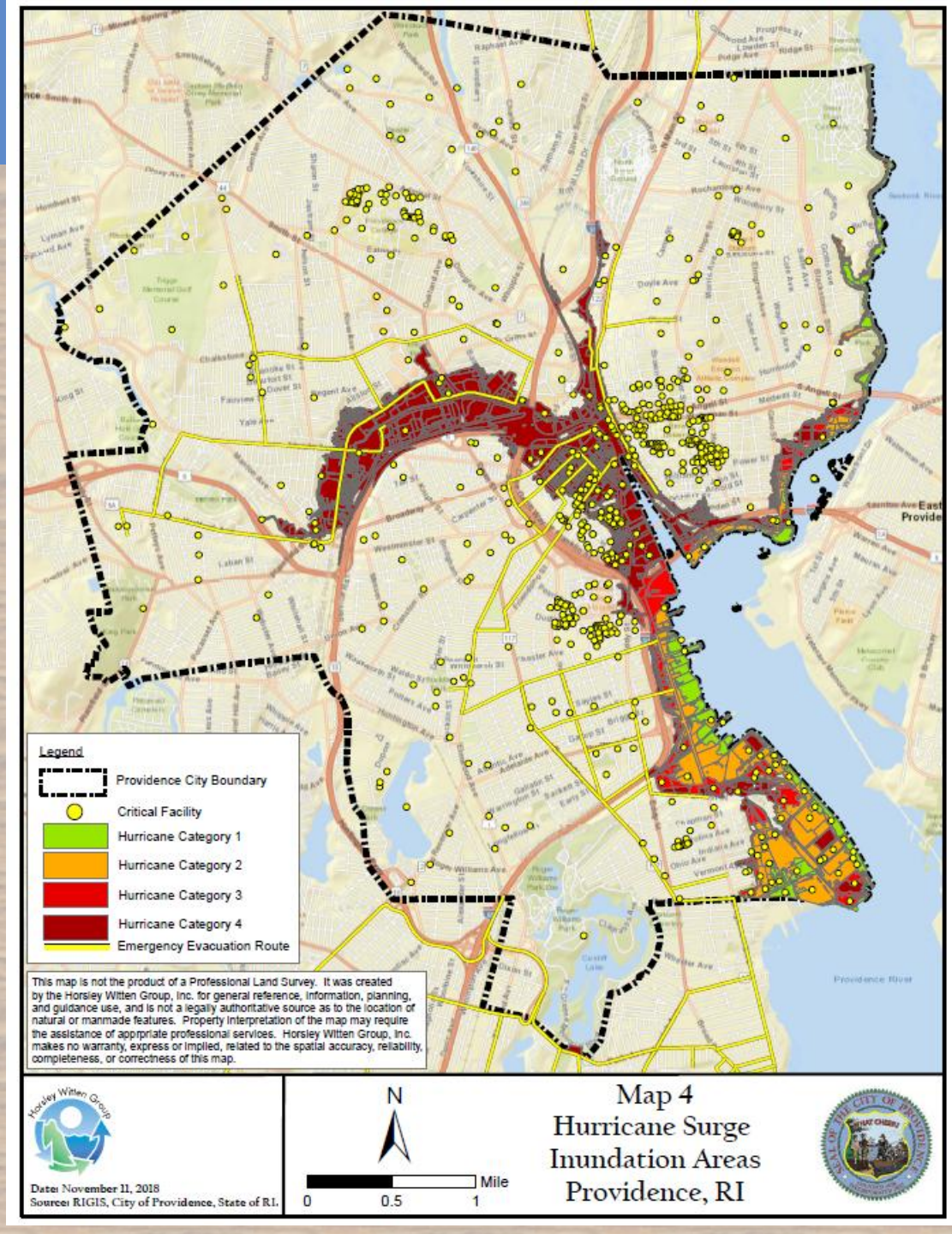


Vulnerability Analyses

Hurricane – Category 1

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	
Port	22
Hazardous Material	1
College/University	9
Public Assembly	
Fire Station	
Police Station	
Sewer Pump Station	
Federal Building	
Library	
School	
Energy/Power	
Healthcare/Hospital	3
Shelter	
Total	**35**



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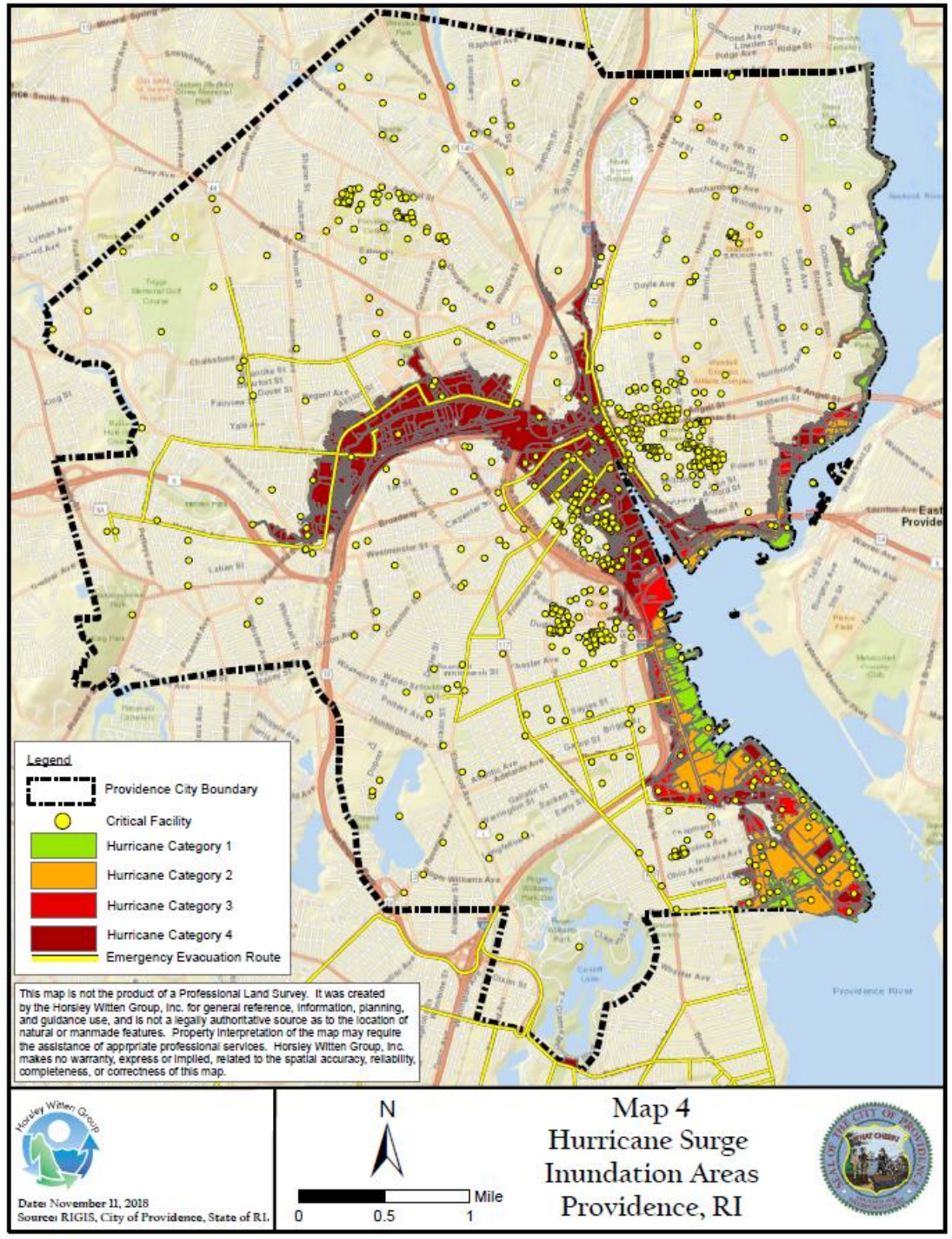
Vulnerability Analyses

Hurricane – Category 2

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	32	$4,483,100	$7,658,100	$54,600	$12,195,800
Commercial	77	$66,031,500	$15,265,800	$4,475,600	$85,772,900
Office	12	$25,136,500	$10,222,400	$2,080,000	$37,438,900
Industrial	37	$55,400,600	$14,629,900	$4,781,200	$74,811,700
Utility/Energy	5	$13,643,600	$31,300	$259,100	$13,934,000
Healthcare/Hospital	7	$25,188,700	$195,593,300	$4,119,500	$224,901,500
State	11	$5,173,400	$20,800	$115,300	$5,309,500
College/University	17	$17,798,900	$113,498,100	$3,576,800	$134,873,800
Federal					
Transportation					
Water Infrastructure					
Wastewater Infrastructure	6	$3,898,000	$5,534,200	$789,900	$10,222,100
Emergency Response					
Non-Profit	4	$7,398,100	$397,200	$47,300	$7,842,600
Cemetery	1	$63,251,900	$4,581,200	$303,400	$68,136,500
School					
Charitable	2	$2,902,200	$4,096,500	$341,900	$7,340,600
Hotel/Motel	1	$1,428,000	$4,940,700	$545,200	$6,913,900
Mixed Use	2	$289,300	$404,200	$8,000	$701,500
Civic/Public Assembly					
Missing Data	9				
Total	**223**	$292,023,800	$376,873,700	$21,497,800	**$690,395,300**

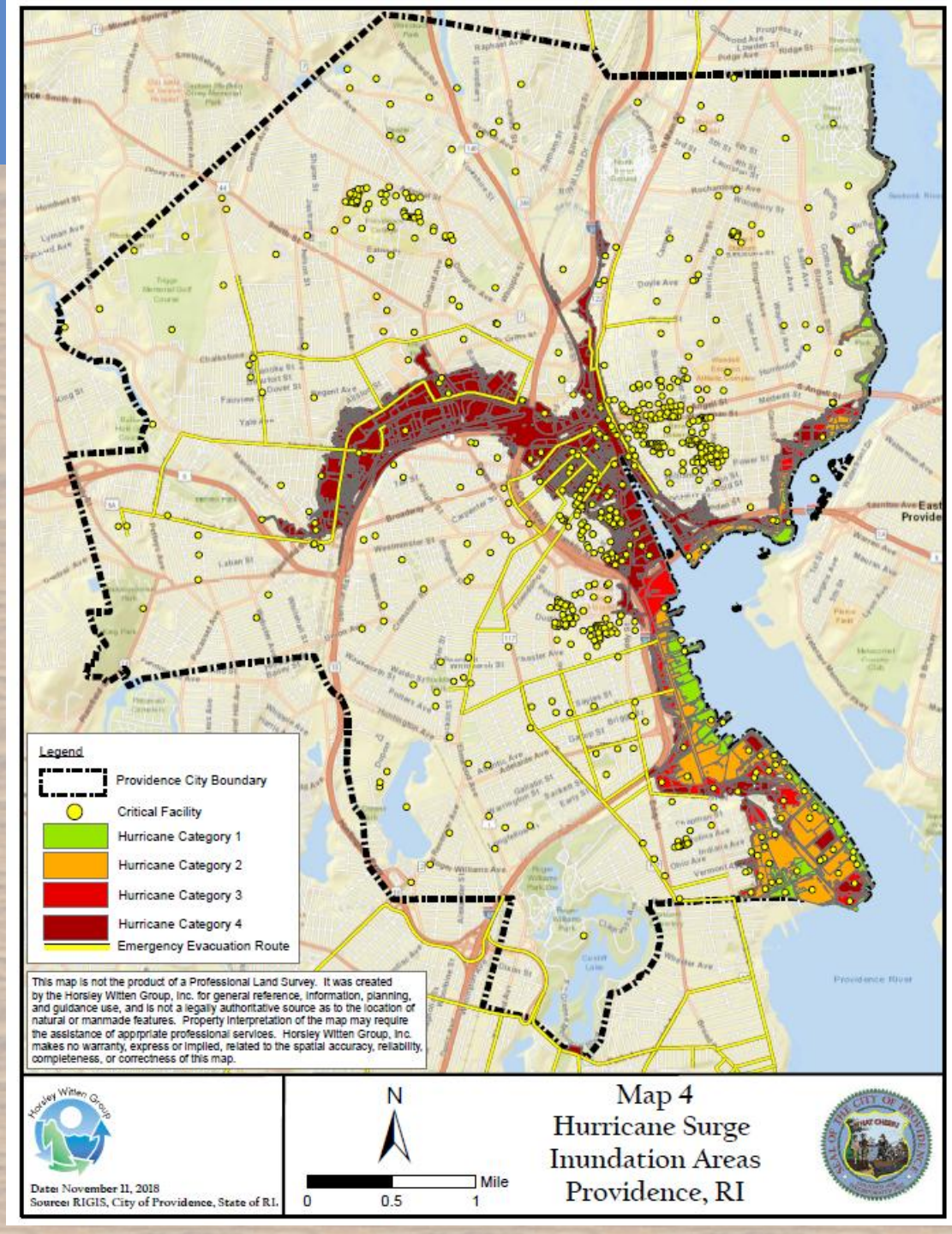


Vulnerability Analyses

Hurricane – Category 2

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	
Port	27
Hazardous Material	2
College/University	16
Public Assembly	
Fire Station	
Police Station	
Sewer Pump Station	3
Federal Building	
Library	
School	
Energy/Power	1
Healthcare/Hospital	4
Shelter	
Total	**53**



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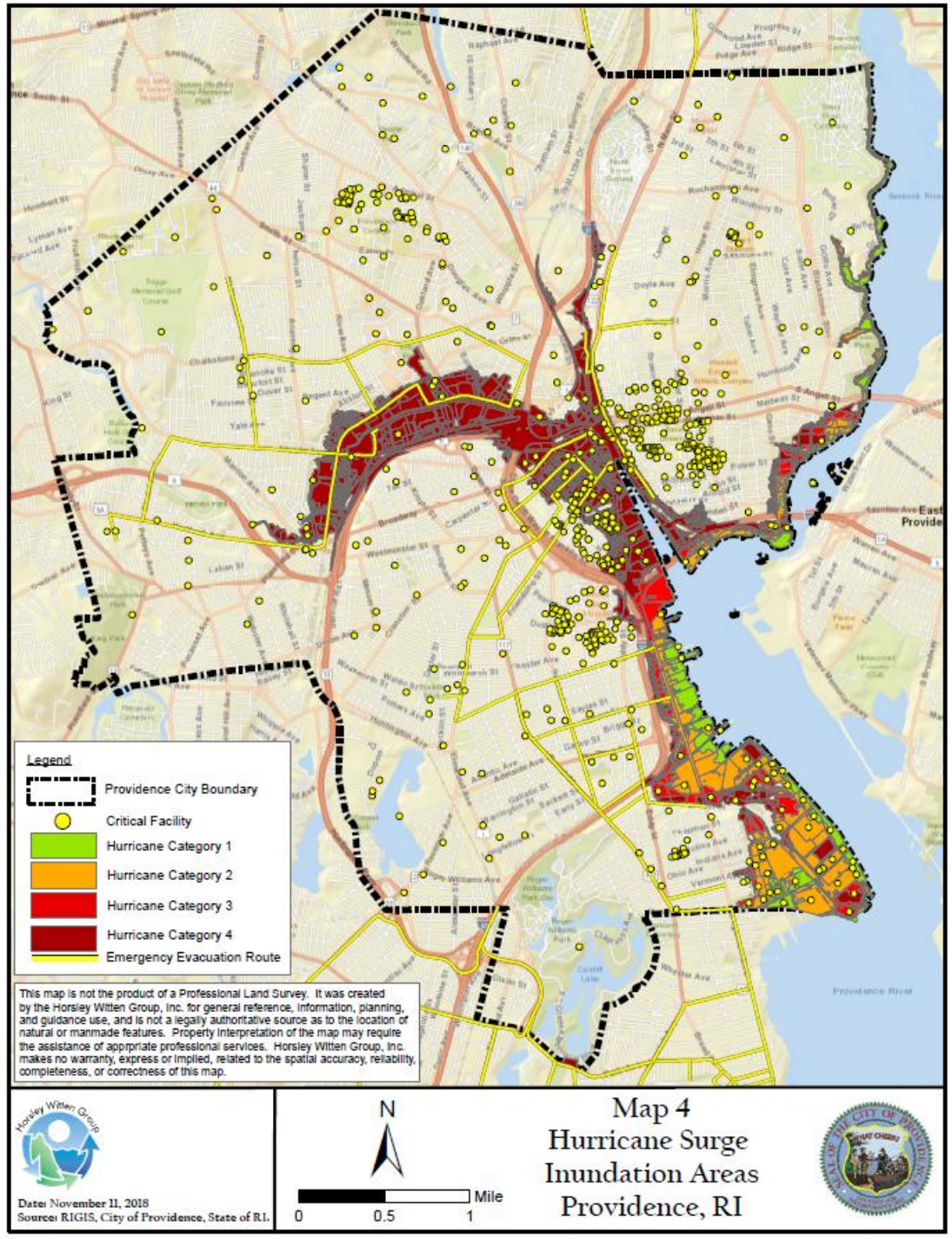
Vulnerability Analyses

Hurricane – Category 3

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	133	$7,696,100	$37,754,600	$84,300	$45,535,000
Commercial	61	$52,652,400	$11,088,700	$3,419,600	$67,160,700
Office	10	$21,947,700	$9,824,700	$1,946,100	$33,718,500
Industrial	24	$38,800,800	$10,628,400	$2,253,400	$51,682,600
Utility/Energy	6	$22,095,400	$256,104,900	$12,046,900	$290,247,200
Healthcare/Hospital	42	$72,846,500	$554,712,900	$8,713,100	$636,272,500
State	10	$4,571,100	$170,100	$128,400	$4,869,600
College/University	15	$22,565,400	$110,605,800	$3,688,800	$136,860,000
Federal					
Transportation					
Water Infrastructure					
Wastewater Infrastructure	7	$10,494,600	$6,304,200	$844,600	$17,643,400
Emergency Response					
Non-Profit	3	$7,204,800	$187,400	$38,100	$7,430,300
Cemetery	1	$63,251,900	$4,581,200	$38,303,408	$106,136,508
School					
Charitable	5	$3,259,500	$4,186,400	$363,300	$7,809,200
Hotel/Motel	1	$1,428,000	$4,940,700	$545,200	$6,913,900
Mixed Use	2	$386,600	$337,900	$9,600	$734,100
Civic/Public Assembly					
Missing Data	4				
Total	**324**	$329,200,800	$1,011,427,900	$72,384,808	**$1,413,013,508**

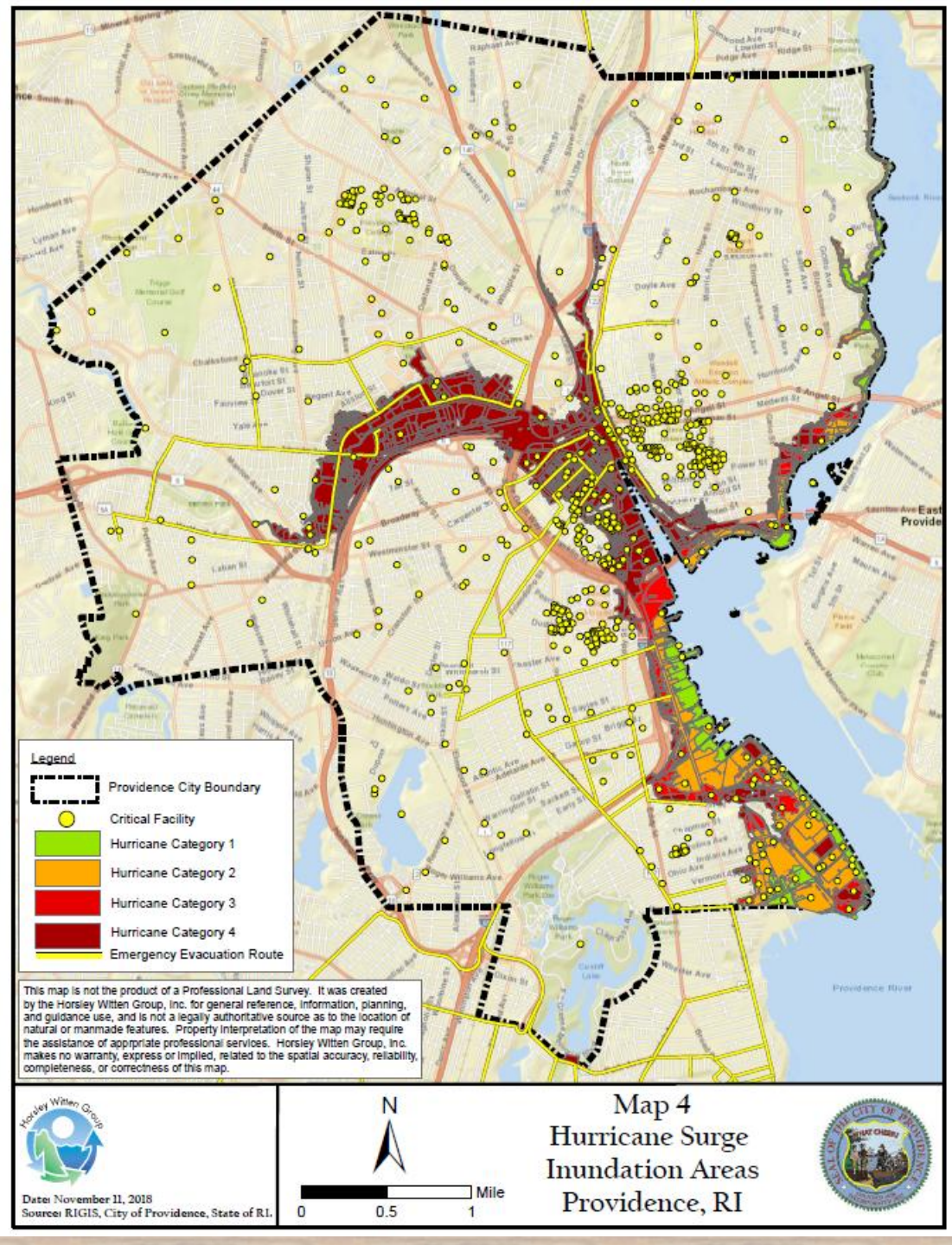


Vulnerability Analyses

Hurricane – Category 3

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	
Port	15
Hazardous Material	1
College/University	12
Public Assembly	
Fire Station	
Police Station	
Sewer Pump Station	5
Federal Building	
Library	
School	1
Energy/Power	3
Healthcare/Hospital	39
Shelter	
Total	**76**



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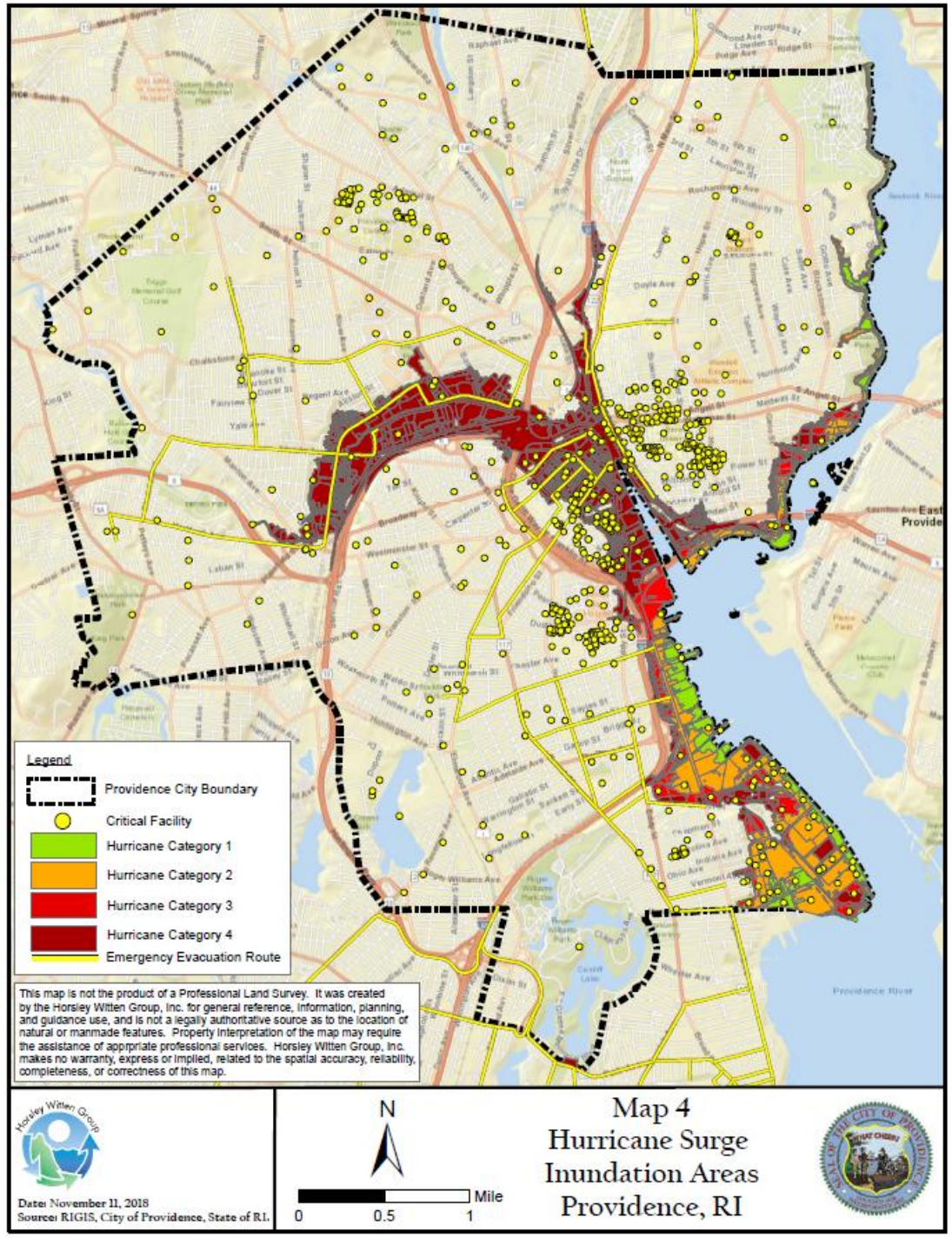
Vulnerability Analyses

Hurricane – Category 4

- Economic Impacts

Land Use	No. of Parcels Impacted	Approximate Land Value	Approximate Building Value	Approximate Other Value	Approximate Total Value
Residential	1,579	$93,243,100	$582,163,100	$14,102,000	$689,508,200
Commercial	439	$301,864,900	$192,127,000	$15,366,700	$509,358,600
Office	274	$98,663,500	$434,585,230	$23,924,000	$557,172,730
Industrial	184	$52,839,100	$66,258,000	$7,368,100	$126,465,200
Utility/Energy	8	$22,908,800	$256,606,300	$11,786,600	$291,301,700
Healthcare/Hospital	75	$111,404,400	$786,227,200	$12,389,700	$910,021,300
State	50	$24,831,800	$96,639,100	$2,467,400	$123,938,300
College/University	47	$41,432,900	$362,237,700	$8,347,100	$412,017,700
Federal	4	$9,949,200	$41,876,400	$1,435,400	$53,261,000
Transportation	21	$10,191,500	$0	$1,263,800	$11,455,300
Water Infrastructure					
Wastewater Infrastructure	9	$14,667,000	$20,637,300	$2,100,700	$37,405,000
Emergency Response	4	$2,039,000	$16,659,800	$681,500	$19,380,300
Non-Profit	11	$11,069,800	$13,900,400	$564,100	$25,534,300
Cemetery	1	$63,251,900	$4,581,200	$303,400	$68,136,500
School	10	$9,174,100	$83,691,400	$1,508,200	$94,373,700
Charitable	16	$4,938,800	$9,313,800	$586,200	$14,838,800
Hotel/Motel	8	$16,155,600	$173,938,500	$9,511,100	$199,605,200
Mixed Use	62	$11,845,800	$23,787,600	$1,184,300	$36,817,700
Civic/Public Assembly	45	$70,346,800	$856,058,000	$16,091,600	$942,496,400
Missing Data	41				
Total	**2,888**	$970,818,000	$4,021,288,030	$130,981,900	**$5,123,087,930**

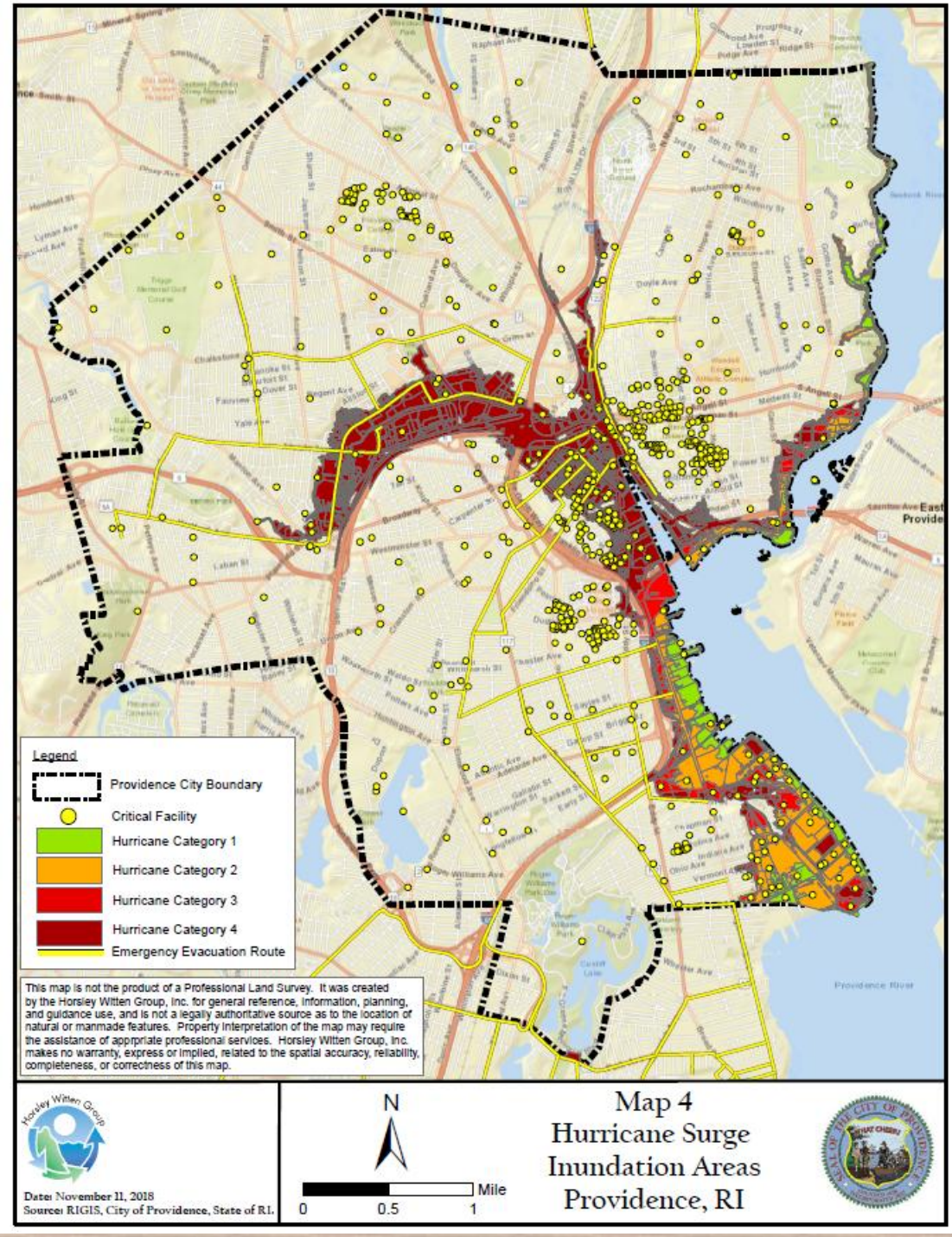


Vulnerability Analyses

Hurricane – Category 4

- Critical Facility Impacts

Land Use	No. of Parcels Impacted
Dam	4
Port	7
Hazardous Material	2
College/University	66
Public Assembly	6
Fire Station	2
Police Station	2
Sewer Pump Station	6
Federal Building	5
Library	3
School	3
Energy/Power	
Healthcare/Hospital	55
Shelter	
Total	**161**



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Shelter Capacity Roll Up

- July 1, 2017 Population estimate 180,393
- As per American Red Cross standards 10% of the population will need sheltering. For Providence, this represents 18,039 people will be displaced with one-third (6,013) needing short-term sheltering, with one-half of that (3,007) needing long-term sheltering.

American Red Cross Hurricane Certified Shelters				
Shelter Name	Square Footage	Short Term Capacity (20 SF/Person)	Long Term Capacity (40 SF/Person	Address
Springfield Middle School	6,000	300	150	152 Springfield St.
Levington Complex	8,000	300	150	152 Springfield St.
B. Jae Clanton Elementary	7,800	390	195	672 Prairie Ave.
Mount Pleasant High	10,431	521	260	434 Mount Pleasant Ave.
Hope High School	10,000	500	250	324 Hope Street
Neutaconkanut Rec. Center	11,000	550	275	675 Plainfield St.
Providence Career and Technical	56,000	2,800	1,400	91 Fricker Street
Anthony Carnevale, Jr. Elementary	3,200	160	80	50 Springfield Street
Subtotal	**112,431**	**5,622**	**2,811**	
Spaces Required for Short Term		**6,013**		
Spaces Required for Long Term			**3,007**	
Shortage (-) / Overage (+)		**-391**	**-196**	
City Shelters				
Shelter Name	Square Footage	Short Term Capacity (20 SF/Person)	Long Term Capacity (40 SF/Person	Address
Wheeler Academy	12,822	641	320	216 Hope Street
Samuel W. Bridgham Middle	2,000	100	50	1655 Westminster Street
Robert Bailey, III Elementary	2,000	100	50	65 Gordon Avenue
Pleasant View Elementary	2,000	100	50	50 Obadiah Brown Rd.
George J. West Elementary School	3,000	150	75	145 Beaufort Street
Martin Luther King Elementary	2,000	100	50	33 Camp Street
Gilbert Stuart Middle School	3,000	150	75	188 Princeton Avenue
Subtotal	**26,822**	**1,341**	**671**	
Total	**139,253**	**6,963**	**3,481**	
Spaces Required for Short Term		**6,013**		
Spaces Required for Long Term			**3,007**	
Shortage (-) / Overage (+)		**950 (surplus)**	**474 (surplus)**	

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Healthcare Cluster Annex

Approach…

Risk Assessment Survey
- respond according to the Risk Assessment Rubric natural, human-caused, and technological hazards
- rate the impacts on the public health and healthcare delivery systems

Identification of top concerns for improvement and potential mitigation strategies

Prioritization of potential mitigation strategies and discussion around implementation

Healthcare Cluster Annex

Approach…

Risk Assessment Survey
- respond according to the Risk Assessment Rubric natural, human-caused, and technological hazards
- rate the impacts on the public health and healthcare delivery systems

Identification of top concerns for improvement and potential mitigation strategies

Prioritization of potential mitigation strategies and discussion around implementation

Update of Kaiser Permanente Hazard Vulnerability Analysis

Higher Education Annex

Approach…

Risk Assessment Survey
- respond according to the Risk Assessment Rubric natural, human-caused, and technological hazards
- rate the impacts on the operations and management of facilities

Identification of top concerns for improvement and potential mitigation strategies

Prioritization of potential mitigation strategies and discussion around implementation

Mitigation Process…next steps

- Assess Risks
- **Establish Goals**
- **Identify Projects/Actions**
- **Update/Maintain Plan**

Project Schedule

Draft Update available for public comment – **Feb./March 2019**

Draft Update to RIEMA – **April 2019**

Contact Us…

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On-line Surveys available!
English Version:
https://www.surveymonkey.com/r/ProvidenceHazardMitigationPlanUpdate

Spanish Version:
https://www.surveymonkey.com/r/ProvidenceHazardMitigationPlanUpdate_SpanishVersion

Thank You!