

3.3.3 Assessing Vulnerability: Identifying Assets

Summary: The geographic location of the Lincoln Trail Region, lends itself to some risk from most natural hazards. Therefore, no community facility or location should be considered “safe” from any type of natural hazard event that could occur in the region. The following section summarizes the physical assets in the Lincoln Trail Region. This portion of the plan identifies information such as critical facilities, transportation infrastructure, and population patterns. In part, the definition of an “asset” is its value. When possible, an effort was made to determine a dollar value for each asset. Because parcel data originates from numerous, diverse sources, this information is difficult to quantify and summarize. The cumulative product of this research is a “snapshot” of the vulnerabilities to the natural hazard events, that exist in the Lincoln Trail Region. In conjunction with the economic value of regional assets, risk has been evaluated as part of the section 3.3.4; “Estimating Potential Losses.”

Note: for the purpose of compilation of data the City of Upton while lying in both Hardin and LaRue Counties is considered to be in Hardin County.



Various Critical Facilities in Lincoln Trail Region. *Source: LTADD Archive.*

Table 3.3.3.1 - Population Characteristics

Name	Population *	Total Households	Median Household Income	Total Families	Median Family Income	Per Capita Income	Individuals Below Poverty Level	% Below Poverty Level (2020 Population Figures)
BRECKINRIDGE	20,432	7,598	\$47,190	5,158	62,988	\$23,286	3,674	17.98%
Cloverport	1,119	448	\$23,929	243	\$35,972	\$17,045	383	34.23%
Hardinsburg	1,231	989	\$46,188	609	\$57,083	\$22,616	382	31.03%
Irvington	2,385	511	\$32,083	304	\$50,417	\$20,815	329	13.79%
GRAYSON	26,420	9,758	\$38,612	6,801	\$45,876	\$21,231	6,585	24.92%
Caneyville	529	225	\$32,431	149	\$44,375	\$17,127	151	28.54%
Clarkson	933	442	\$25,676	291	\$35,096	\$16,588	352	37.73%
Leitchfield	6,404	2,689	\$31,221	1,585	\$41,375	\$19,794	1,700	26.55%
HARDIN	110,702	42,644	\$57,463	28,039	\$71,610	\$29,622	10,418	9.41%
Elizabethtown	31,394	12,553	\$46,754	7217	\$64,303	\$29,771	4,406	14.03%
Radcliff	23,042	9,192	\$46,105	5749	\$54,426	\$24,933	4,582	19.89%
Sonora	565	254	\$46,750	188	\$51,786	\$21,384	138	24.42%
Upton	704	296	\$45,096	202	\$49,375	\$27,720	87	12.36%
Vine Grove	6,559	2,230	\$62,596	1582	\$77,800	\$31,608	258	3.93%
West Point	952	355	\$37,007	224	\$42,500	\$21,729	195	20.48%
LARUE	14,867	5,741	\$47,643	3,882	\$57,598	\$24,803	2,013	13.54%
Hodgenville	3,235	1,142	\$31,314	723	\$45,855	\$19,114	675	20.87%
MARION	19,581	7,405	\$40,107	4,442	\$57,225	\$22,241	4,236	21.63%
Bradfordsville	270	136	\$31,786	78	\$40,000	\$19,319	76	28.15%
Lebanon	6,274	2,688	\$30,031	1158	\$36,848	\$21,164	1,740	27.73%
Loretto	723	289	\$41,979	181	\$47,404	\$20,578	85	11.76%
Raywick	155	71	-	38	\$48,750	\$22,192	34	21.94%
MEADE	30,003	10,685	\$56,603	7,674	\$72,298	\$27,861	3,369	11.23%
Brandenburg	2,894	1,084	\$43,971	696	\$48,482	\$23,455	472	16.31%
Ekron	175	91	\$47,188	65	\$48,250	\$16,708	110	62.86%
Muldraugh	1,040	427	\$34,583	243	\$54,625	\$18,576	268	25.77%
NELSON	46,738	17,853	\$20,127	12,243	\$72,320	\$32,735	4,147	8.87%
Bardstown	13,567	5,277	\$54,328	2973	\$62,217	\$33,674	1,409	10.39%
Bloomfield	961	349	\$33,854	237	\$39,688	\$22,612	177	18.42%
Fairfield	118	40	-	21	\$74,583	\$26,458	13	11.02%
New Haven	798	308	\$42,143	155	\$48,750	\$24,324	106	13.28%
WASHINGTON	12,027	4,581	\$53,743	3,209	\$64,683	\$26,035	1,777	14.78%
Mackville	222	78	\$45,000	53	\$64,750	\$21,518	5	2.25%
Springfield	2,846	1,200	\$40,915	652	\$43,750	\$20,043	728	25.58%
Willisburg	300	115	\$60,694	67	\$50,938	\$27,297	99	33.00%
LTADD	280,770	106,265		71,448			36,219	12.90%
Source: American Community Survey 2019								
*US Census, data.census.gov								

Residential: Housing is an integral component of the social and physical environment of any community. The provision of adequate housing should be regarded as an element of the overall planning process. Although a challenging goal, the provision of sound and affordable housing for all citizens of the region can be aided by comprehensive planning programs as well as, sensible hazard mitigation strategies. The table below details selected housing characteristics across the region. As illustrated, the median value of homes ranged from as low as \$45,000 to as high as \$180,000, in 2019. Many of the cities in the region saw large increases in Median home values while others have saw decreases. The counties within the Lincoln Trail region have continued to realize an increase in the median housing value since 1990.

Table 3.3.3.2 - Housing Characteristics

Name	Population*	Total Housing Units*	Occupied Housing Units*	Vacant Housing Units*	% Mobile Homes	Owner Occupied	Renter Occupied	Median Housing Value				
								1990	2003	2008	2013	2019
BRECKINRIDGE	20,432	10,704	8,003	2,701	26.8	6,123	1,475	\$37,700	\$64,600	\$93,000	\$82,700	\$102,900
Cloverport	1,119	557	485	72	9.7	274	174	\$24,400	\$39,000	\$56,000	\$44,100	\$57,300
Hardinsburg	1,231	1,101	976	125	14.1	596	393	\$45,800	\$72,700	\$104,800	\$82,500	\$99,300
Irvington	2,385	566	514	52	16.8	242	269	\$37,500	\$58,100	\$84,100	\$71,800	\$86,700
GRAYSON	26,420	13,275	10,440	2,835	21.7	7,084	2,674	\$35,700	\$65,600	\$95,800	\$87,700	\$113,900
Caneyville	529	282	233	49	16.6	155	70	\$29,800	\$56,900	\$76,800	\$65,900	\$96,400
Clarkson	933	456	416	40	68	205	237	\$26,000	\$50,600	\$72,100	\$71,700	\$84,200
Leitchfield	6,404	2,885	2,626	259	9.4	1,434	1,255	\$40,100	\$66,900	\$95,200	\$83,000	\$103,000
HARDIN	110,702	46,669	42,933	3,736	9.9	25,605	16,041	\$58,300	\$88,300	\$143,500	\$140,600	\$156,600
Elizabethtown	31,394	14,076	13,095	981	2.6	5,564	6,989	\$59,500	\$98,300	\$162,800	\$155,400	\$180,000
Radcliff	23,042	10,207	9,152	1,055	11.8	4,640	4,552	\$65,000	\$83,500	\$134,400	\$121,400	\$129,100
Sonora	565	237	232	5	5.6	210	44	\$30,600	\$62,500	\$101,500	\$106,500	\$120,500
Upton	704	321	296	25	5.7	177	92	\$32,100	\$56,900	\$97,100	\$70,500	\$96,300
Vine Grove	6,559	2,820	2,563	257	3.8	1,450	780	\$52,200	\$81,100	\$136,000	\$121,200	\$152,700
West Point	952	490	393	97	24.5	232	123	\$25,600	\$54,500	\$79,900	\$81,100	\$45,600
LARUE	14,867	6,474	5,879	595	14.1	4,253	1,488	\$39,500	\$72,100	\$111,000	\$101,000	\$115,600
Hodgenville	3,235	1,488	1,369	119	2.2	616	526	\$39,300	\$65,900	\$93,000	\$79,900	\$90,400
MARION	19,581	8,350	7,752	598	13	5,434	1,971	\$39,500	\$70,300	\$105,000	\$100,200	\$105,400
Bradfordsville	270	142	116	26	31.9	82	54	\$16,100	\$27,500	\$37,500	\$54,200	\$56,700
Lebanon	6,274	2,799	2,582	217	8.4	1,530	1,158	\$39,600	\$64,100	\$93,900	\$95,400	\$92,600
Loretto	723	313	289	24	17.7	226	63	\$33,600	\$65,400	\$97,700	\$93,900	\$108,100
Raywick	155	68	68	0	16.9	46	25	\$24,200	\$68,500	\$109,000	\$111,800	\$108,300
MEADE	30,003	11,943	11,045	898	17.7	7,759	2,926	\$49,700	\$85,500	\$114,000	\$120,500	\$153,500
Brandenburg	2,894	1,250	1,160	90	4.4	578	506	\$47,900	\$75,400	\$108,000	\$106,800	\$146,400
Ekron	175	83	74	9	28.4	51	40	\$28,300	\$50,300	\$52,000	\$50,600	\$59,600
Muldraugh	1,040	551	440	111	23.8	157	270	\$37,000	\$54,900	\$58,000	\$70,000	\$61,100
NELSON	46,738	19,716	18,462	1,254	7.9	13,561	4,292	\$45,800	\$87,100	\$129,700	\$124,500	\$154,700
Bardstown	13,567	5,995	5,572	423	2.8	2,957	2,320	\$46,900	\$76,000	\$107,600	\$102,500	\$123,500
Bloomfield	961	448	408	40	7.1	242	107	\$37,700	\$72,900	\$108,000	\$95,500	\$106,000
Fairfield	118	50	50	0	0	30	10	\$40,400	\$49,121	\$52,000	\$82,500	\$150,000
New Haven	798	367	333	34	1.4	195	113	\$36,800	\$68,600	\$105,300	\$94,300	\$102,100
WASHINGTON	12,027	5,196	4,674	522	13.7	3,434	1,147	\$40,700	\$72,000	\$112,000	\$107,300	\$128,300
Mackville	222	92	78	14	6	62	16	\$32,200	\$56,700	\$85,800	\$88,300	\$95,000
Springfield	2,846	1,303	1,182	121	2.5	557	643	\$40,900	\$74,900	\$114,200	\$86,300	\$120,700
Willisburg	300	118	101	17	0	83	32	\$38,800	\$66,300	\$73,000	\$96,700	\$1,097,000
LTADD	280,770											

Source: US Census, American Community Survey - 2019, 5 Year.
 * 2020 US Census

Commercial: Currently, there is no inventory of commercial structures in the Lincoln Trail Region or for any of its eight counties or twenty-seven cities.

Industrial: The 2020 Kentucky Directory of Manufacturers, from the Economic Development Cabinet, reports that there are 202 industries in the Lincoln Trail Region, an increase of 30 industries since 2015. An estimated 20,723 people are employed by these industries. Due to rapid industrial growth, the dynamic nature of employment and the absence of individual dollar values, no further analysis for potential loss can be completed at this time. However, the number of companies and employees can't be disregarded when considering the economic impact of any hazard event.

Table 3.3.3.3 - Lincoln Trail Region Industries		
Jurisdiction	Number of Industries	Number of Employees
Breckinridge County	6	284
Garfield	1	5
Hardinsburg	5	279
Grayson County	31	1,685
Clarkson	2	117
Leitchfield	28	1,532
Millwood	1	36
Hardin County	44	7,231
Cecilia	2	154
Eastview	1	7
Elizabethtown	36	6,831
Radcliff	4	169
Sonora	1	70
LaRue County	8	423
Hodgenville	7	421
Magnolia	1	2
Marion County	29	4,364
Lebanon	27	4,186
Loretto	2	178
Meade County	4	425
Brandenburg	4	425
Nelson County	51	4,637
Bardstown	36	4,260
Boston	3	149
Bloomfield	2	56
Cox's Creek	6	92
New Haven	3	70
New Hope	1	10
Washington County	9	1224
Springfield	9	1224
Lincoln Trail Region	202	20,273
<i>Source: Report: 2020 Kentucky Directory of Manufacturers</i>		

Agricultural: Agricultural lands are particularly susceptible to damage from drought, flooding, hail, and storms. The frequency and magnitude of events during a growing season is a major determinant of the impact of any natural hazard on crops. The natural hazards listed above, as well as lightning, could also affect livestock. The total estimated value of livestock, crops, and agricultural related lands at risk in the region, is detailed in the following table.

Table 3.3.3.4 - Agricultural Assets

Location	Number of Farms	Farmland	Cropland	Cropland in Floodplain ¹	Harvested Cropland	Estimated Market Value Cropland and Structures Per Acre	Estimated Market Value Crop & Livestock Production
Acres						Dollars	
BRECKINRIDGE	1,357	275,105	126,792	2,674	102,430	\$3,087	\$99,439,000
GRAYSON	1,339	212,343	95,299	4,717	72,227	\$2,956	\$59,578,000
HARDIN	1,305	199,201	109,575	5,277	93,215	\$4,594	\$59,242,000
LARUE	718	110,371	67,671	7,529	62,017	\$3,549	\$41,112,000
MARION	954	162,949	85,208	7,851	77,682	\$3,482	\$60,230,000
MEADE	781	141,054	80,352	2,777	64,318	\$4,328	\$45,793,000
NELSON	1,434	213,534	114,006	10,166	98,396	\$4,061	\$67,099,000
WASHINGTON	1,102	161,449	67,509	2,274	54,280	\$3,212	\$34,391,000
LTADD	8,990	1,476,006	746,412	43,264	624,565		

Source: USDA 2017 Ag Census

¹ - Comparison using USDA's National Agricultural Statistics Service "CroplandCROS" data, version 2020 and FEMA DFIRM Flood Elevation data 2007-2012.

This comparison reflects more the current landuse for agriculture versus the potential landuse as with previous plans. As with 2015 HMP, this focuses on land used for crops and excludes pasture lands.



Agriculture is an important economic factor in Lincoln Trail Region. Source: LTADD Archive.

Transportation: Each County has a fully equipped road department to maintain county roads and bridges. The Kentucky Transportation Cabinet is responsible for the remaining state roads.

Table 3.3.3.5 - Transportation Assets

Location	Road Miles ¹	Bridges ²	Airports ³	Rail Miles ⁴
BRECKINRIDGE	881	91	1	30
Cloverport	11			
Hardinsburg	16		1	
Irvington	11			
GRAYSON	934	117	2	34
Caneyville	4			
Clarkson	6			
Leitchfield	49			
HARDIN	1,172	221	1	70
Elizabethtown	164			
Radcliff	96			
Sonora	5			
Upton ⁵	7			
Vine Grove	35			
West Point	9			
LARUE	448	54		3
Hodgenville	14			
MARION	478	148		0
Bradfordsville	2			
Lebanon	34			
Loretto	3			
Raywick	1			
MEADE	558	24		24
Brandenburg	10			
Ekron	2			
Muldraugh	5			
NELSON	708	150	1	30
Bardstown	80			
Bloomfield	7			
Fairfield	1			
New Haven	4			
WASHINGTON	451	99	1	0
Mackville	2			
Springfield	17			
Willisburg	1			
County Totals	5,630	904	6	191
Municipal Totals	596			
LTADD Total	6,226	904	6	191

¹. County Mileage includes Federal, state and County roads, KYTC May 2021.
². Bridges are on Federal and State roads only, Bureau of Transportatin Statistics, June 2021.
³. Paved Runways with some services, Bureau of Transportatin Statistics, 2021
⁴. Main Lines only, Bureau of Transportatin Statistics, 2021
⁵. Hardin & LaRue Combined



Transportation Facilities in Lincoln Trail Region. *Source: LTADD Archive.*

Utilities: The Lincoln Trail Region is served by numerous utilities, provided by various sources. The following tables detail the wastewater and water treatment systems currently operating in the Lincoln Trail Region. Due to future growth projections, there are several projects currently being considered by the regional water management council that pertain to line expansions and/or system upgrades.

Table 3.3.3.6 - Wastewater Utility Assets

County	Owner	Treatment Plant	Max Hydraulic Capacity (MGD)	Ave Daily Flow (MG)	Population Served
Breckinridge	Cloverport	Cloverport Stp	0.20	0.15	1,071
	Hardinsburg	Hardinsburg Stp	0.73	0.47	2,242
	Irvington	Irvington Wwtp	0.15	0.08	99
Grayson	Caneyville	Caneyville Wwtp	0.12	0.09	609
	Clarkson	Clarkson Wwtp	0.04	0.05	898
	Leitchfield	Leitchfield Wwtp	2.00	1.27	6,230
Hardin	Airview Estates Subdivision	Airview Estates Wwtp	Design - 0.055	0.06	na
	Elizabethtown	Valley Creek Wwtp	29.00	7.80	29,554
	Hardin County Water Dist #1	Radcliff	4.00	3.92	23,218
	Hardin County Water Dist #1	Ft Knox	6.00	1.48	<i>included in above</i>
	Vine Grove	Vine Grove Wwtp	0.71	0.37	5,017
	West Point	West Point Wwtp	0.20	0.11	839
Larue	Hodgenville	Hodgenville Wwtp	0.78	0.55	3,629
Marion	Bradfordsville	Bradfordsville Wwtp	0.04	0.03	304
	Lebanon	Lebanon Wwtp	3.00	2.13	6,926
	Loretto	<i>Collection System Only</i>	With Lebanon	With Lebanon	803
Meade	Brandenburg	Brandenburg Wwtp	0.91	0.26	2,797
	Doe Valley Association, Inc.	Doe Valley Wwtp	Design - 0.15	na	1,860
	Muldraugh	<i>Collection System Only</i>	With Ft Knox	With Ft Knox	937
Nelson	Bardstown	Bardstown	3.00	1.20	18,185
	Bardstown	Jerry L. Riley	4.00	1.63	0
	Bloomfield	<i>Collection System Only</i>	With Bardstown	With Bardstown	978
	New Haven	New Haven Wwtp	0.16	0.11	938
Washington	Springfield Water & Sewer Commission	Springfield Stp	0.88	0.61	2,714

Source: Kentucky Infrastructure Authority, Water Resources Information System, April, 2021

Table 3.3.3.7 - Water Utility Assets

County	Owner	Water Treatment Plant Name	Design Capacity (MGD)	Total Population	Useage (Million Gallons)
Breckinridge	Hardinsburg Water	Hardinsburg Water	2.00	15,014	391.91
Grayson	Leitchfield Water Works	Leitchfield Utilities	2.88	20,793	592.02
Grayson	Grayson County Water District	Grayson County Water District	2.30	15,911	382.82
Hardin	Hardin County Water District #1	Pirtle Springs	3.10	127,323	1,056.00
Hardin	Hardin County Water District #1 Fort Knox System	Muldrough Plant	7.00	37,764	657.21
		Fort Knox/Central	3.50		
Hardin	Hardin County Water District #2	City Springs	3.00	75,812	2,425.93
		Freeman Lake	3.00		
		White Mills	8.10		
Hardin	West Point Water Dept	West Point	0.34	898	18.35
LaRue	Hodgenville Water Works	Hodgenville	0.50	13,100	179.33
Marion	Lebanon Water Works County Inc	Lebanon	5.20	20,805	752.13
Meade	Brandenburg Water Works	Barney Johnson	1.00	19,351	120.17
Nelson	Bardstown Municipal Water Dept	Sympson Lake	6.00	51,366	1,283.39
Washington	Springfield Water Works	Springfield	3.00	10,413	362.57

Source: Kentucky Infrastructure Authority, Water Resources Information System, Sept. 2021



Critical Facilities are exposed to many hazards in the Lincoln Trail Region. Source: LTADD Archive.

Critical Facilities: These facilities may be public or private: they are critical components of effective loss mitigation and recovery efforts during and after any hazard event. When planning for and implementing hazard mitigation strategies, communities should give top priority to their critical facilities. For the purposes of this document the Lincoln Trail Region has identified their critical facilities to be those listed. The list identifies the location of each facility, not a specific government authority. The number of critical facilities remained constant with the only changes, as noted below, in the categories of government buildings, water storage tanks and wells.

Table 3.3.3.8 Critical Facilities

Jurisdiction	Communications – Pubic Radio Transmitters	Fire Stations	Police Stations	Government Buildings	Hospitals	Waste Water Treatment Plants	Water Treatment Plants	Pumping Stations	Storage Tanks	Wells	Schools
Breckinridge	0	6	0	1	1	0	1	6	7	3	1
Cloverport	0	1	1	1	0	1	0	0	2	0	3
Hardinsburg	2	3	2	5	1	1	1	0	2	0	2
Irvington	0	1	1	1	0	1	0	3	2	0	1
Grayson	0	4	0	3	1	2	2	8	10	0	0
Caneyville	0	1	1	1	0	1	0	4	3	0	1
Clarkson	0	1	1	1	0	1	0	0	1	0	1
Leitchfield	2	2	1	2	1	1	1	2	3	0	5
Hardin	11	18	6	12	2	4	2	10	11	0	7
Elizabethtown	3	5	2	7	1	1	1	2	10	0	12
Radcliff	2	2	1	3	0	1	0	3	2	0	9
Sonora	0	1	0	1	0	0	0	0	0	0	1
Upton	0	1	0	2	0	0	0	0	0	0	1
Vine Grove	2	1	1	1	0	1	0	8	3	0	5
West Point	0	1	1	2	0	1	0	5	1	2	0
Larue	1	3	1	2	0	0	0	6	8	0	2
Hodgenville	0	2	2	4	0	1	1	1	3	0	2
Marion	0	1	0	4	0	0	1	3	8	0	2
Bradfordsville	0	1	0	3	0	1	0	0	1	0	0
Lebanon	2	2	2	8	1	1	1	1	1	0	5
Loretto	0	1	0	1	0	0	0	0	1	0	1
Raywick	0	1	0	1	0	0	0	0	0	0	0
Meade	0	11	2	6	0	1	1	2	3	0	4
Brandenburg	2	1	2	5	0	0	1	0	1	3	5
Ekron	0	1	0	1	0	0	0	0	0	0	1
Muldraugh	1	1	1	4	0	0	0	4	0	0	0
Nelson	2	10	5	15	1	2	2	9	17	0	2
Bardstown	3	3	2	8	1	2	1	3	4	0	19
Bloomfield	0	1	1	1	0	0	0	1	1	0	2
Fairfield	0	0	0	1	0	0	0	0	0	0	0
New Haven	1	1	1	1	0	1	0	3	2	0	2
Washington	4	3	2	4	0	1	1	4	5	0	0
Mackville	0	1	0	0	0	0	0	0	0	0	0
Springfield	0	2	2	5	0	1	1	1	4	0	4
Willisburg	0	1	0	1	0	0	0	0	0	0	1
Total in Region	38	95	41	118	10	27	18	89	116	8	101

Special Critical Facilities: Dams represent a unique critical facility situation where the loss of the facility itself due to any disaster can lead to an additional disaster in the form of flooding.

Within the Lincoln Trail, eight-county region, there are 90 dams. Of the 90 dams in the region, 21 are for flood control, 48 are for recreation purposes, 13 are for water supply, and the remaining 8 dams are used for other purposes that include fire protection, fish and wildlife, and irrigation.

The following chart lists all 90 dams in the Lincoln Trail Region by county and shows each dam's current hazard class. The information below, was provided by the Department for Environmental Protection of the Kentucky Energy and Environment Cabinet. The various dams listed are portrayed on the maps in section 3.3.2.1 Flooding.

Table 3.3.3.9.-. Lincoln Trail Region Dams

Breckinridge County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
LEE THOMAS LAKE DAM	Earth	Significant	Recreation	13.6	0
G. E. BENNETTE DAM	Earth	Low	Water Supply	8.2	28,370.10
N FORK OF ROUGH RIVER FRS 1	Earth	Low	Flood Control	12.2	55,506.70
HONEY LOCUST DAM	Earth	Low	Recreation	8.2	59,207.10
BRECKRIDGE	Earth	Significant	Recreation	5.8	67,841.50
JOHN SMITH DAM	Earth	Low	Water Supply	8.8	100,158.70
BLANCHETTE DAM	Earth	High	Recreation	8.8	108,793.10
HARDINSBURG FFA CAMP LAKE DAM	Earth	Significant	Recreation	11	136,546.40
DRY FORK LAKE DAM	Earth	Low	Water Supply	8.5	145,550.90
PAPE DAM	Earth	Low	Recreation	9.4	220,793.30
ROUGH RIVER LAKE DAM	Earth	High	Flood Control	0	111,260,063.40

Grayson County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
CANEY CREEK FRS 1	Earth	Significant	Flood Control	12.2	238,062.00
SHORT CREEK FRS 7	Earth	Low	Flood Control	10.4	98,678.50
PINE KNOB DAM	Earth	Low	Recreation	6.1	191,189.70
CANEY CREEK FRS 13	Earth	Significant	Flood Control	11.3	185,022.30
BIG REEDY CREEK FRS 8	Earth	Low	Flood Control	8.8	111,013.40
CANEY CREEK FRS 6	Earth	High	Flood Control	14	246,696.40
CANEY CREEK FRS 9	Earth	Significant	Flood Control	12.8	166,520.10
CANEY CREEK MPS 2	Earth	Significant	Flood Control	10.4	712,582.50
SHORT CREEK FRS 8A	Earth	Low	Flood Control	12.5	99,912.00
CANEY CREEK FRS 5	Earth	Significant	Flood Control	11.9	209,691.90
CANEY CREEK FRS 12	Earth	Significant	Flood Control	8.2	339,207.50
WOLFORD LAKE DAM	Earth	Low	Recreation	15.9	599,472.20
CANEY CREEK FRS 10	Earth	Low	Flood Control	7	199,700.70
CANEY CREEK FRS 3	Earth	Low	Flood Control	11.3	357,709.70
CANEY CREEK FRS 7	Earth	Significant	Flood Control	11.6	273,833.00

Hardin County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
VALLEY CREEK MPS 4	Earth	High	Water Supply	13.4	2,257,271.80
VALLEY CREEK FRS 8	Earth	High	Flood Control	13.4	270,255.90
HARDIN CO. SPORTSMAN LAKE DAM	Earth	Significant	Recreation	7	194,890.10
SANDERS SPRING BRANCH FRS 5	Earth	Low	Flood Control	12.8	182,185.30
VALLEY CREEK FRS 12	Earth	High	Flood Control	11.3	141,850.40
VALLEY CREEK FRS 3	Earth	High	Flood Control	14	64,141.10
SANDERS SPRING RESERVOIR	Earth	Low	Recreation	11.3	80,176.30
C.L.RATCLIFF DAM	Earth	Low	Recreation	7.6	77,832.70
PARADISE DAM	Earth	Low	Recreation	4.6	108,546.40
DOUGLAS DAM (UPPER) 1	Earth	Low	Recreation	12.2	236,828.50
DOUGLAS DAM (LOWER) 2	Earth	Significant	Recreation	16.2	1,000,353.80
SANDER SPRING BRANCH STR #5	Earth	Low	Fish and Wildlife Pond	0	182,555.30
UPPER DOUGLAS STRUCTURE NUMBER 1	Earth	Low	Recreation	0	236,828.50
LOWER DOUGLAS STRUCTURE NO 2	Earth	Significant	Recreation	0	585,903.90

LaRue County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
LARUE CO. SPORTSMANS LAKE DAM	Earth	Low	Recreation	4	74,008.90
DIXIE STOCK FARM LAKE DAM	Earth	Low	Irrigation	5.5	43,171.90
NORTH FORK NOLIN RIVER MPS 3	Earth	High	Water Supply	15.9	1,461,676.00
DOUG SPROWLS LAKE DAM	Earth	Low	Recreation	4.9	29,603.60
WALTER SMITH LAKE DAM	Earth	Significant	Recreation	6.1	85,110.20
NORTH FORK NOLIN RIVER MPS 15	Earth	High	Recreation	15.5	506,961.00

Marion County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
MARION CO SPORTSMAN S DAM	Earth	Significant	Recreation	10.1	269,269.10
LEBANON IMPOUNDMENT 2	Gravity	Significant	Water Supply	1.8	50,572.80
LANGFORD DAM	Earth	High	Fire Protection, Stock, Or Small Fish Pond	10.1	68,088.20
MONTGOMERY DAM	Earth	Significant	"Fire Protection, Stock, Or Small Fish Pond"	9.1	62,414.20
GEORGE DAM	Earth	Low	Recreation	8.5	23,436.20
STAR HILL DISTILLERY DAM	Earth	Low	Other	10.7	101,145.50
JOHN ANGEL LAKE DAM	Earth	Significant	Recreation	7.9	16,775.40
LEBANON WATER WORKS (NEW)	Earth	High	Water Supply	23.8	3,562,295.60

Meade County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
DOE VALLEY LAKE DAM	Earth	Significant	Water Supply	29.6	15,252,003.10
GRAHAMTON LAKE DAM	Earth	Low	Recreation	6.1	123,348.20
HAYES DAM	Earth	Low	Recreation	8.5	124,828.40
GRAHAMTON LAKE DAM	Earth	Low	Recreation	0	123,348.20
TOBACCO LEAF LAKE DAM	Earth	Low	Recreation	0	61,674.10

Nelson County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
LAKE SYMPSON DAM	Rockfill	Significant	Water Supply	22.3	4,937,011.10
SPOOKY HOLLOW (LOWER) DAM	Earth	Significant	Recreation	5.8	76,475.90
HURRICANE LAKE DAM	Earth	Significant	Recreation	13.7	501,533.70
EAGLE LAKE DAM	Earth	Low	Recreation	7.3	250,396.80
T W SAMUELS DISTILLERY DAM 3	Earth	Low	Other	7	45,392.10
MELODY LAKE DAM	Earth	Low	Flood Control	7.9	511,895.00
TIMBER TRAILS LAKE DAM	Earth	Significant	Recreation	5.5	45,638.80
HEAVEN HILL DISTILLERY DAM	Earth	Low	Recreation	10.7	60,070.60
HOLT DAM	Earth	Low	Fire Protection, Stock, Or Small Fish Pond	8.2	79,312.90
BARTON DAM	Earth	Significant	Recreation	7	86,097.00
T W SAMUELS DISTILLERY DAM 1	Earth	Significant	Recreation	5.8	65,251.20
T W SAMUELS DISTILLERY DAM 2	Earth	Significant	Recreation	6.1	0
SPOOKY HOLLOW UPPER LAKE DAM	Earth	Significant	Recreation	6.4	0
BLOOMFIELD CITY PARK DAM	Earth	High	Recreation	7.9	35,400.90
STONE CREEK FARM DAM		Unknown	Recreation	9.8	664,846.70
MAYWOOD DAM		Low	Recreation	17.7	0

Washington County

Dam Name	Dam Type	Hazard Class	Main Purpose	Dam Height (m)	Normal Reservoir Storage (m3)
SPRINGFIELD RESERVOIR (OLD)	Earth	High	Water Supply	11	362,890.40
SPRINGFIELD RESERVOIR (NEW)	Earth	Low	Water Supply	10.1	705,058.20
WILLISBURG LAKE DAM	Earth	High	Recreation	23.5	2,900,532.60
SAM NALLY DAM	Earth	Low	Recreation	13.4	112,863.60
HAYS FARM LAKE DAM	Earth	Low	Recreation	9.1	14,801.80
JOHN BARBER DAM	Earth	Low	Recreation	7.9	21,956.00
HUGH L. GRUNDY FARM DAM	Earth	Low	Recreation	11.6	125,691.80
ST. ROSE LAKE (UPPER)	Earth	Low	Water Supply	9.1	92,511.10
ST. ROSE LAKE (LOWER)	Earth	Low	Water Supply	7.9	30,713.70
MORRISON O NAN FARM DAM	Earth	Low	Irrigation	7.9	45,638.80
GOODE PAY DAM	Earth	Low	Recreation	9.1	30,220.30
WILLIS WALKER FARM DAM	Earth	Low	Recreation	9.4	27,383.30
SAM SMITH DAM	Earth	High	Fire Protection, Stock, Or Small Fish Pond	6.1	49,832.70
TRUMAN LAWSON DAM	Earth	Low	Water Supply	8.5	31,207.10
LINCOLN HOMESTEAD DAM NO.2	Earth	Low	Recreation	7.9	75,242.40

Source: National Performance of Dams Program

3.3.4 Assessing Vulnerability: Potential Losses

I. Estimating Potential Losses:

The following section provides a compilation of potential economic and human losses that could occur because of a natural hazard in the Lincoln Trail Region. To determine this potential loss, the vulnerability (or risk) of a natural hazard must be determined and combined with the value of the assets, both human and economic. The resulting values are to be considered estimates, due to an overall lack of comprehensive and complete data (event data and asset value data) and the limited sophistication of the methodology. While considered restricted in their use, the values do allow for the identification of various scenarios and should be helpful in the relative evaluation and prioritization of any proposed mitigation strategies.

Vulnerability Methodology: A review of the profiled hazards and the assets inventory, leads to a need to determine which physical areas are the most vulnerable to risk, to best devise solutions and allocate resources to mitigate potential hazard events. This results in a two-phase approach. The first phase is the determination of the total potential economic and human cost of a particular event. In the second phase, these potential losses are allocated to the geographic areas that are identified with the highest risk for any natural hazard event.

A. Social Vulnerability: The published literature regarding natural hazard risk assessment notes that there is a definite social factor associated with each level of vulnerability of any area.¹ To incorporate this factor into the study the following methodology was used.

To establish a geographic area for the data used in this analysis, the basic US Census Bureau *Block* was used since it ensures the finest possible granularity. The statistical information used was available at this level for the entire LTADD region. The block boundaries used were defined by the 2020 Census. Some data is not, however, available at this level. That data is thus compiled at the level of geography indicated. This includes the Block Group and the County level geographies as defined by the US Census.

Table 3.3.4.1 - Social Vulnerability Source Units

<i>Social Vulnerability Category</i>	<i>Basic Unit</i>	<i>Source</i>
Under 18 Population (derivative of P0030001)	Block	2020 Census
Over 65 Population, B01001	Block Group	2019 5 Year ACS
Total Population, P0010001	Block	2020 Census
Family Poverty Population*	Block Group	2019 5 Year ACS
Housing Units (Occupied) H0010002	Block	2020 Census
Group Quarters (Institutionalized)**	Block	2020 Census
* B17010, Poverty Status Past 12 Months, presence of children under 18 years.		
**P0050002, Correctional, Juvenile, Nursing Facilities		

¹ See Cutter & Odeh.

Source dates also factor into the available data. Due to delays in collection and reporting of the 2020 Decennial Census, the 2019 American Community Survey information was used where available to provide the most current, available data. As an example, the 2019 American Community Survey 5-Year cycle for family units below poverty level by Block Group was used and included an economic standing risk in the calculations. This value was assigned to each Block that makes up the Block Group since the data is not available at a lower level. The values for each block were analyzed, according to its county as a whole, to generate a *Social Vulnerability (SV)* score². For example, the total population score for an individual block is determined as follows:

$$SV(\text{total pop}) = \left(\frac{\text{total pop in block}}{\text{total pop in county}} \right) / \left(\frac{\text{total pop in block}^{[max\ value]}}{\text{total pop in county}} \right) \quad \text{This}$$

calculation resulted in an SV score for each value in each block. The sum of these scores yields the *Total Social Vulnerability (TSV)* score for the block as a whole.

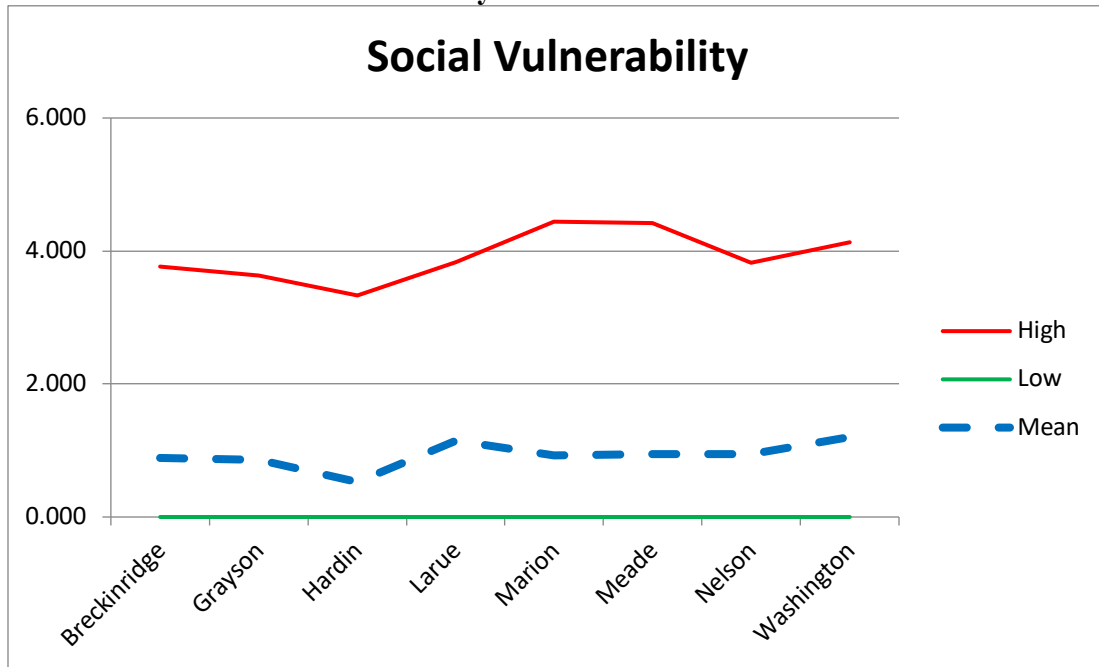
Below is a table that reflects the range and mean of the block scores for each county and for the region as a whole. A similar method is used for the Block Group and County level geographies as necessary based on data availability.

Table 3.3.4.2 - Social Vulnerability Scores

Geography	High	Low	Mean
Breckinridge	3.763	0.000	0.892
Grayson	3.636	0.000	0.862
Hardin	3.331	0.000	0.526
Larue	3.832	0.000	1.152
Marion	4.441	0.000	0.927
Meade	4.422	0.000	0.943
Nelson	3.818	0.000	0.942
Washington	4.130	0.000	1.202
Lincoln Trail	4.441	0.000	0.821
Note: Zero values are generally the result of no population in a block. This is typical for areas of open water but may occur in other areas of unused land.			

² Each block's score was determined on a county basis and not as regional value to better reflect the highest risk areas in the individual county. The following maps of the vulnerability are scaled based on region-wide values.

Chart 3.3.4.1 - Social Vulnerability



B. Geographic Vulnerability

Several of the natural hazard events determined to be a significant threat (section 3.3, table 3.3.1.1) to the Lincoln Trail Region, are not typically bound by geography. The risk potential is therefore assumed to be the same throughout the Region for all natural hazards except for ones that generally have a specific geographic component such as karst (sinkholes), landslides / subsidence, earthquakes and especially flooding. Flooding (except for some flash flooding and Dam failure related flooding) is considered to be confined to the predetermined flood zones as defined by the FEMA DFIRM mapping data.

Because of its significant threat to the region, flooding is used for mapping and analysis. This version also includes a value score for data that is available for karst terrain, earthquakes, and landslides.

To determine the *Geographic Vulnerability (GV)* score, the US Census block polygons from the 2010 Census were used. The historic frequencies for each county from the “Hazard Frequency Table” 3.3.2.1 were assigned to the individual blocks for non-geographic specific events. For events that are geographically based blocks, values were assigned based on the referenced geographic type as a percentage of each block area, for karst and landslide (slopes greater than 5%.) For earthquakes it was based on the Peak Ground Acceleration zone the centroid of the block was located in. For flooding it was allocated based on the presence of a 100 or 500-year flood zones in each block.

Table 3.3.4.3 - Geographic Vulnerability Source Units

Geographic Vulnerability Category	Basic Unit	Range	Source
Hail	Block	county wide	NEIC, NCDC & SHELDUS Cumulative as reported in tables in previous sections.
Lightning	Block	county wide	
Snow / Ice	Block	county wide	
Tornado	Block	county wide	
Thunderstorm	Block	county wide	
Flooding	Block	100 & 500 Year Flood Plains	FEMA DFIRM 2007 - 2011
Karst	Block	Mapped Karst based on 1:24K USGS Topographic Maps	KY Geological Survey, 2003
Landslide / Subsidence	Block	Areas of Slope Greater than 5% based on 30ft Digital Elevation Models	US Geological Survey, 2000
Earthquake	Block	Peak Ground Acceleration - 2% probability of exceedance in 50 years.	US Geological Survey, 2014

Table 3.3.4.4 – Geographic Specific Event Factors

	County Wide				
	Hail	Lightning	Snow_Ice	Tornado	Thunderstorm
Breckinridge	1.4701	0.429752	0.747967	0.276423	4.380165
Grayson	1.513	0.528926	0.796748	0.256	3.584
Hardin	1.9316	0.561983	0.878049	0.422764	5.674419
Larue	1.0076	0.545455	0.715447	0.172662	3.586777
Marion	1.0579	0.585366	0.601626	0.211382	3.53719
Meade	1.1128	0.46281	0.764228	0.227642	3.804878
Nelson	1.405	0.682927	0.780488	0.227642	4.892562
Washington	0.9091	0.585366	0.764228	0.178862	3.305785

Table 3.3.4.4 – Geographic Specific Event Factors (cont.)

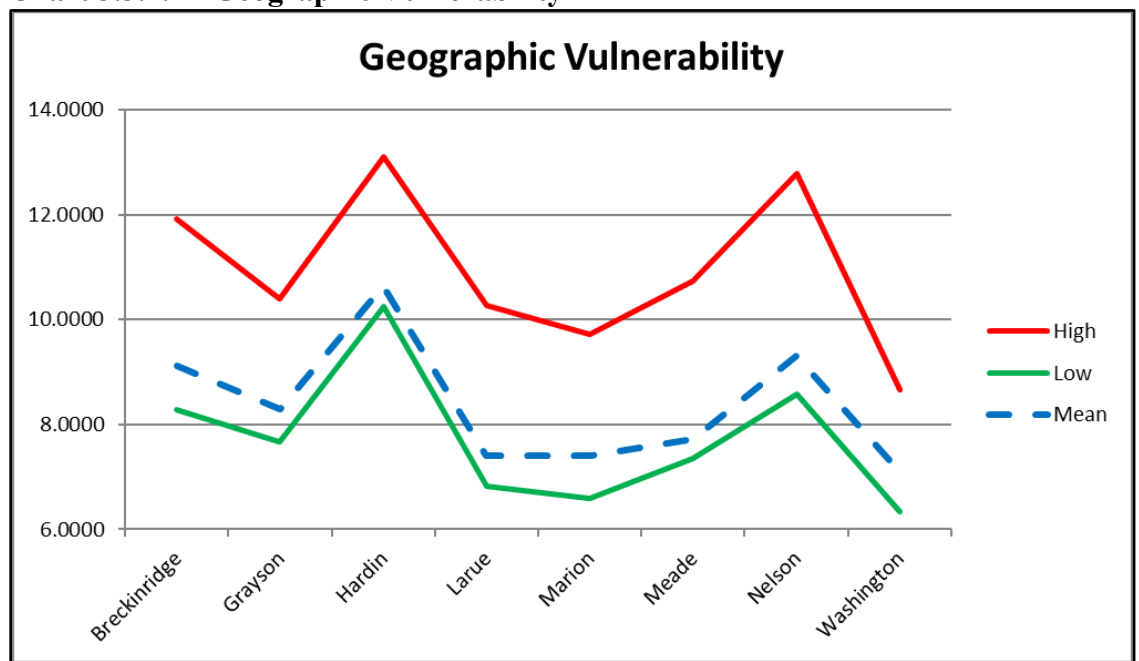
	Geographic Specific			
	Flooding	Karst	Landslide/Subsidence	Earthquake
Breckinridge	1 for 100 year, 0.2 for 500 year	County-wide score value calced against Karst acres per block as a %	County-wide score value calced against Slope acres per block as a %	PGA Value from USGS:
Grayson				
Hardin				
Larue				6% *g = 0.589
Marion				8% *g = 0.785
Meade				10% *g = 0.981
Nelson				12% *g = 1.177
Washington				14% *g = 1.373

The total GV score (*TGV*) is determined by the sum of the GV score for each of the hazard event types used.

Table 3.3.4.5 - Geographic Vulnerability Scores

Geographic Vulnerability Scores	High	Low	Mean
Breckinridge	11.9120	8.2854	9.1195
Grayson	10.3964	7.6597	8.2928
Hardin	13.1060	10.2536	10.6314
Larue	10.2624	6.8127	7.4014
Marion	9.7166	6.5821	7.3995
Meade	10.7311	7.3534	7.7260
Nelson	12.7734	8.577219	9.3005
Washington	8.6651	6.3319	7.1049
Lincoln Trail	13.1060	6.3319	9.0095

Chart 3.3.4.2 - Geographic Vulnerability



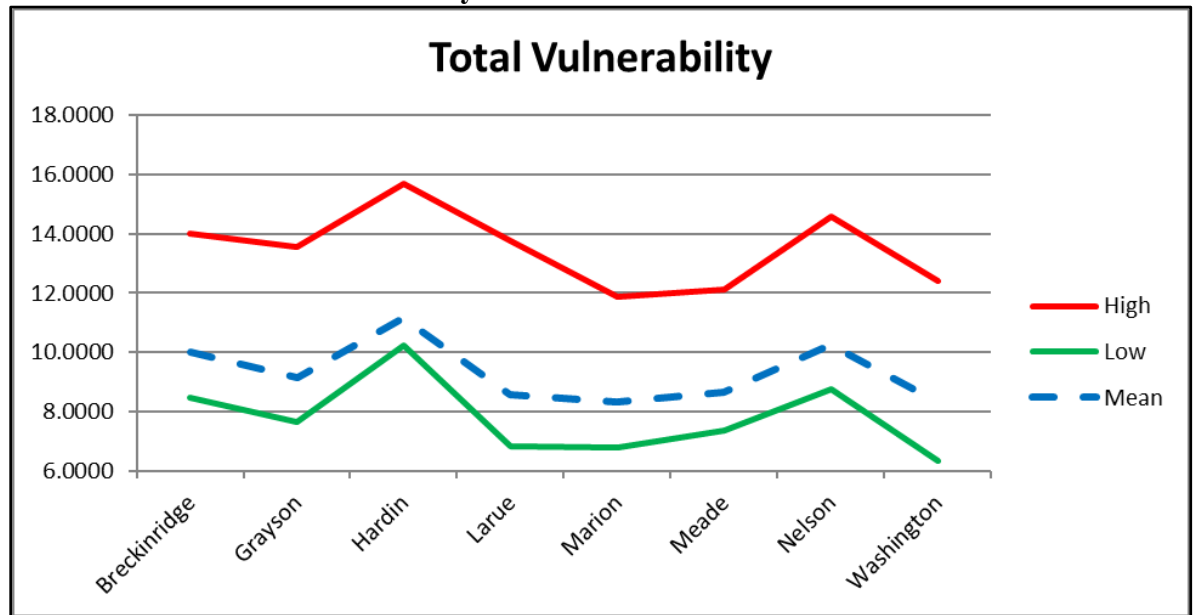
C. Total Vulnerability Score

The factor of the SV and GV yields the *Total Vulnerability (TV)* score for each Census block.

Table 3.3.4.6 - Total vulnerability Scores

Total Vulnerability Scores	High	Low	Mean
Breckinridge	13.9971	8.4816	10.0112
Grayson	13.5766	7.6597	9.1543
Hardin	15.6802	10.2536	11.1577
Larue	13.7499	6.8127	8.5533
Marion	11.8854	6.7783	8.3267
Meade	12.1072	7.3534	8.6692
Nelson	14.5919	8.7734	10.2428
Washington	12.3903	6.3319	8.3071
Lincoln Trail	15.6802	6.331941	9.8308

Chart 3.3.4.3 - Total Vulnerability



This score allows a determination of the relative vulnerability of each block to a hazard event. The scores were classified using an equal interval method of four categories. The classification ranges are as follows:

Low	6.331941 - 8.669011
Moderate	8.669012 - 11.006080
High	11.006081 - 13.343150
Extreme	13.343151 - 15.680219 (maximum value)

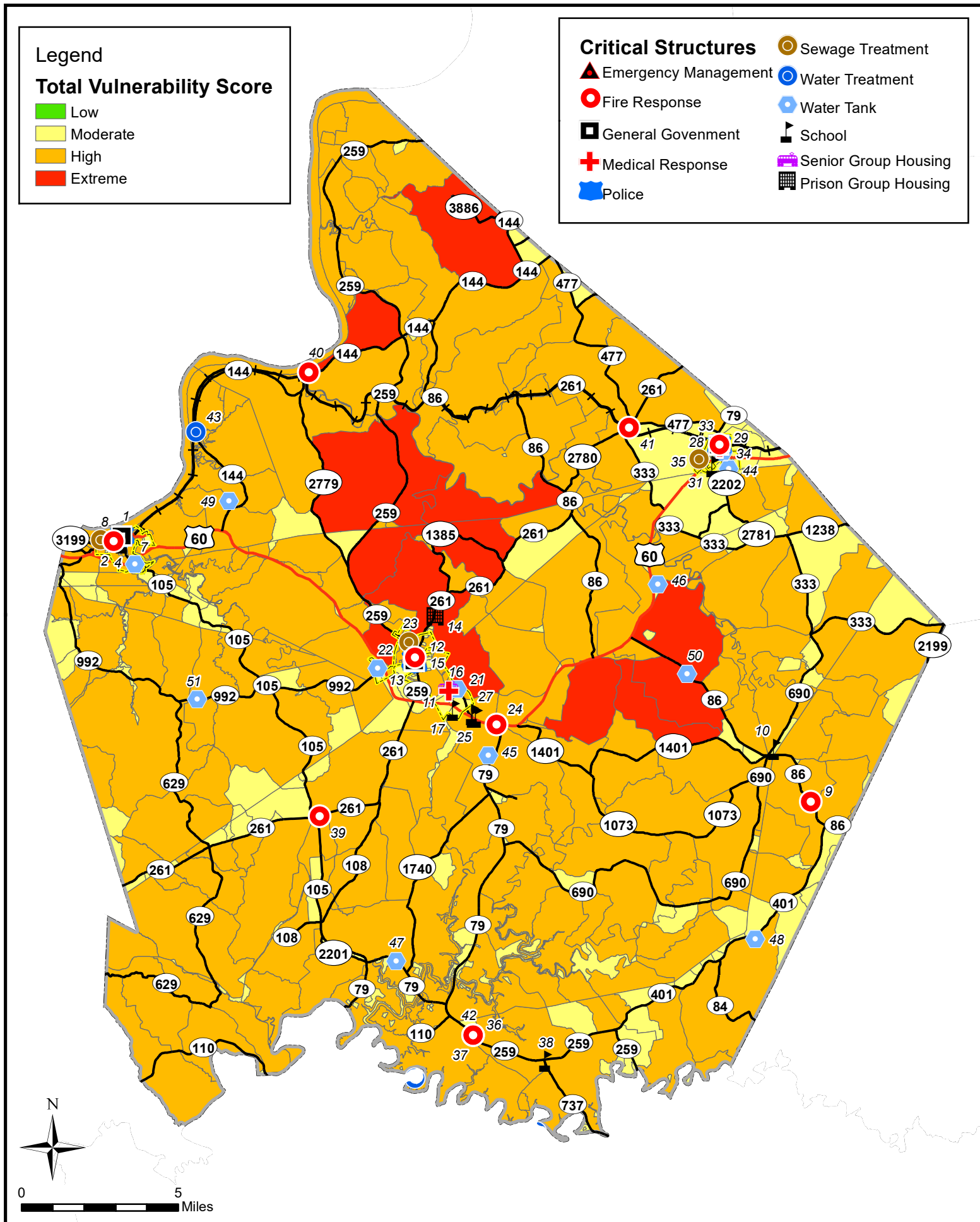
The results of this analysis aids in providing focus areas for the evaluation of current mitigation strategies and implementation of future strategies. The following table and individual entity maps illustrate the block vulnerability for each county and plot, and the critical structures that currently fall within the extreme or high zones.

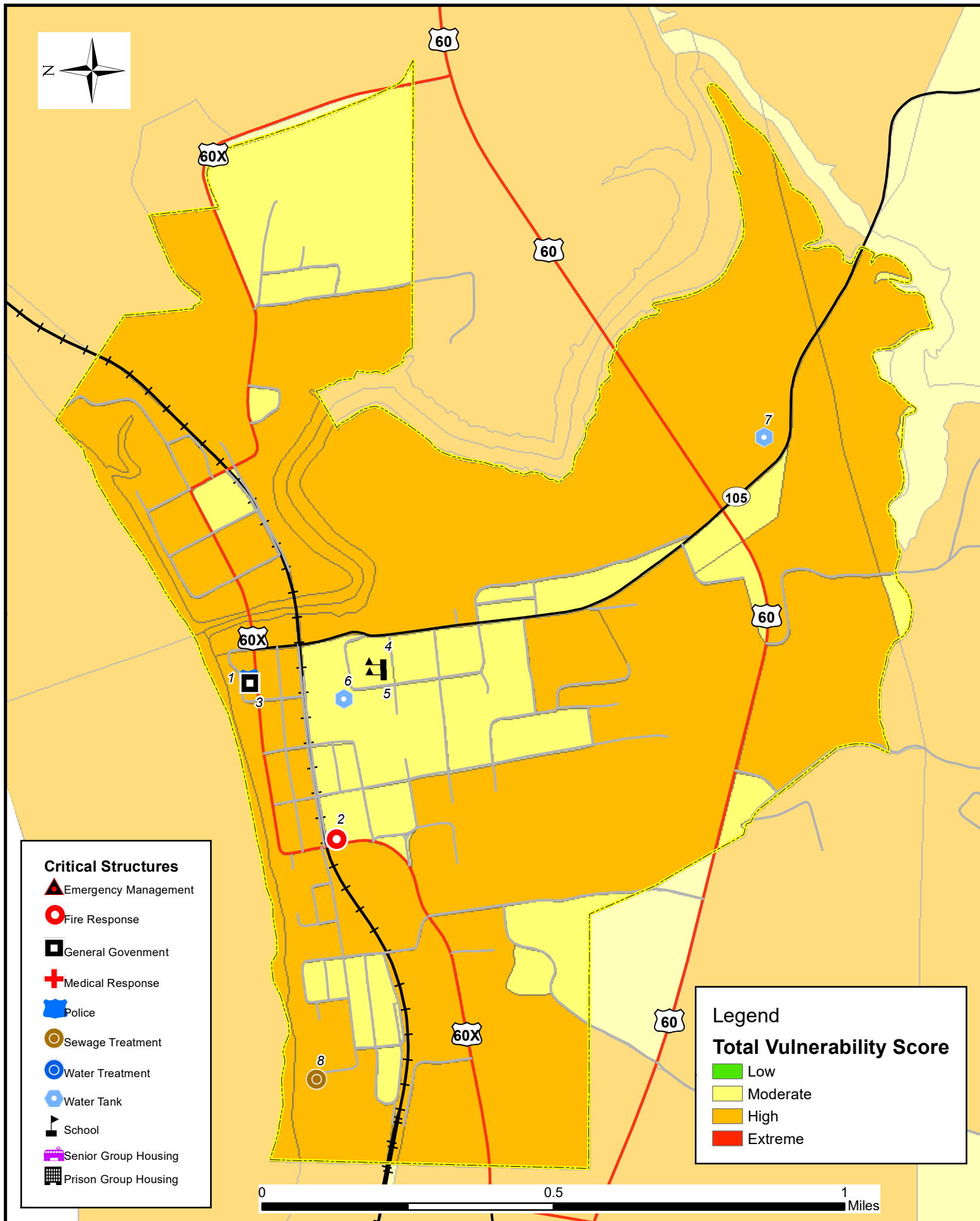
Table 3.3.4.7 - Critical Facilities located in combined Socially and Geographically Vulnerable Area by County.

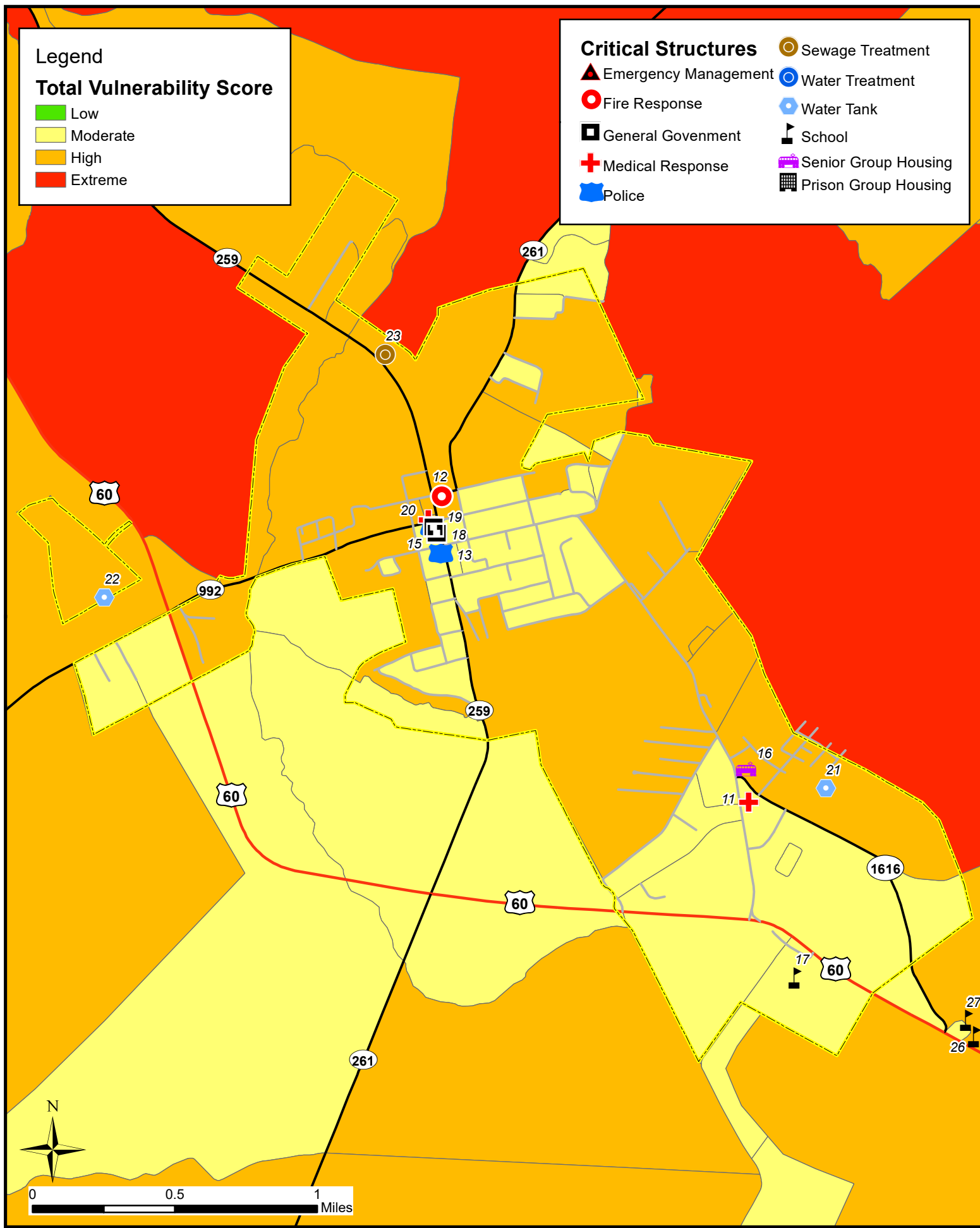
Breckinridge County

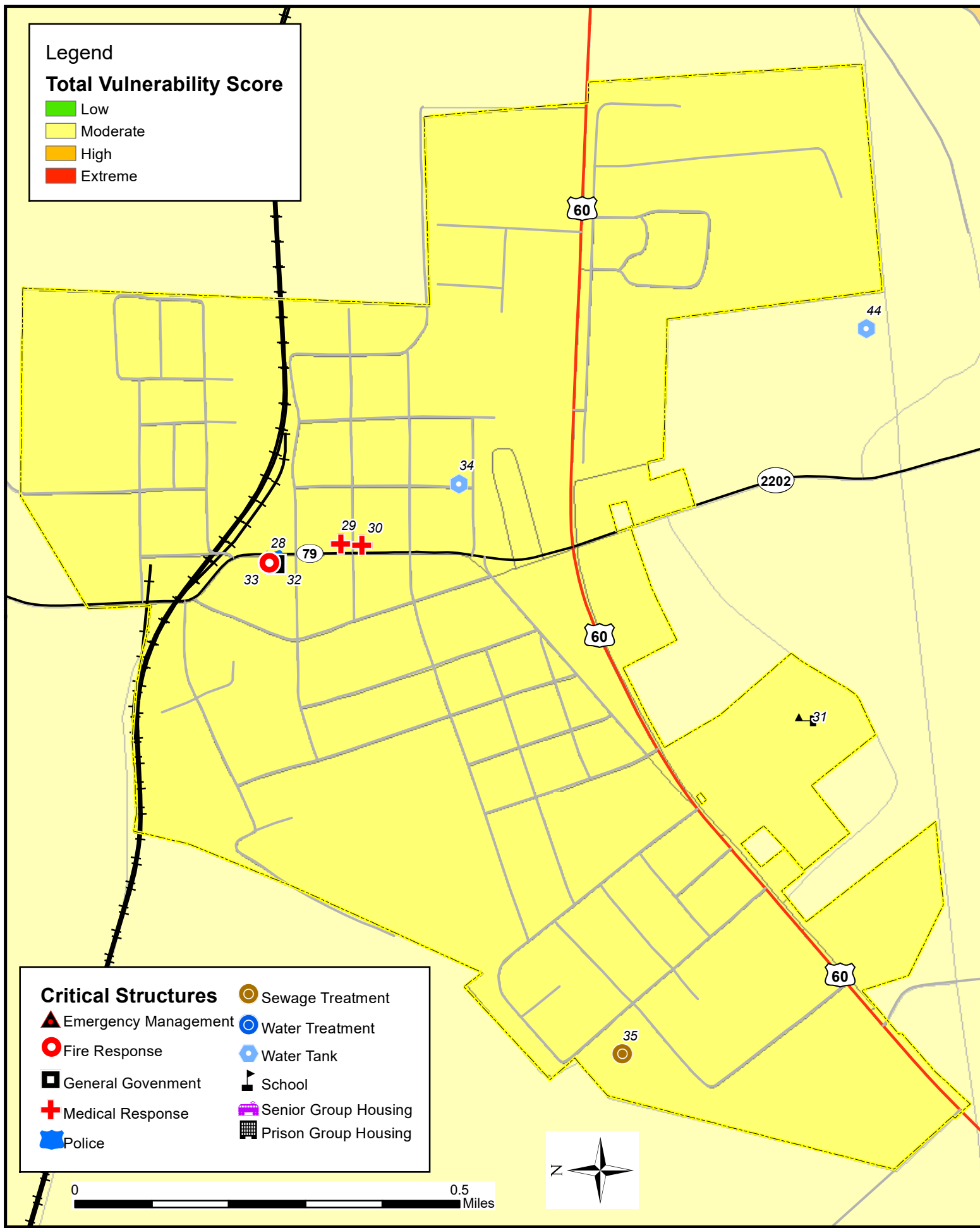
Map #	Facility	Function	Vulnerability Zone
1	Cloverport Police	Police	Moderate
2	Cloverport VFD	Fire Response	Moderate
3	Cloverport City Hall	General Government	Moderate
4	Frederick Fraize High School	School	Moderate
5	William H Natcher Elementary School	School	Moderate
6	Elevated Tank	WT	Moderate
7	Standpipe Tank	WT	Moderate
8	Cloverport STP	STP	Moderate
9	Custer Fire Dept	Fire Response	High
10	Custer Elementary School	School	Moderate
11	Breckinridge Memorial Hospital	Medical Response	Moderate
12	Hardinsburg VFD	Fire Response	Moderate
13	Hardinsburg Police	Police	Moderate
14	Breckinridge County Jail	Prison Group Housing	High
15	Breckinridge County Sheriff	Police	Moderate
16	Medco Center	Senior Group Housing	Moderate
17	Hardinsburg Elementary School	School	Moderate
18	Hardinsburg City Hall	General Government	Moderate
19	Breckinridge County Courthouse	General Government	Moderate
20	Breckinridge County Health Department	Medical Response	Moderate
21	Fairgrounds Rd.	WT	High
22	Industrial Park	WT	Moderate
23	Hardinsburg STP	STP	High
24	Harned VFD	Fire Response	Low
25	Breckinridge County High School	School	Moderate
26	Breckinridge County Area Technology Center	School	Moderate
27	Breckinridge County MIDDLE SCHOOL	School	Moderate
28	Irvington Police	Police	Moderate
29	Irvington Area Emergency Medical HQ	Medical Response	Moderate
30	Irvington Area Ambulance Service	Medical Response	Moderate
31	Irvington Elementary School	School	Moderate
32	Irvington City Hall	General Government	Moderate
33	Irvington VFD	Fire Response	Moderate

34	Irvington Water Tank	WT	Moderate
35	Irvington WWTP	STP	Moderate
36	Mcdaniels Ems Fire & Rescue Service	Medical Response	Moderate
37	Mcdaniels Fire-Rescue, Inc.	Fire Response	Moderate
38	Ben Johnson Elementary School	School	High
39	Mcquady VFD	Fire Response	Moderate
40	Stephensport VFD	Fire Response	Moderate
41	Webster VFD	Fire Response	Moderate
42	Mcdaniels VFD	Fire Response	Moderate
43	Hardinsburg WTP	WTP	Moderate
44	Sam Dowell Rd	WT	Moderate
45	Ben Wright	WT	Moderate
46	Irvington	WT	Moderate
47	Axtel	WT	High
48	Hudson	WT	Moderate
49	Persimmon Flats Tank	WT	Moderate
50	Stinnettsville Tank	WT	High
51	Balltown	WT	Moderate





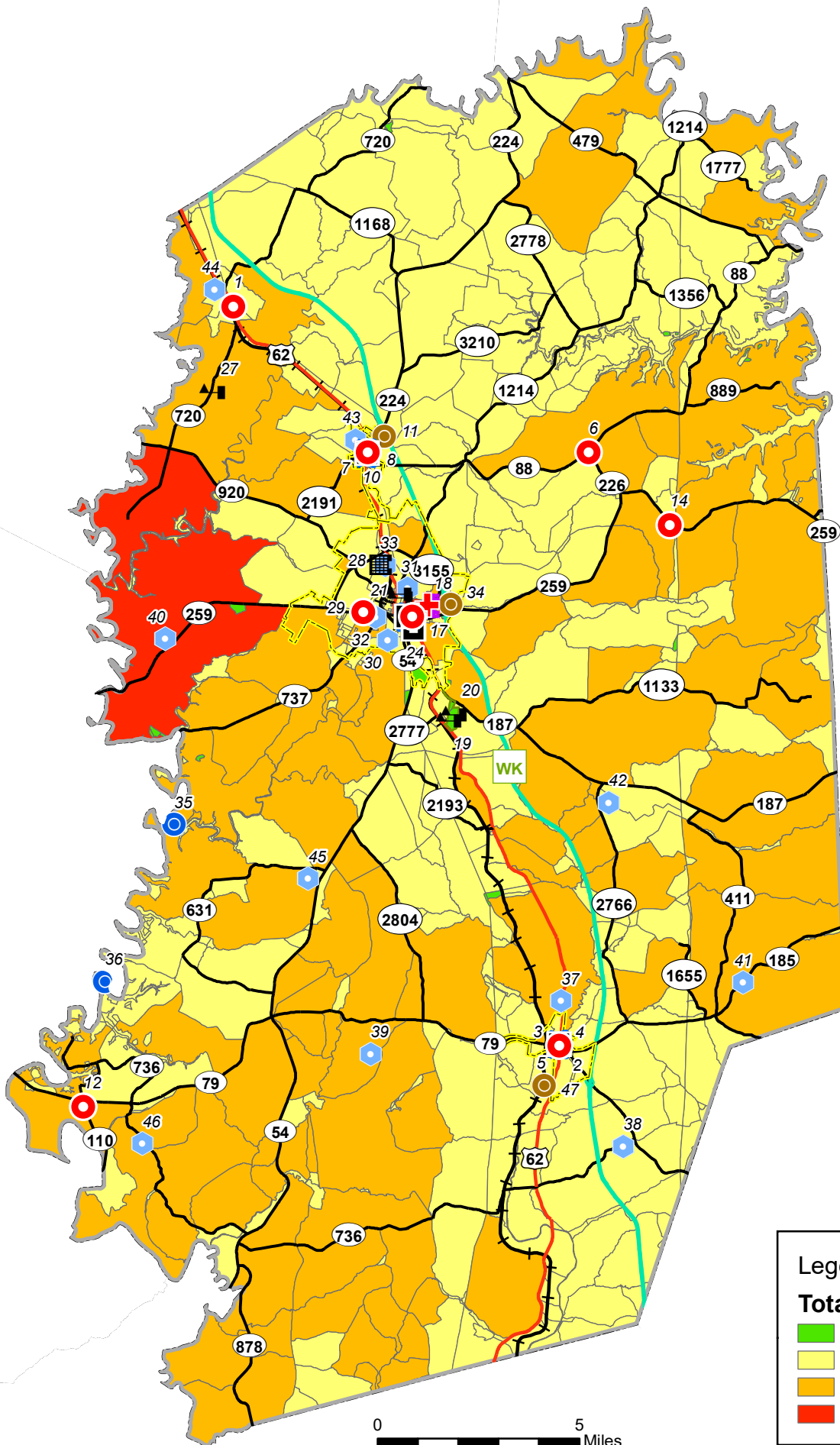




Grayson County

Map #	Facility	Function	Vulnerability Zone
1	East Grayson County Fire Dept	Fire Response	Low
2	Caneyville VFD	Fire Response	Moderate
3	Caneyville Police	Police	Moderate
4	Caneyville City Hall	General Government	Moderate
5	Caneyville Elementary School	School	Moderate
6	Wax Fire Dept	Fire Response	Moderate
7	Clarkson Police	Police	Low
8	Clarkson VFD	Fire Response	Low
9	Clarkson Elementary School	School	Low
10	Clarkson City Hall	General Government	Low
11	Clarkson WWTP	STP	Low
12	Falls Of Rough VFD	Fire Response	Moderate
13	Leitchfield Pd	Police	Moderate
14	Aneta Fire Dept	Fire Response	Moderate
15	Grayson County Sheriff	Police	Low
16	Grayson County Jail	Prison Group Housing	Moderate
17	Leitchfield VFD	Fire Response	Moderate
18	Twin Lakes Regional Medical Center	Medical Response	High
19	Oran P Lawler Elementary School	School	Low
20	Grayson County High School	School	Low
21	H W Wilkey Elementary School	School	Moderate
22	Grayson County Middle School	School	Moderate
23	Grayson County Courthouse	General Government	Moderate
24	Leitchfield City Hall	General Government	Low
25	Grayson County Health Department	Medical Response	Moderate
26	Grayson Manor Nursing Home	Senior Group Housing	High
27	St. Paul Elementary School	School	High
28	Grayson County Correctional Facility	Prison Group Housing	Moderate
29	Leitchfield VFD	Fire Response	Low
30	Sunbeam Rd.	WT	Moderate
31	School St.	WT	Moderate
32	Orchard St.	WT	High
33	Detention Center	WT	Moderate
34	Leitchfield WWTP	STP	Moderate
35	Leitchfield	WTP	Moderate

36	Grayson County	WTP	Low
37	Hwy 62 East	WT	Moderate
38	Windy Ridge	WT	Moderate
39	Post Tousey	WT	Moderate
40	Conklin School	WT	Extreme
41	Hwy 185	WT	High
42	Shrewsbury (Out of Service)	WT	Moderate
43	Clarkson	WT	Moderate
44	Big Clifty	WT	Moderate
45	Duff Rd	WT	Moderate
46	Lone Hill	WT	Moderate
47	Caneyville WWTP	STP	Moderate



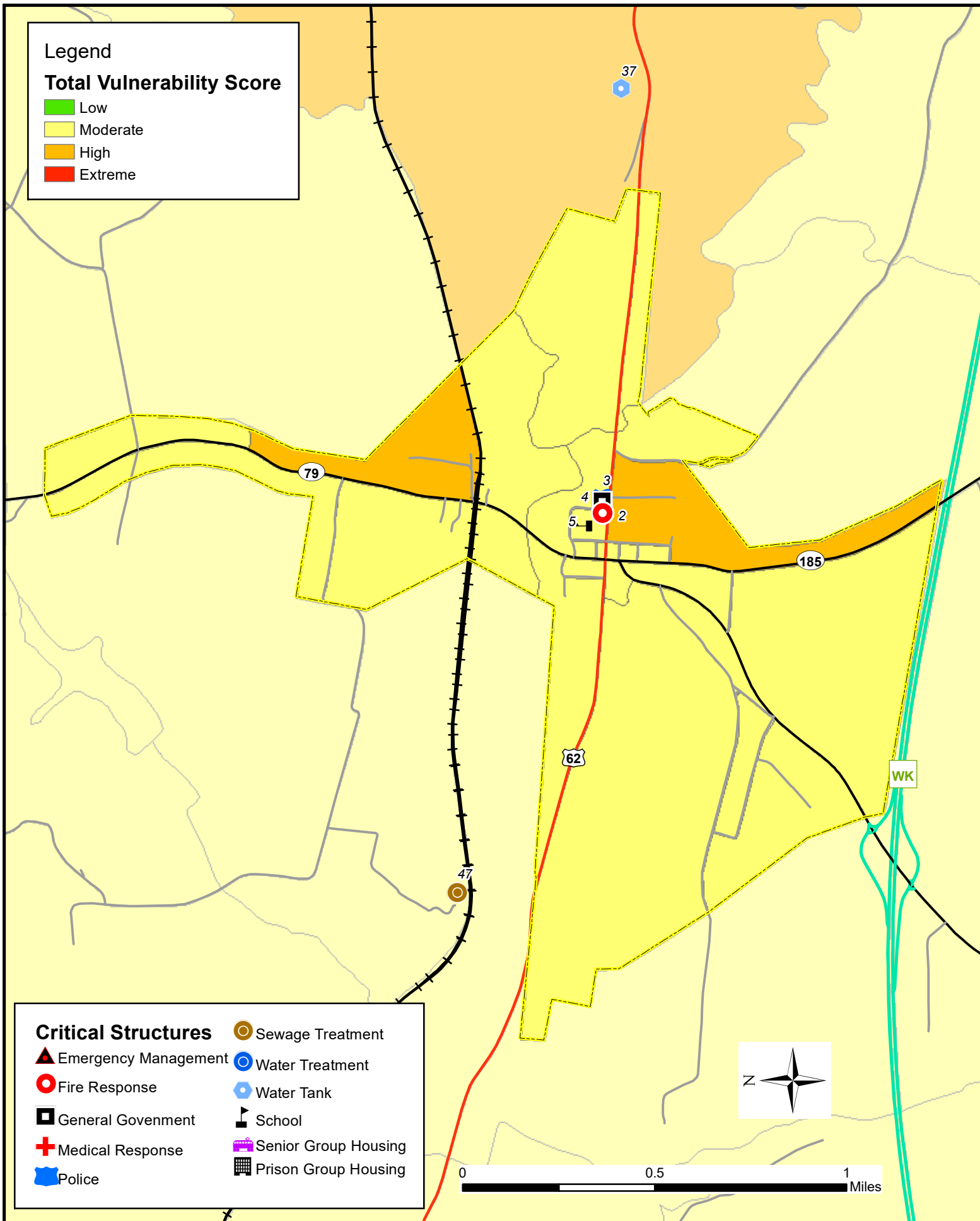
Critical Structures

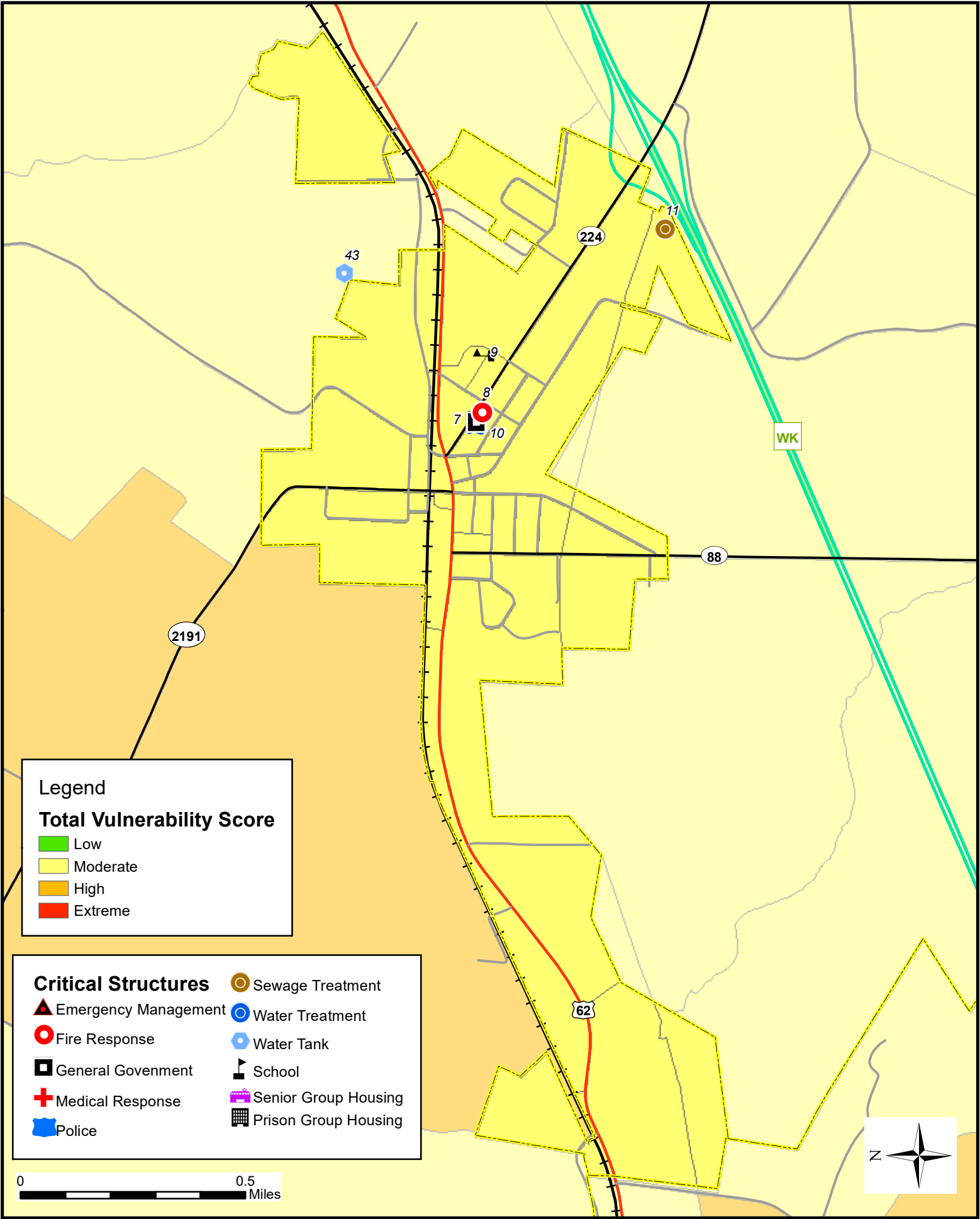
- Emergency Management
- Fire Response
- General Government
- Medical Response
- Police
- Sewage Treatment
- Water Treatment
- Water Tank
- School
- Senior Group Housing
- Prison Group Housing

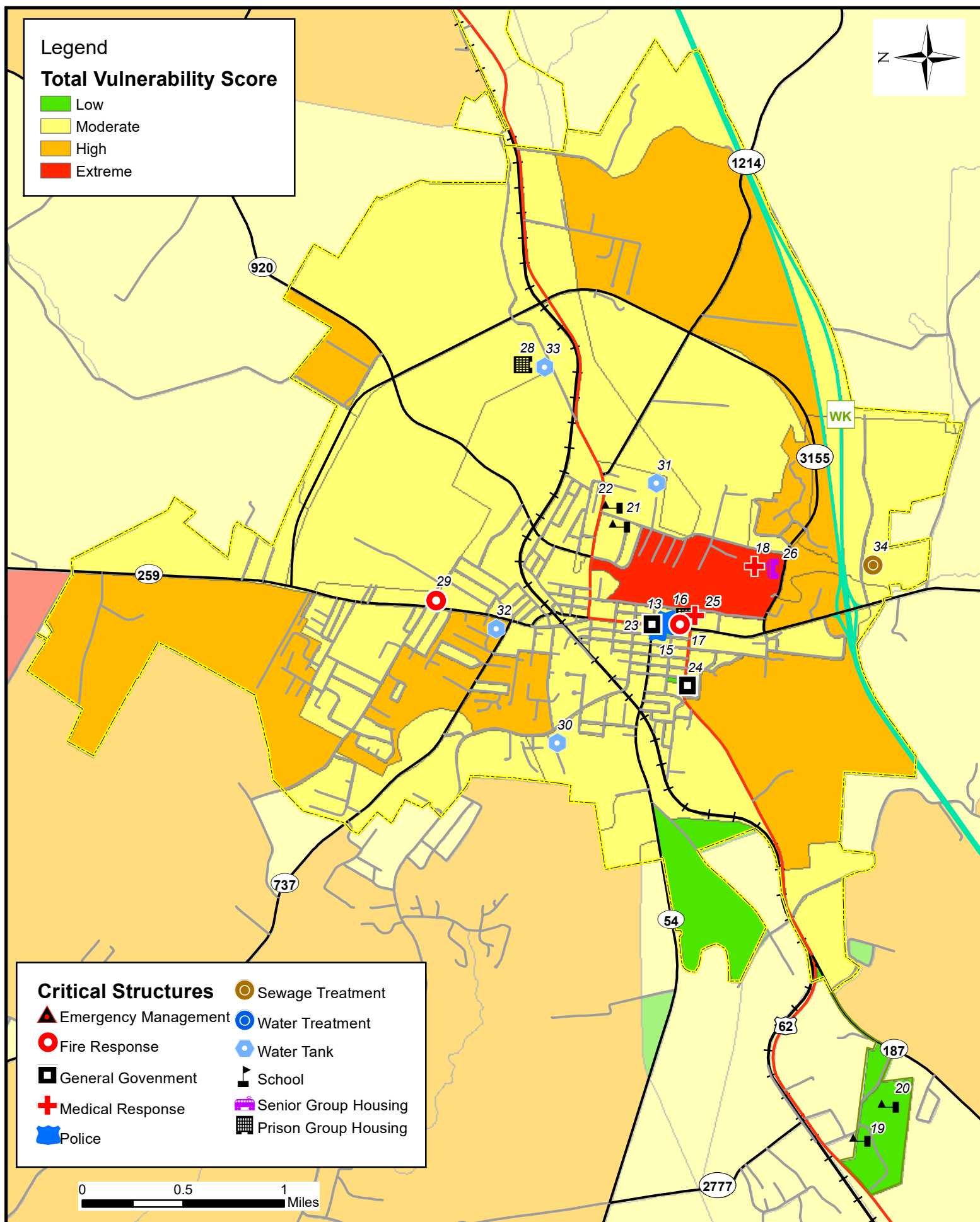
Legend

Total Vulnerability Score

- Low
- Moderate
- High
- Extreme







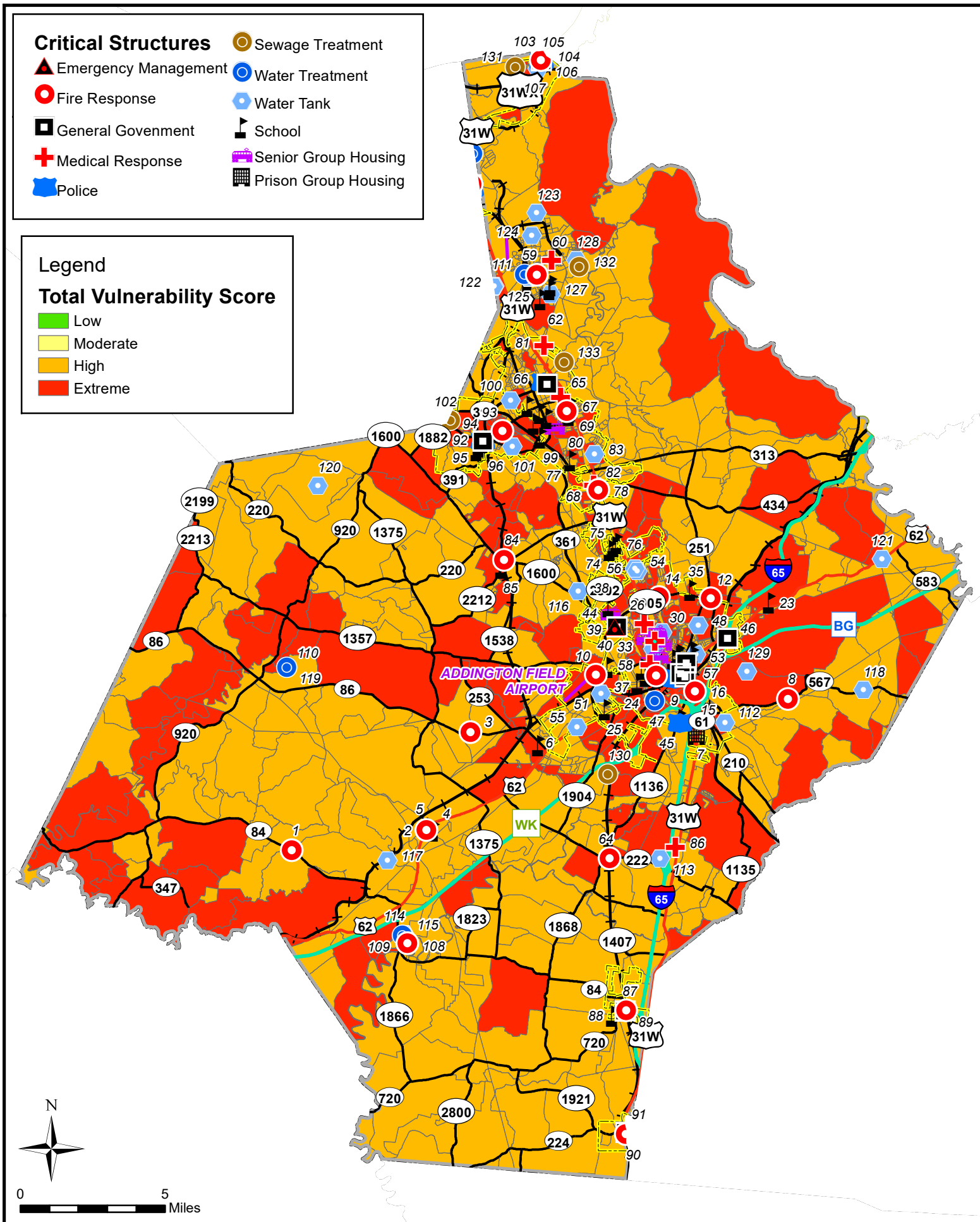
Hardin County

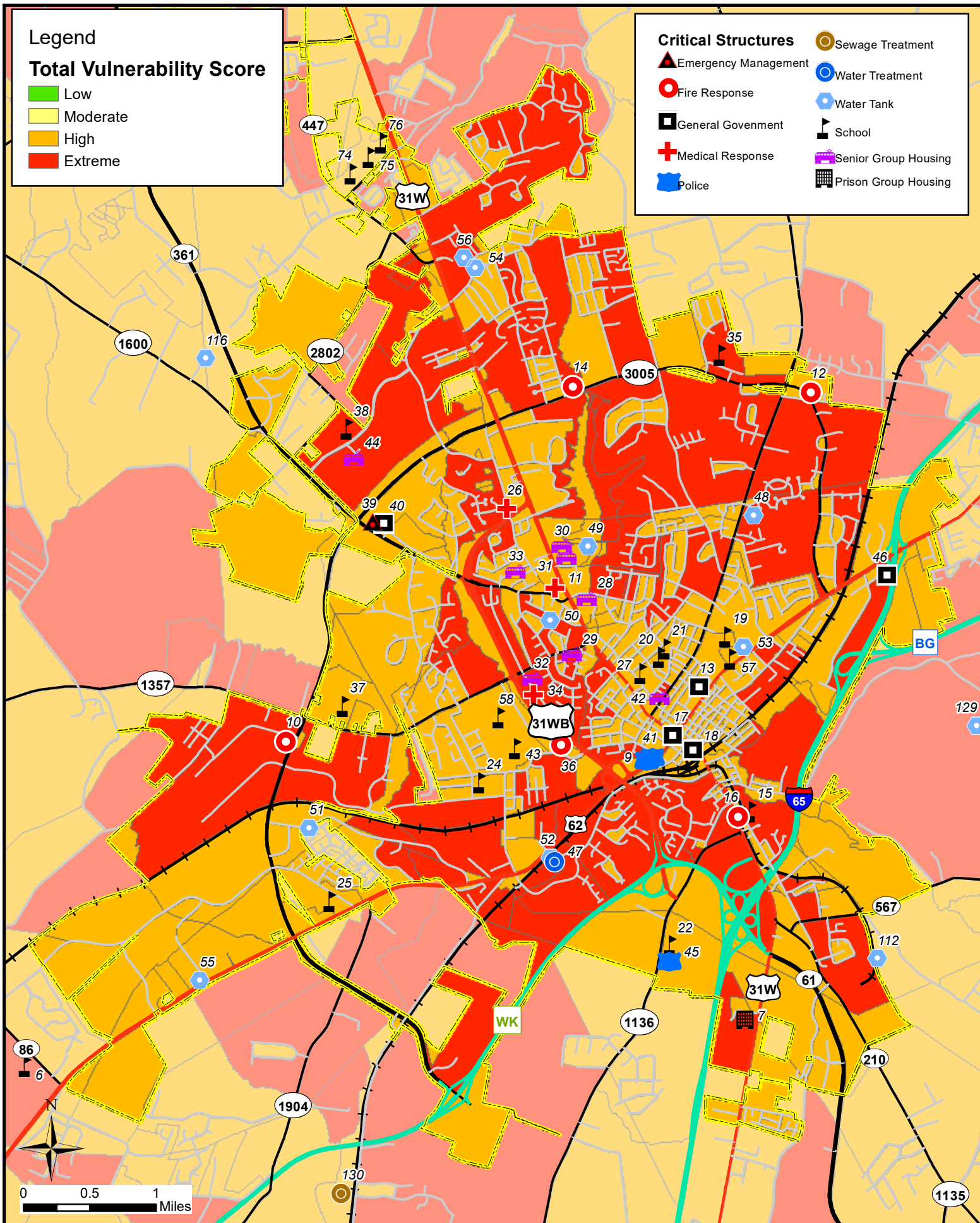
Map #	Facility	Function	Vulnerability Zone
1	West 84 Fire Dept	Fire Response	Moderate
2	Stephensburg VFD	Fire Response	High
3	Kentucky 86 Fire Dept	Fire Response	High
4	Lakewood Elementary School	School	High
5	West Hardin Middle School	School	Moderate
6	Cecilia Valley Elementary School	School	High
7	Hardin County Jail	Prison Group Housing	High
8	Valley Creek Fire Dept	Fire Response	Moderate
9	Elizabethtown Police	Police	High
10	Elizabethtown Fire Station #1	Fire Response	High
11	Hardin Memorial Hospital	Medical Response	Moderate
12	Central Hardin County Fire Dept	Fire Response	High
13	National Guard Armory	General Government	High
14	Elizabethtown Fire Station #3	Fire Response	High
15	Valley View Education Center	School	High
16	Elizabethtown Fire Station #2	Fire Response	High
17	Elizabethtown City Hall	General Government	Moderate
18	Hardin County Justice Center	General Government	High
19	Elizabethtown High School	School	High
20	Morningside Elementary School	School	Moderate
21	T. K. Stone Middle School	School	Moderate
22	East Hardin Middle School	School	High
23	Lincoln Trail Elementary School	School	High
24	Hardin Alternative School	School	High
25	Central Hardin High School	School	High
26	Lincoln Trail District Health Department	Medical Response	High
27	Elizabethtown Christian Academy	School	High
28	Helmwood Healthcare Center	Senior Group Housing	Moderate
29	Kennington Manor	Senior Group Housing	High
30	Healthsouth Rehab Center	Senior Group Housing	High
31	Atria Assisted Living	Senior Group Housing	High
32	Morningside Gardens Assisted Living	Senior Group Housing	High
33	Taylor Made Assisted Living	Senior Group Housing	High
34	Hardin Co. Health Center	Medical Response	High
35	Heartland Elementary	School	High

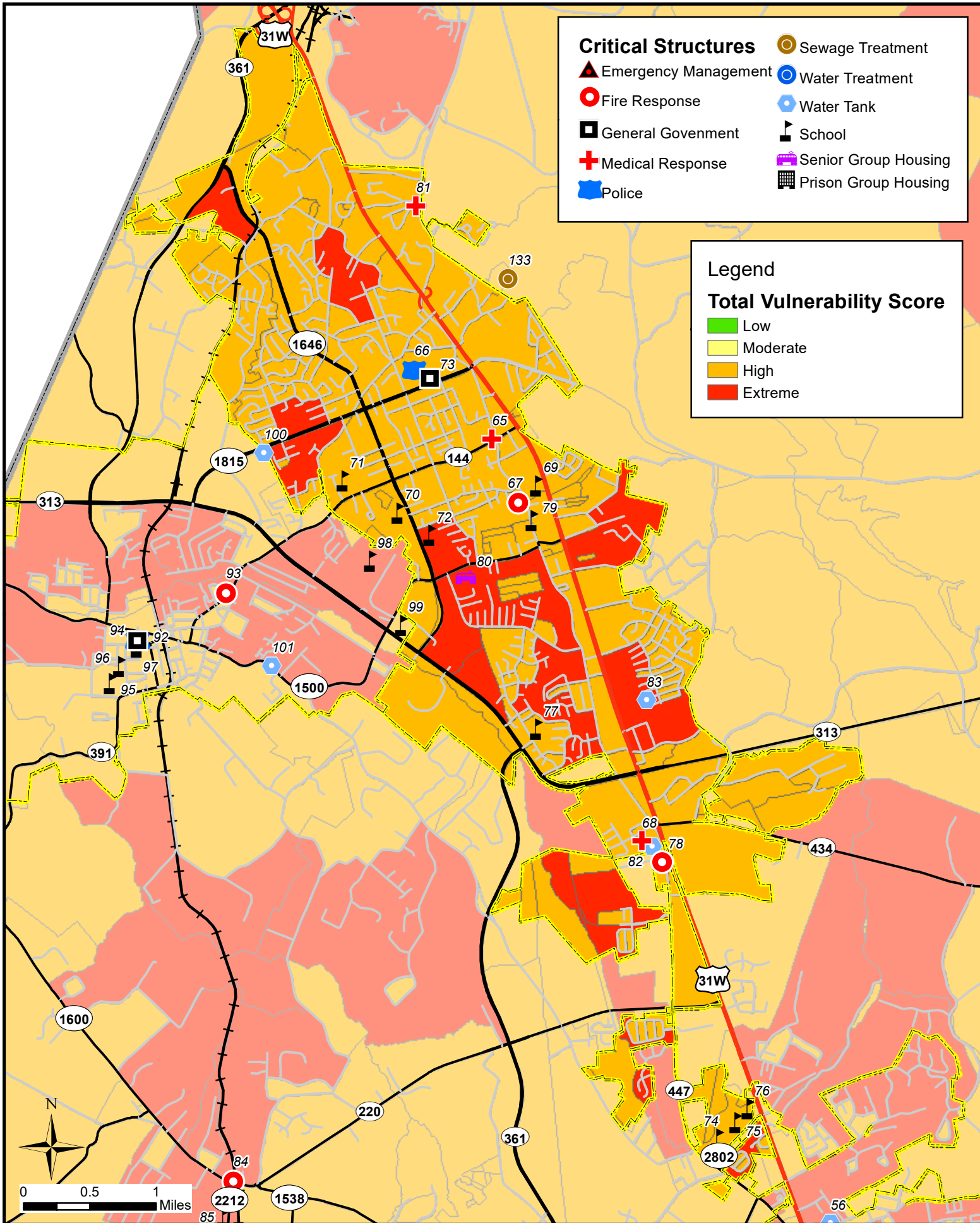
36	Central Kentucky Fire Training Center	Fire Response	High
37	G C Burkhead Elementary School	School	High
38	St James Elementary School	School	Extreme
39	Hardin County Emergency Management	Emergency Management	High
40	Hardin County Government Center	General Government	High
41	Elizabethtown Police Dept	Police	High
42	Communicare Assisted Living	Senior Group Housing	High
43	Elizabethtown Community & Technical College	School	High
44	Robin Brooke Assisted Living	Senior Group Housing	High
45	KSP Post 4	Police	High
46	State Driver's License Office	General Government	High
47	City Springs	WTP	High
48	Pear Orchard	WT	Extreme
49	Freeman Lake WTP	WT	High
50	Helmwood Tank	WT	High
51	Peterson Drive Tower	WT	High
52	City Springs Water Plant Clearwell	WT	High
53	Mulberry Tank	WT	High
54	Oaklawn	WT	High
55	Cecilia Tank	WT	Moderate
56	Pear Orchard Tank	WT	High
57	Panther Academy	School	High
58	Early College and Career Center	School	High
59	Fort Knox Fire Dept	Fire Response	Moderate
60	Ireland Army Hospital	Medical Response	Moderate
61	Scott Middle School	School	Moderate
62	Macdonald Intermediate School	School	High
63	Fort Knox High School	School	Moderate
64	Glendale Fire Dept	Fire Response	Moderate
65	Hardin County Ambulance Service, North Hardin	Medical Response	High
66	Radcliff Police	Police	High
67	Radcliff FD #1	Fire Response	High
68	Lincoln Trail Hospital	Medical Response	High
69	Radcliff Middle School	School	Moderate

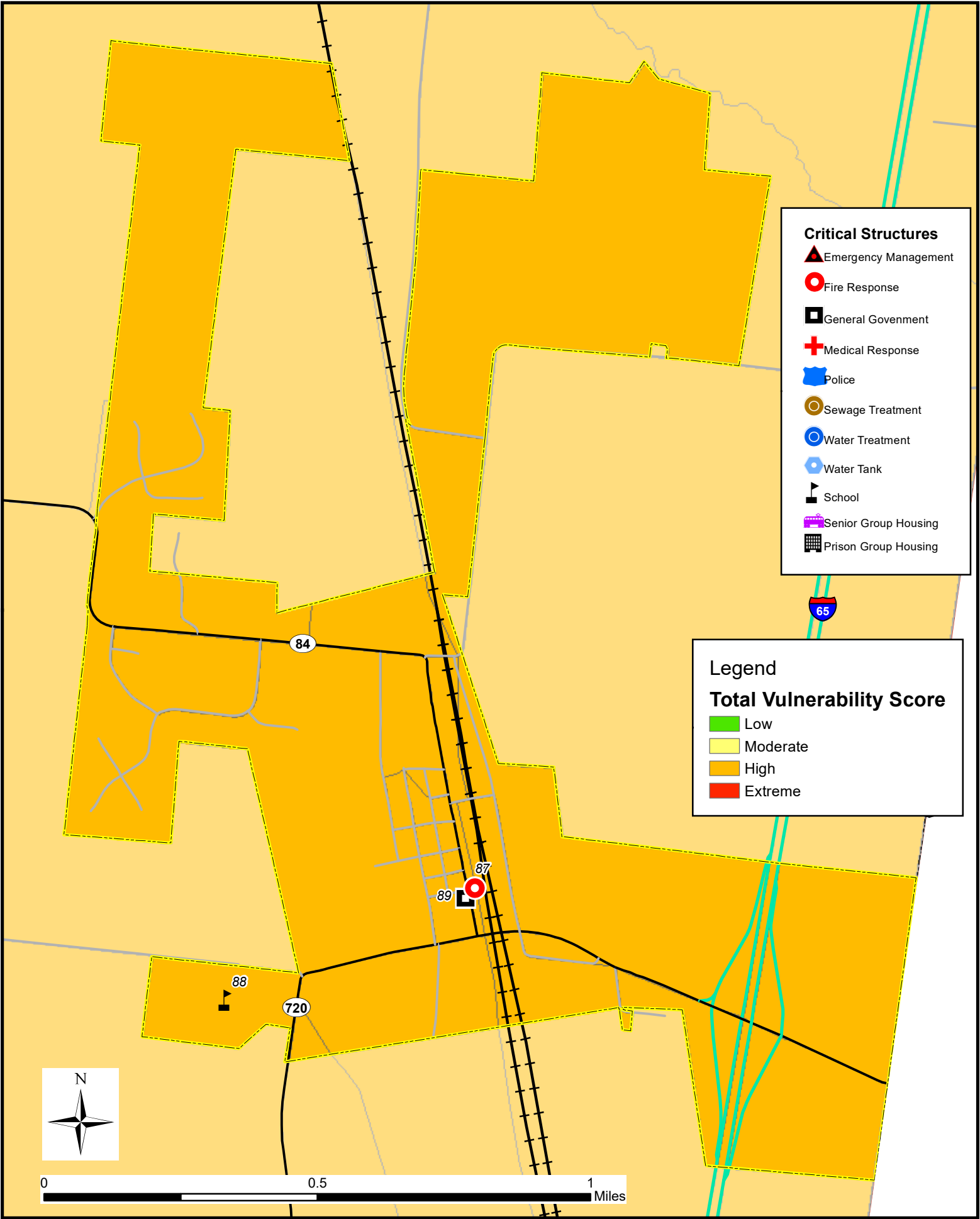
70	North Hardin High School	School	High
71	Meadow View Elementary School	School	High
72	Parkway Elementary School	School	High
73	Radcliff City Hall	General Government	High
74	John Hardin High School	School	Moderate
75	Bluegrass Middle School	School	Moderate
76	New Highland Elementary School	School	Moderate
77	Woodland Elementary School	School	High
78	Radcliff FD #2	Fire Response	High
79	St. Christopher Elementary School	School	Moderate
80	North Hardin Health & Rehab Center	Senior Group Housing	Extreme
81	Hardin County Health Department	Medical Response	High
82	Longview	WT	High
83	Whispering Hills	WT	High
84	Rineyville Fire Dept	Fire Response	High
85	Rineyville Elementary School	School	High
86	Hardin County Ambulance Service, South Hardin	Medical Response	High
87	Sonora Fire Dept	Fire Response	Moderate
88	Creekside Elementary School	School	Moderate
89	Sonora City Hall	General Government	Moderate
90	Upton Fire Dept	Fire Response	Moderate
91	Upton City Hall	General Government	Moderate
92	Vine Grove Police	Police	Moderate
93	Vine Grove Fire Dept	Fire Response	Moderate
94	Vine Grove City Hall	General Government	Moderate
95	James T. Alton Middle School	School	Moderate
96	Vine Grove Elementary School	School	Moderate
97	Brown Street Center	School	Moderate
98	North Middle School	School	High
99	North Hardin Christian School	School	Moderate
100	Lincoln Trail	WT	High
101	Elevated Tank	WT	High
102	Vine Grove WWTP	STP	High
103	West Point Fire Dept	Fire Response	High
104	West Point Police	Police	High
105	West Point City Hall	General Government	High
106	West Point	WTP	High
107	West Point Water Storage Tank	WT	High

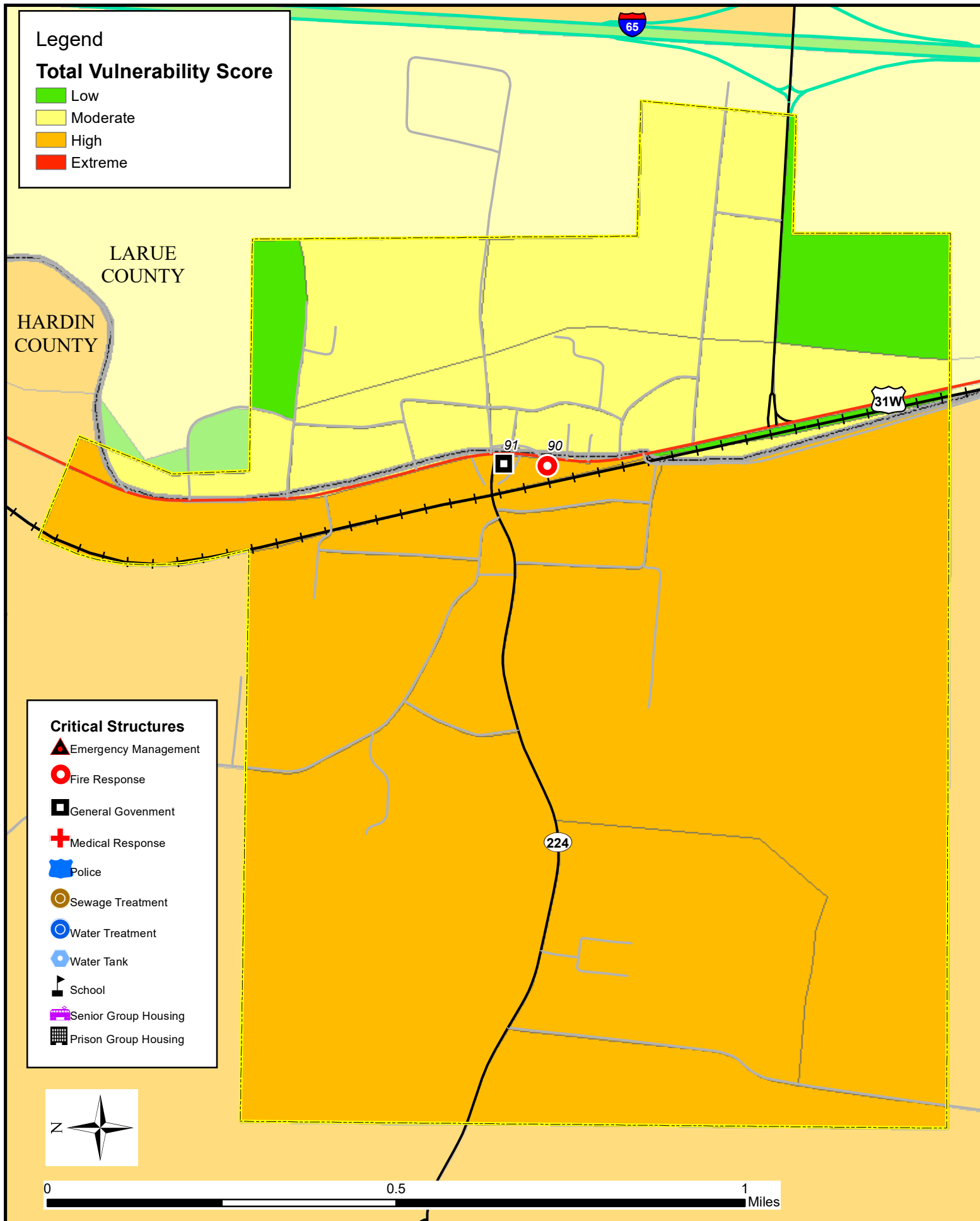
108	White Mills Fire Dept	Fire Response	High
109	White Mills	WTP	High
110	Pirtle Springs	WTP	High
111	Fort Knox/Central WTP	WTP	Moderate
112	South End Tank	WT	Moderate
113	Glendale Tank	WT	High
114	Clearwell #1	WT	High
115	Clearwell #2	WT	High
116	Rineyville Tank	WT	High
117	Eastview Tank	WT	High
118	Valley Creek Tank	WT	Moderate
119	Pirtle Springs Clear Well	WT	High
120	Brizendine	WT	High
121	Hardin County Tank	WT	High
122	Pritchard Tank	WT	High
123	Frazier Tank	WT	Moderate
124	Old Ironsides Tank	WT	Moderate
125	Ed Center #1	WT	Moderate
126	Ed Center #2	WT	Moderate
127	Ft Knox High School	WT	Moderate
128	WWTP Tank	WT	Moderate
129	Springfield Rd Tank	WT	High
130	Valley Creek WWTP	STP	High
131	West Point WWTP	STP	High
132	Ft Knox WWTP	STP	High
133	Radcliff WWTF	STP	High



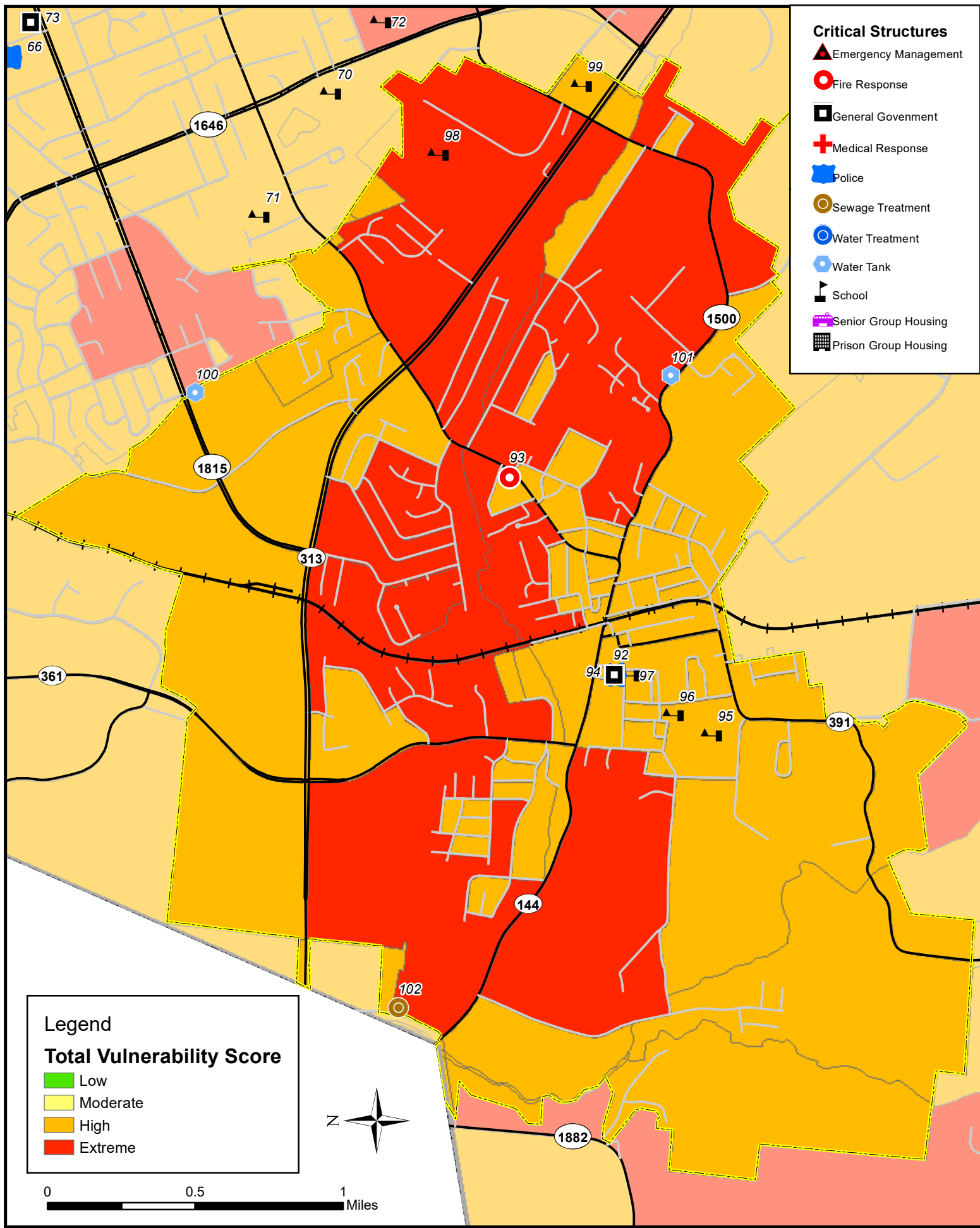


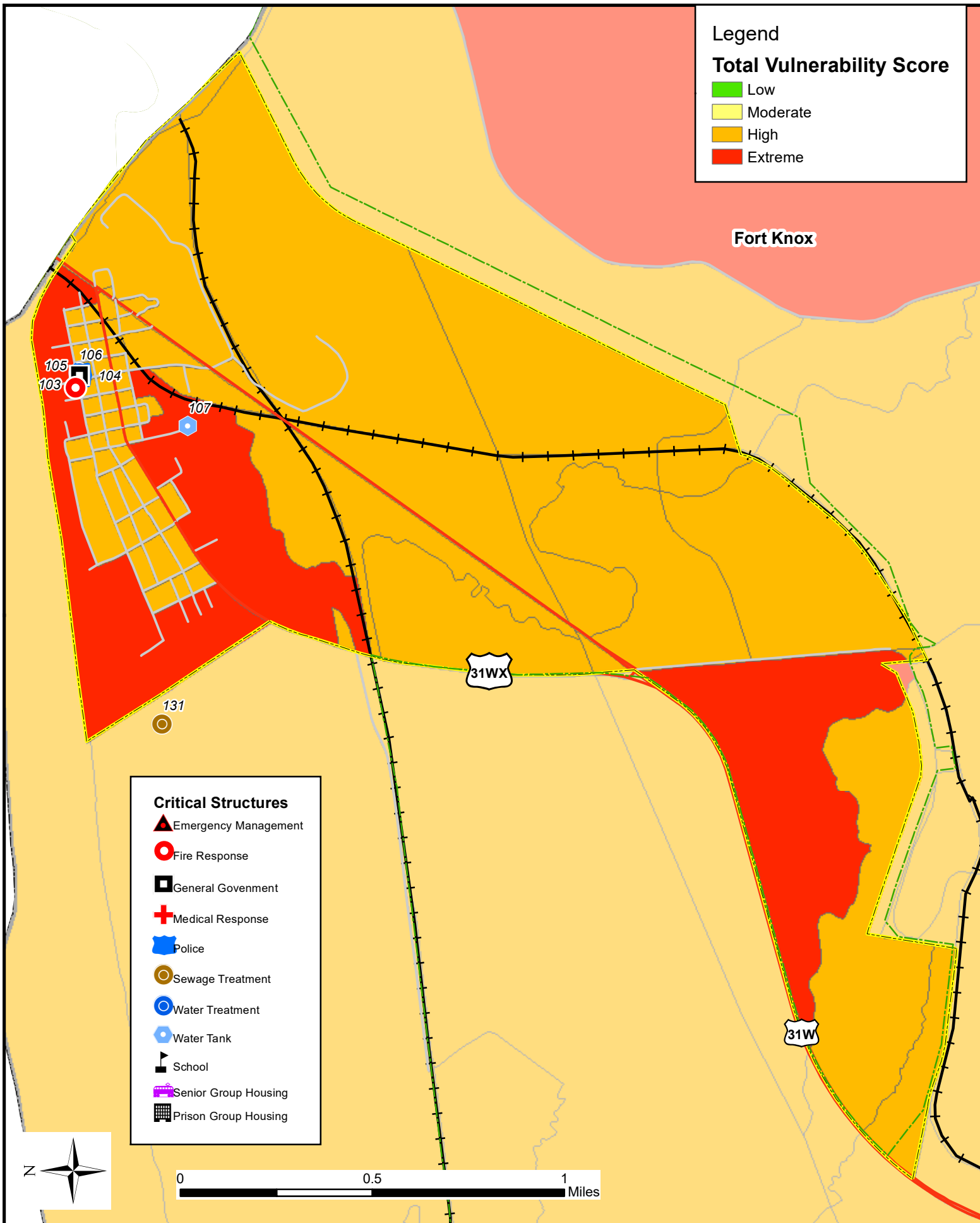






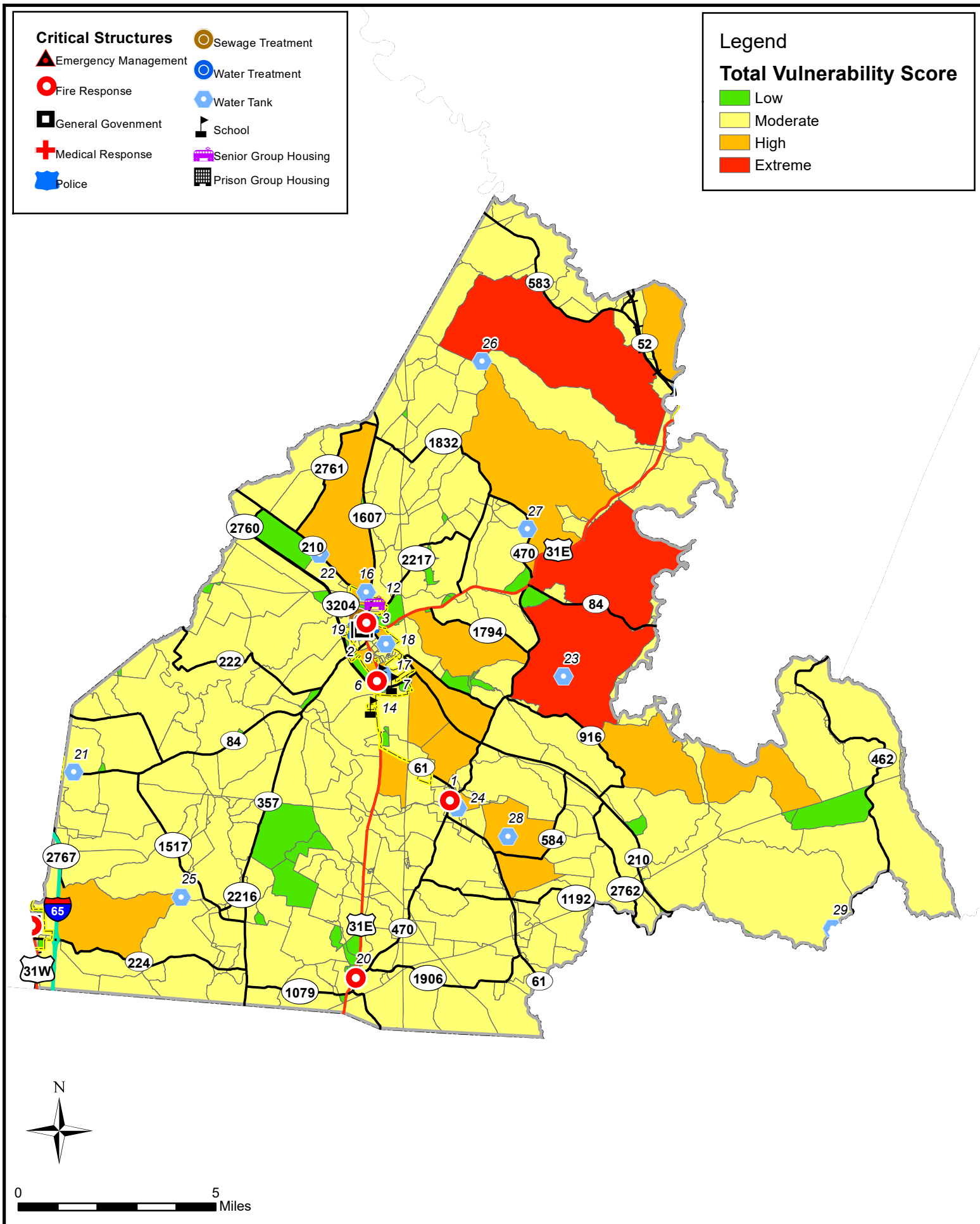
VINE GROVE RISK

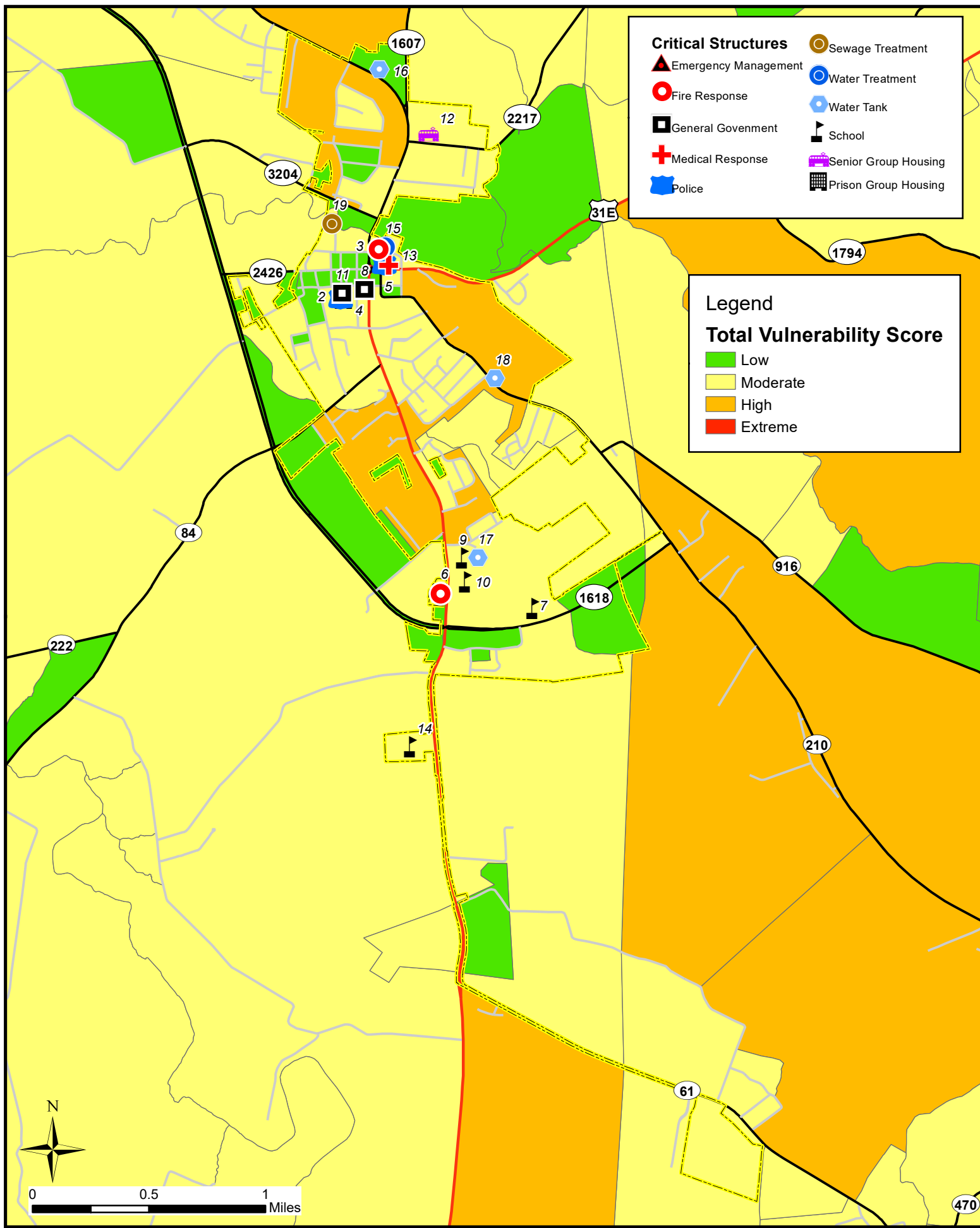




Larue County

Map #	Facility	Function	Vulnerability Zone
1	Buffalo Fire Dept	Fire Response	Moderate
2	Larue County Sheriff	Police	Moderate
3	Hodgenville Fire Dept	Fire Response	Low
4	Larue County Jail	Prison Group Housing	Moderate
5	Hodgenville Police	Police	Moderate
6	Larue County Fire Dept	Fire Response	Low
7	Hodgenville Elementary School	School	Moderate
8	Hodgenville City Hall	General Government	Low
9	Larue County Middle School	School	Moderate
10	Larue County High School	School	Moderate
11	Larue County Courthouse	General Government	Moderate
12	Sunrise Manor	Senior Group Housing	Moderate
13	Larue County Health Department	Medical Response	Moderate
14	Abraham Lincoln Elementary School	School	Moderate
15	Hodgenville	WTP	Low
16	North Tank	WT	Low
17	High School Tank	WT	Moderate
18	Fairgrounds Tank	WT	Moderate
19	Hodgenville WWTP	STP	Moderate
20	Magnolia Fire Dept	Fire Response	Low
21	Sonora Tank	WT	Moderate
22	Industrial Tank	WT	Low
23	East Leafdale	WT	High
24	Buffalo Water Tower	WT	Moderate
25	Wonderland Water Tower	WT	Moderate
26	Roanoke Water Tower	WT	Moderate
27	White City Water Tower	WT	Moderate
28	Tennison Rd Tank	WT	Moderate
29	Attilla Tank	WT	Moderate

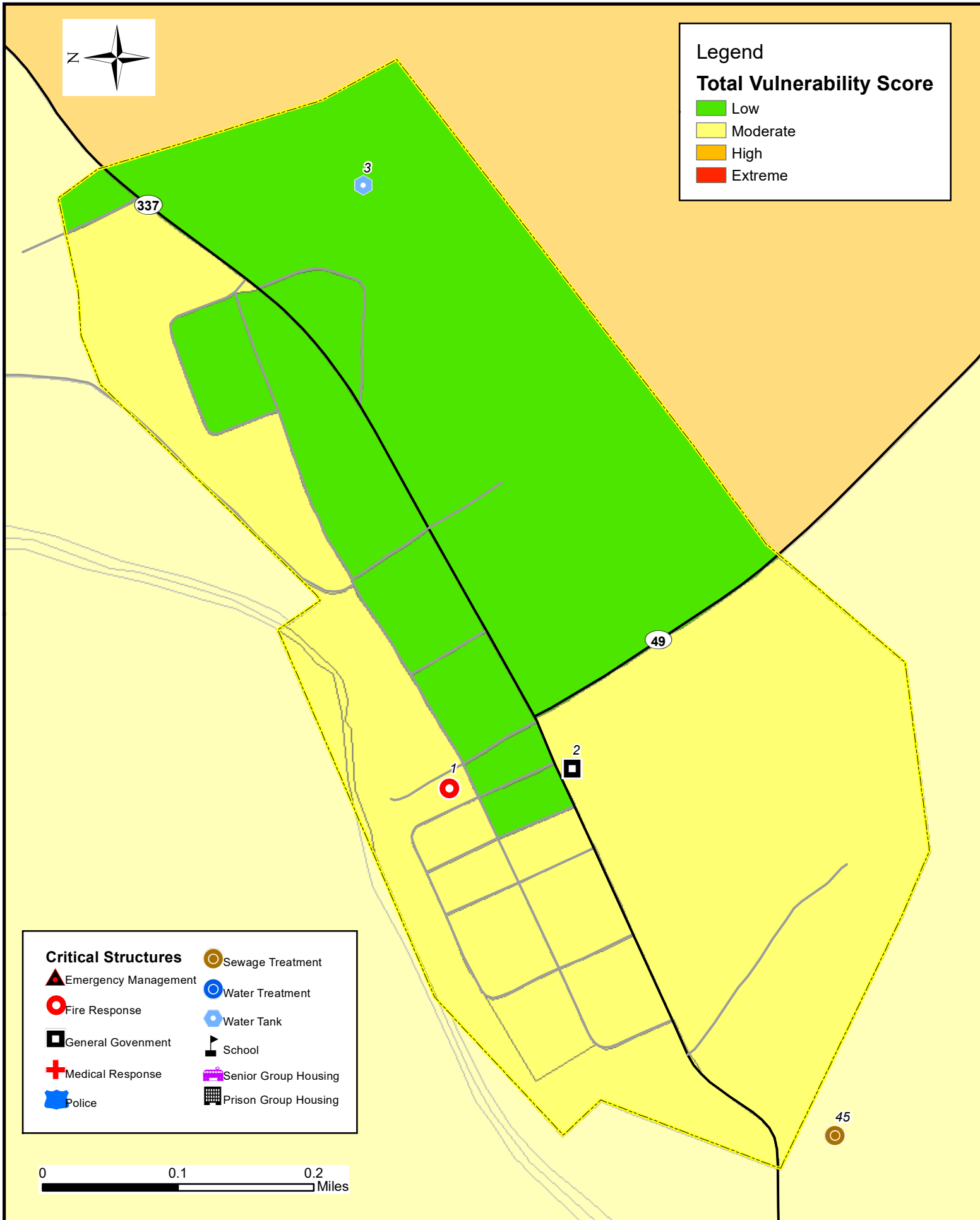


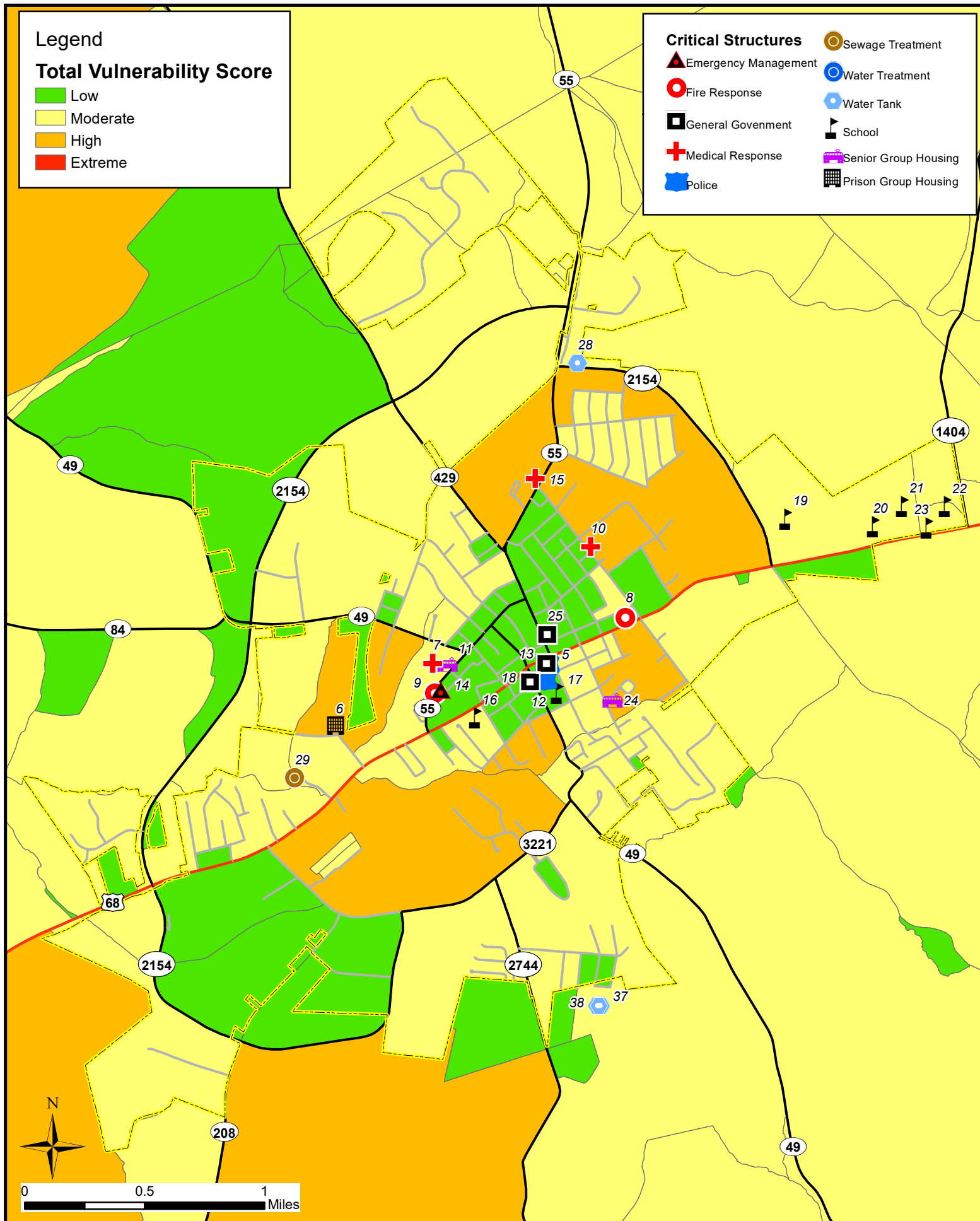


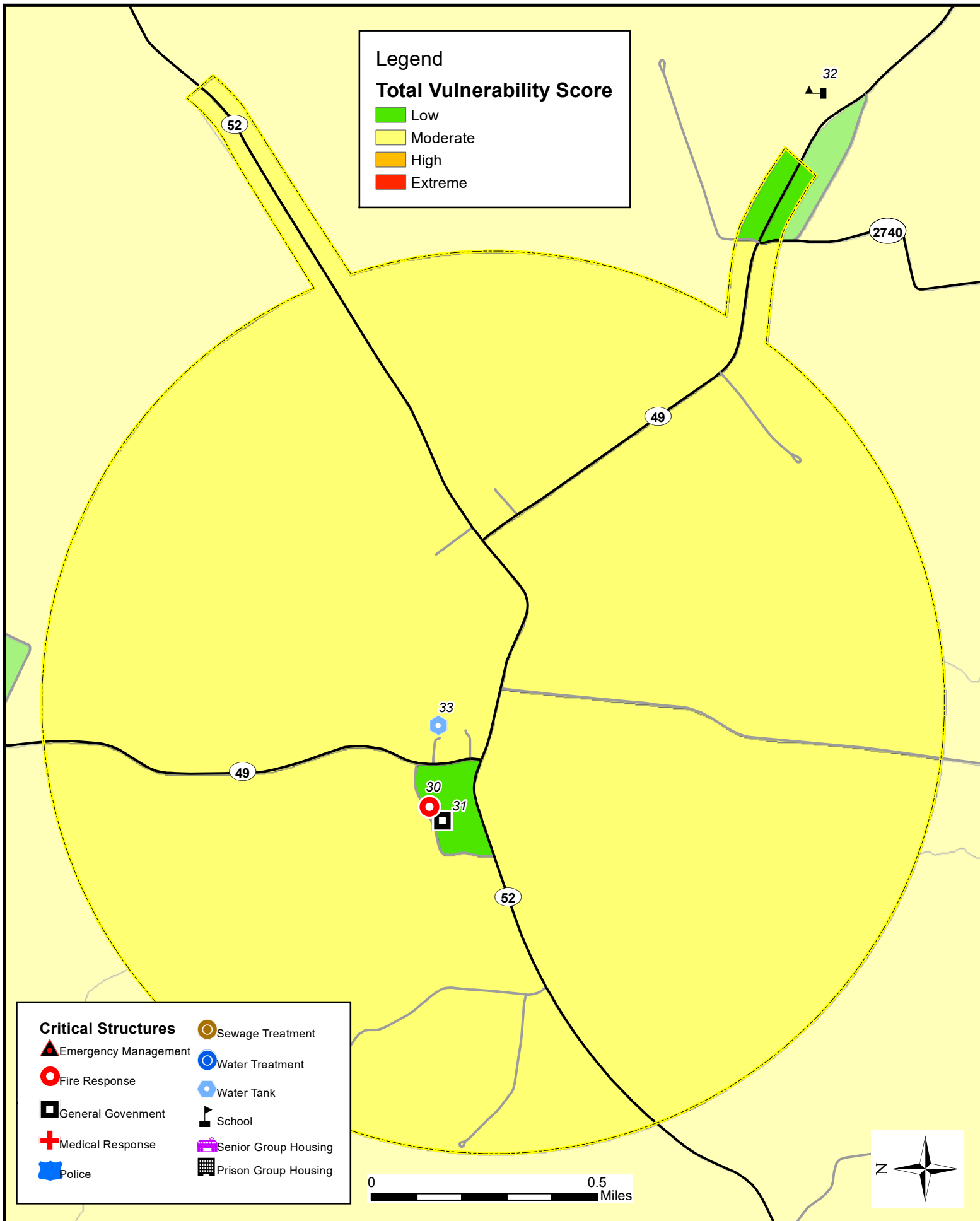
Marion County

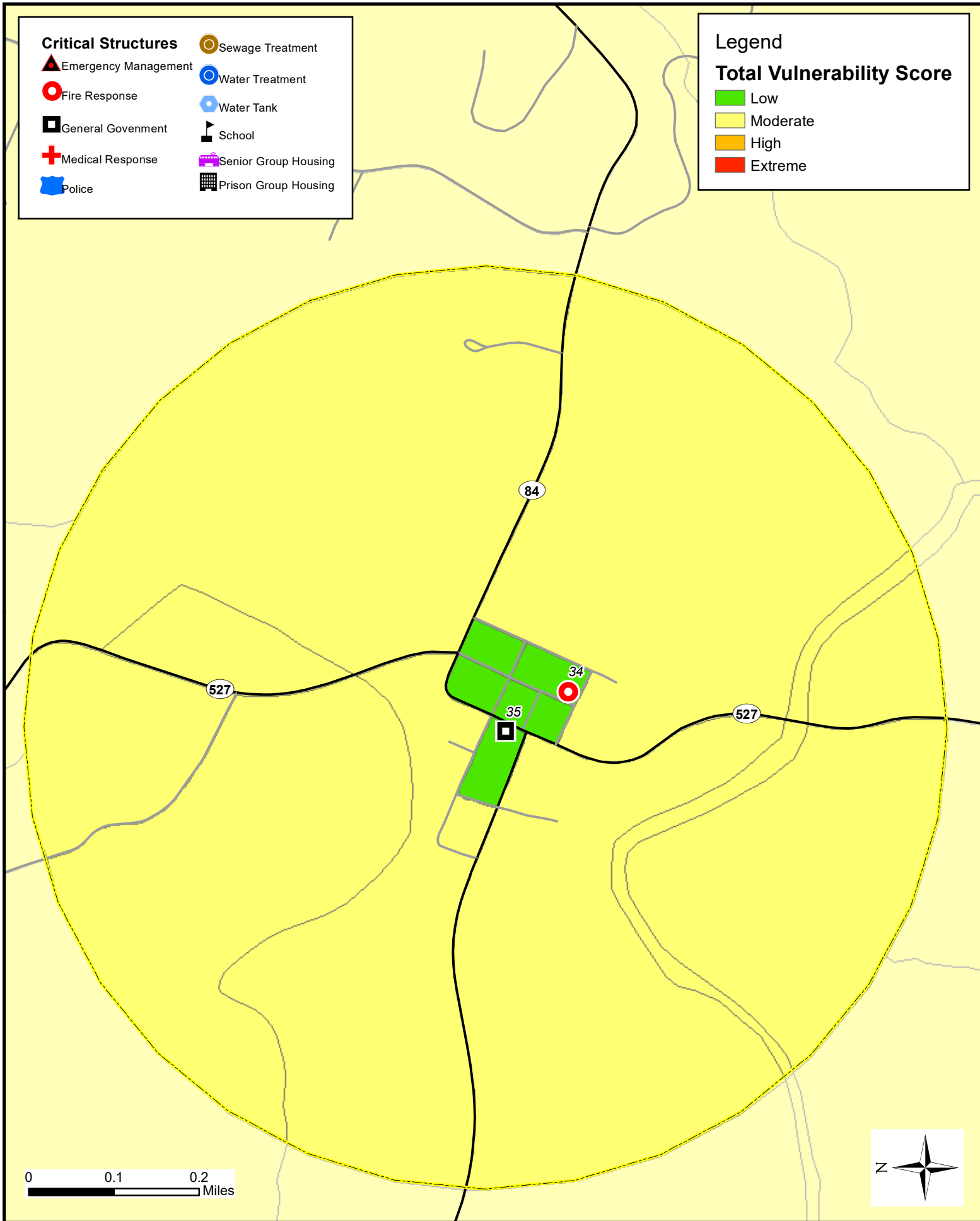
Map #	Facility	Function	Vulnerability Zone
1	Bradfordsville Fire Dept	Fire Response	Low
2	Bradfordsville City Hall	General Government	Low
3	Bradfordsville	WT	Low
4	Gravel Switch Fire Dept	Fire Response	Low
5	Marion County Sheriff	Police	Low
6	Marion County Jail	Prison Group Housing	Moderate
7	Norton Spring View Hospital	Medical Response	Moderate
8	Lebanon Fire Dept	Fire Response	Low
9	Marion County Fire & Rescue	Fire Response	Low
10	Life First Emergency Service	Medical Response	High
11	Norton Rest Home	Senior Group Housing	Moderate
12	Lebanon City Police Station	Police	Low
13	Marion County Court House	General Government	Low
14	Marion County Disaster & Emergency Services	Emergency Management	Low
15	Marion County Health Department	Medical Response	Moderate
16	Lebanon Elementary School	School	Moderate
17	St Augustine Elementary School	School	Low
18	Lebanon City Hall	General Government	Low
19	Marion County Knight Academy	School	Low
20	Marion County Area Tech Center	School	Low
21	Marion County High School	School	Low
22	Glasscock Elementary School	School	Low
23	Marion County Board of Education	School	Low
24	Cedars Of Lebanon Nursing Home	Senior Group Housing	Moderate
25	Justice Center	General Government	Low
26	Marion County Middle School	School	Low
27	Calvary Elementary School	School	Moderate
28	Springfield Rd	WT	Moderate
29	Lebanon WWTP	STP	Moderate
30	Loretto Fire Dept	Fire Response	Low
31	Loretto City Hall	General Government	Low
32	West Marion Elementary School	School	Moderate
33	Loretto	WT	Low
34	Raywick Fire Dept	Fire Response	Low
35	Raywick City Hall	General Government	Low

36	Lebanon	WTP	Moderate
37	Old Calvary Rd #2	WT	Moderate
38	Old Calvary Rd #1	WT	Moderate
39	Holy Cross	WT	Low
40	Hwy 84 (Gap Knob)	WT	Moderate
41	Hwy 49 (Narrows)	WT	Moderate
42	St. Rose Tank	WT	Moderate
43	St. Charles	WT	Low
44	Riley	WT	Moderate
45	Bradfordsville WWTP	STP	Low





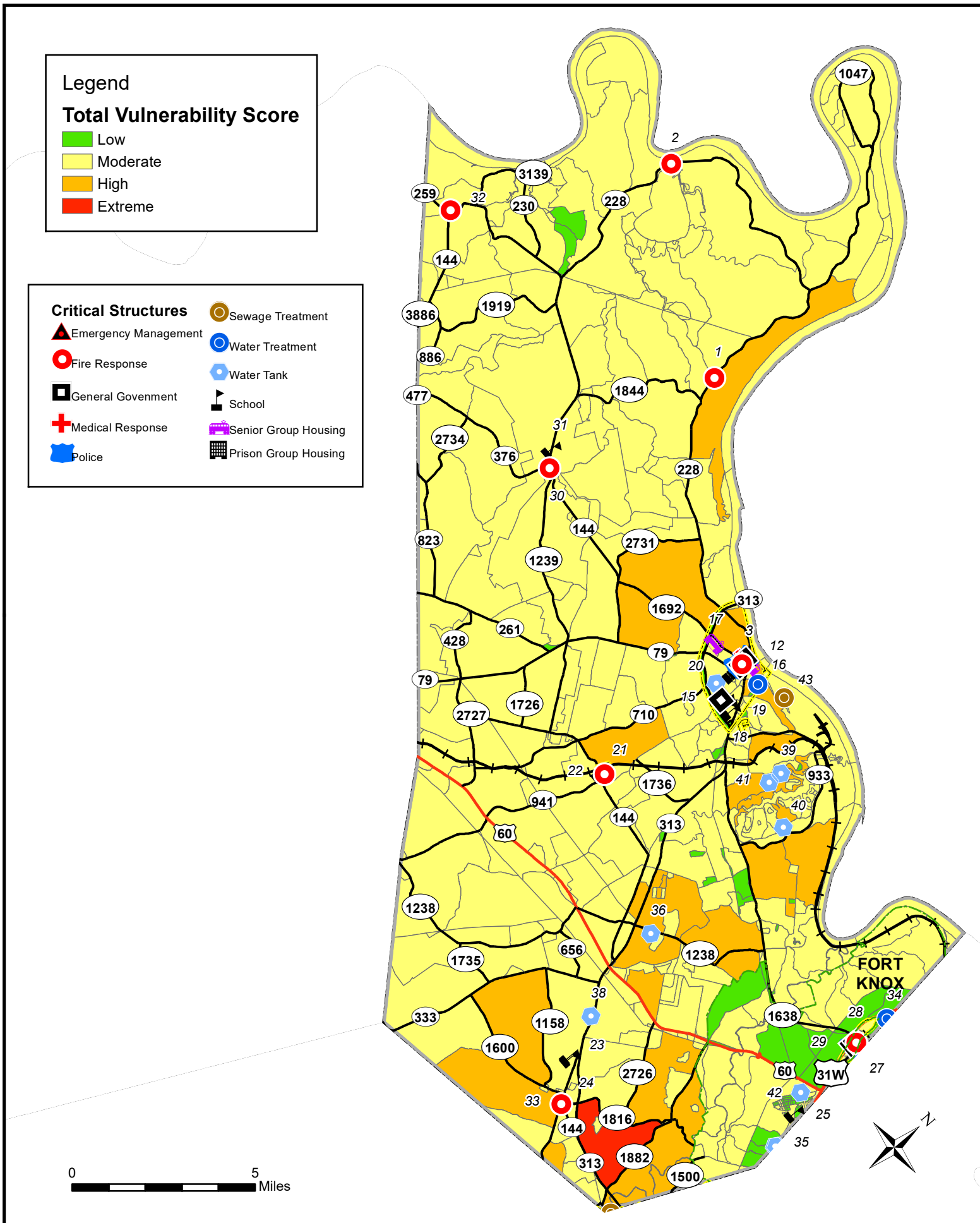


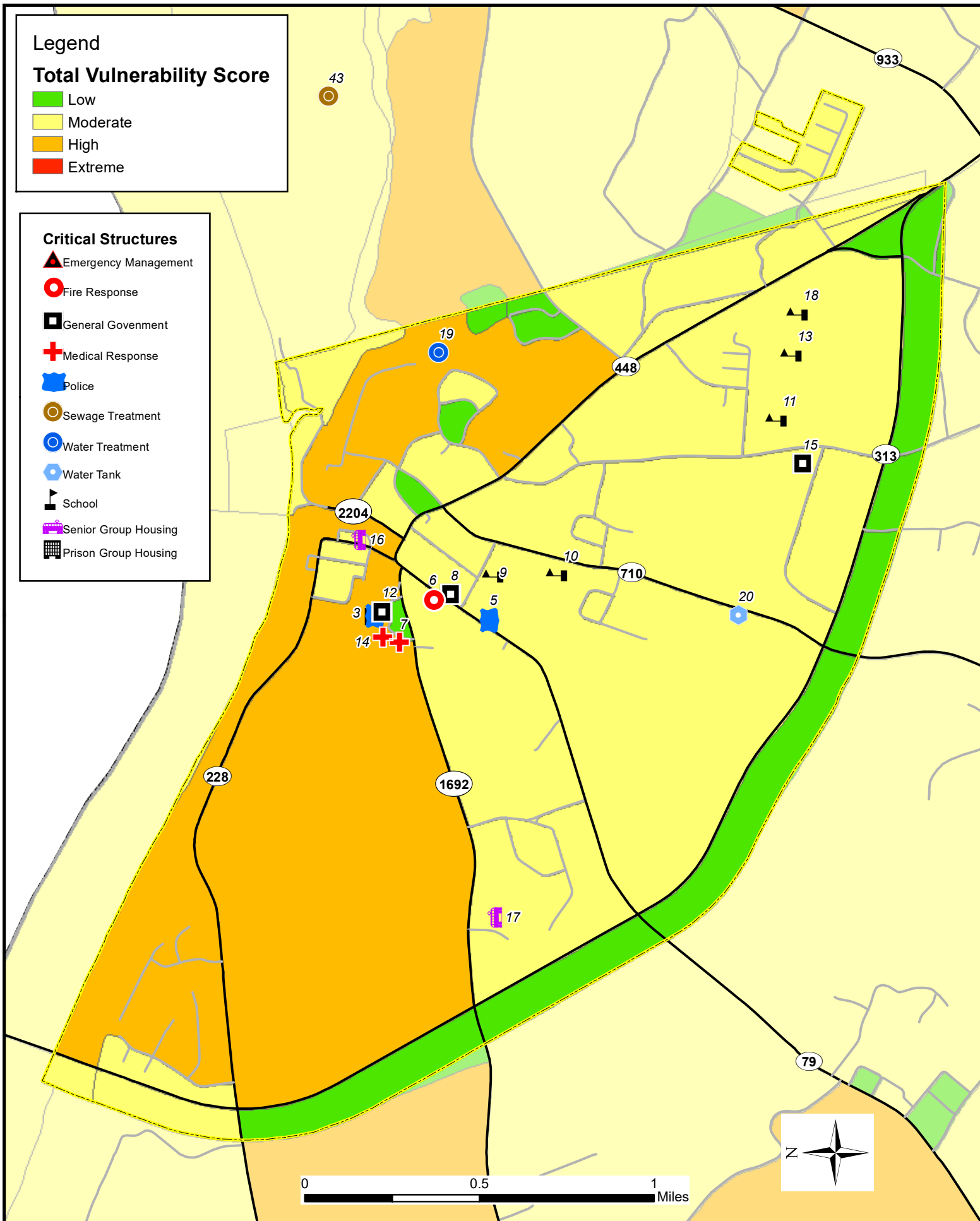


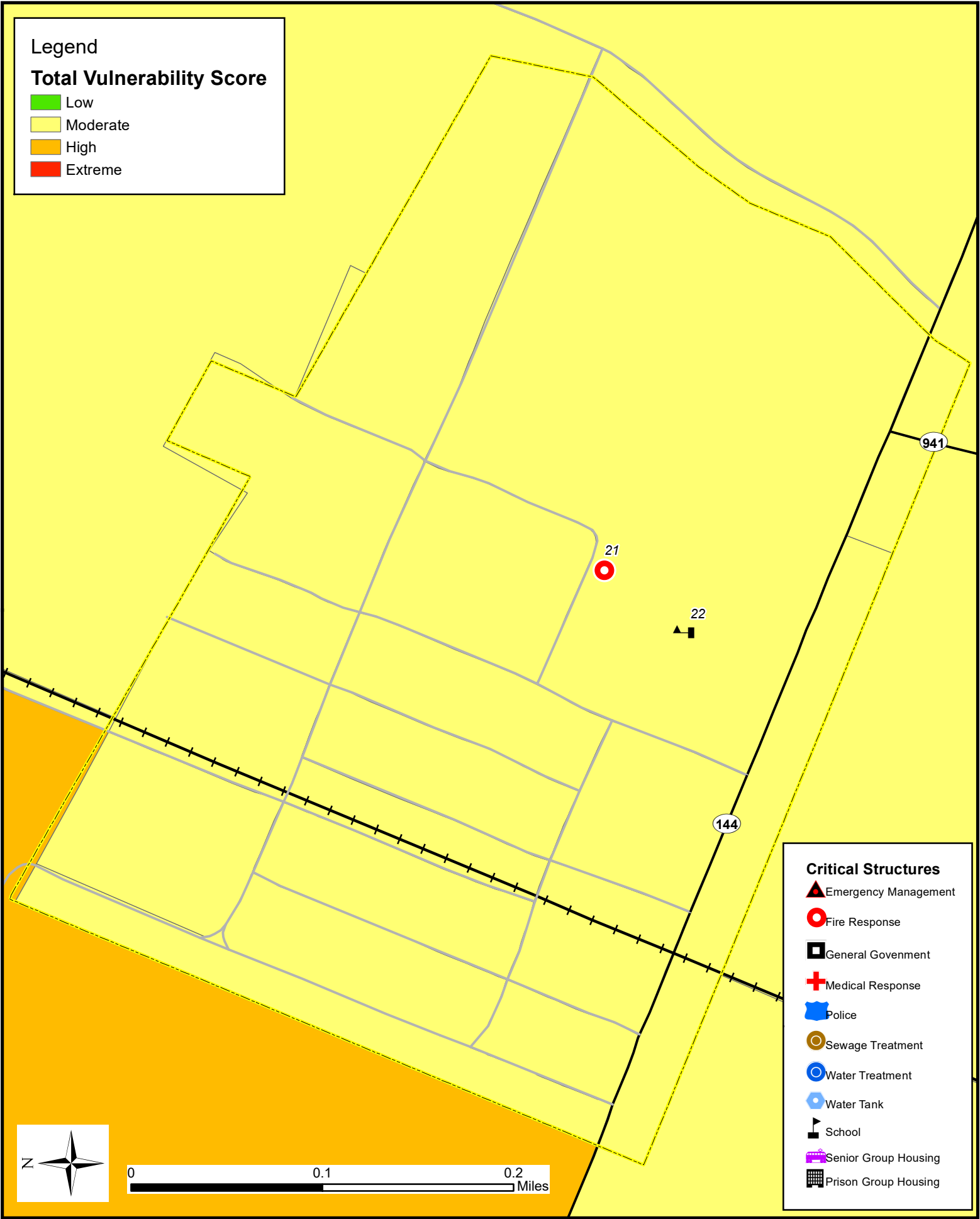
Meade County

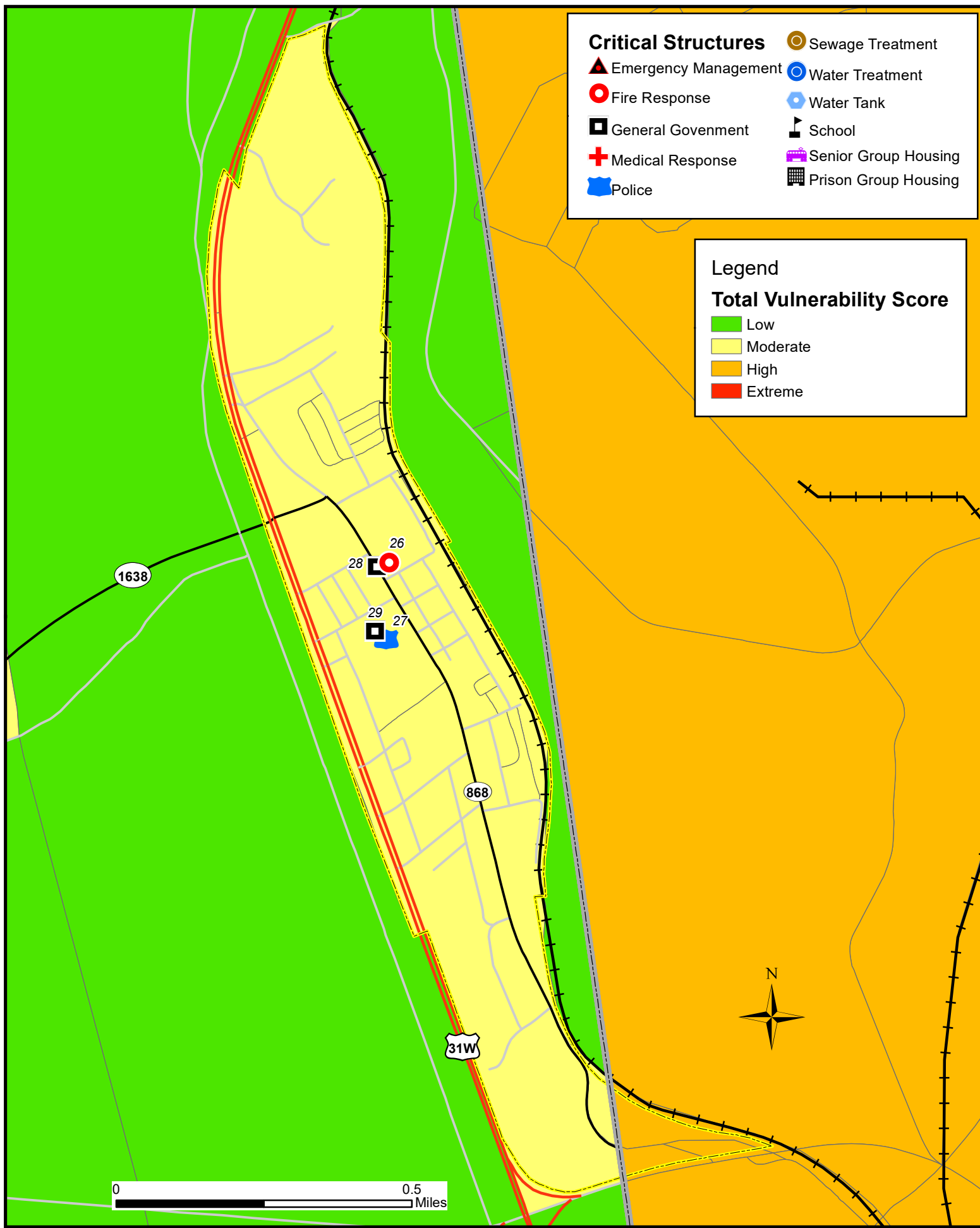
Map #	Facility	Function	Vulnerability Zone
1	Battletown Fire Dept	Fire Response	High
2	Wolf Creek Fire Dept	Fire Response	Moderate
3	Meade County Sheriff	Police	Moderate
4	Meade County Jail	Prison Group Housing	Moderate
5	Brandenburg Police	Police	Moderate
6	Meade County Fire Dept	Fire Response	Moderate
7	Meade County Ems	Medical Response	Moderate
8	Brandenburg City Hall	General Government	Moderate
9	Meade County Area Tech Center	School	Moderate
10	Meade County High School	School	Moderate
11	Stuart Pepper Middle School	School	Moderate
12	Meade County Courthouse	General Government	Moderate
13	David T. Wilson Elementary School	School	Moderate
14	Meade County Health Department	Medical Response	Moderate
15	National Guard Armory	General Government	Moderate
16	All About Home Assisted Living	Senior Group Housing	Moderate
17	Beehive Assisted Living	Senior Group Housing	Moderate
18	Barry Hahn Ps	School	Moderate
19	Barney Johnson	WTP	Moderate
20	High Pressure Tank	WT	Moderate
21	Ekron Fire Dept	Fire Response	Low
22	Ekron Elementary School	School	Low
23	Flaherty Elementary School	School	Moderate
24	Flaherty Ps	School	Moderate
25	Van Voorhis Elementary School	School	Low
26	Muldraugh Fire Dept	Fire Response	Low
27	Muldraugh Police	Police	Low
28	Muldraugh Storm Shelter	General Government	Low
29	Muldraugh City Hall	General Government	Low
30	Payneville Fire Dept	Fire Response	Low
31	Payneville Elementary School	School	Low
32	Rhodelia Fire Dept	Fire Response	Low
33	Flaherty Fire Dept	Fire Response	Moderate
34	Muldraugh Plant	WTP	Low
35	Pritchard	WT	Low

36	Garrett	WT	Moderate
37	Payneville	WT	Low
38	Flaherty Tank	WT	Moderate
39	Standpipe Tank	WT	Moderate
40	Water Tank #2	WT	Moderate
41	Water Tank #1	WT	Moderate
42	Van Voorhis Neighborhood	WT	Low
43	Brandenburg WWTP	STP	Low







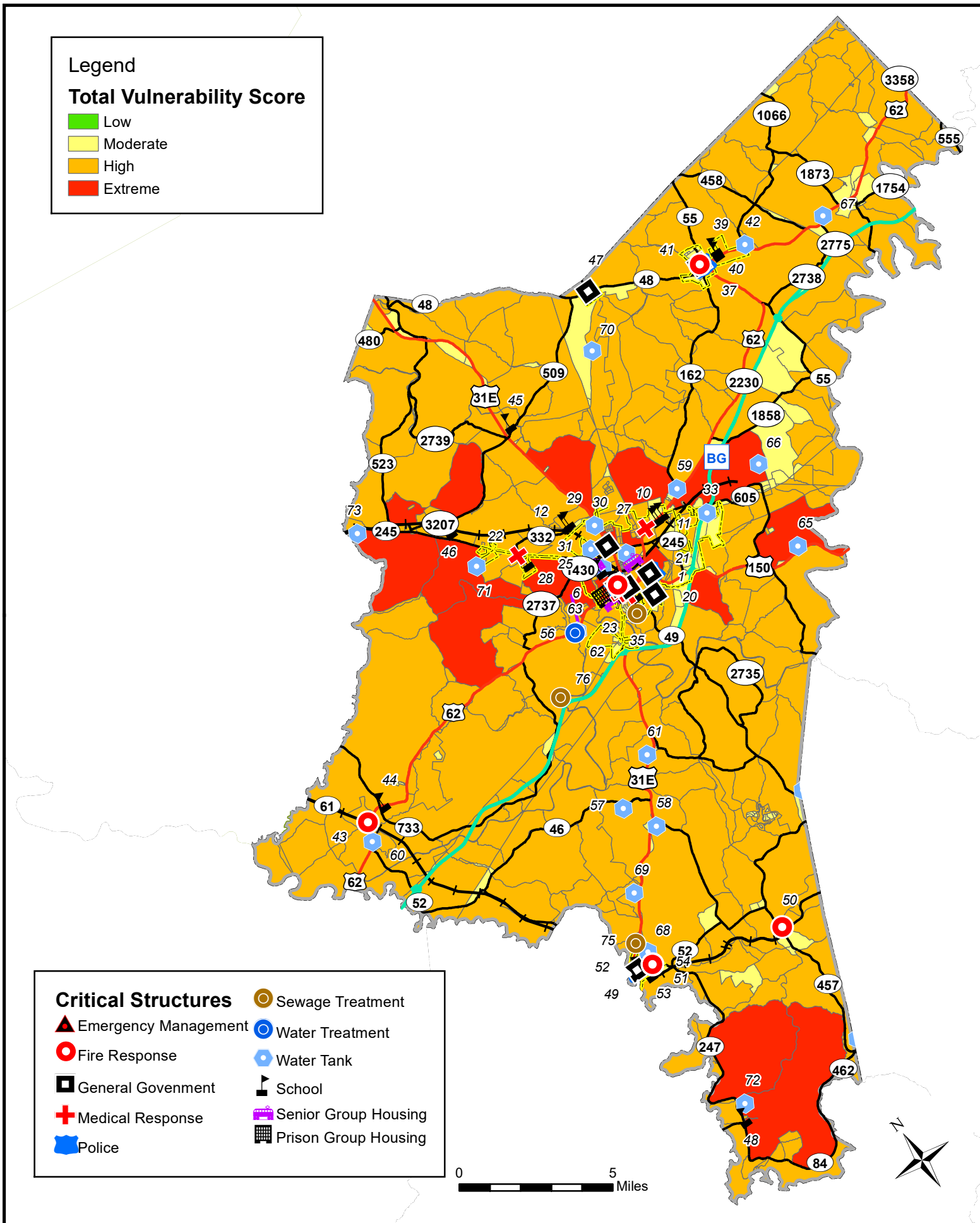


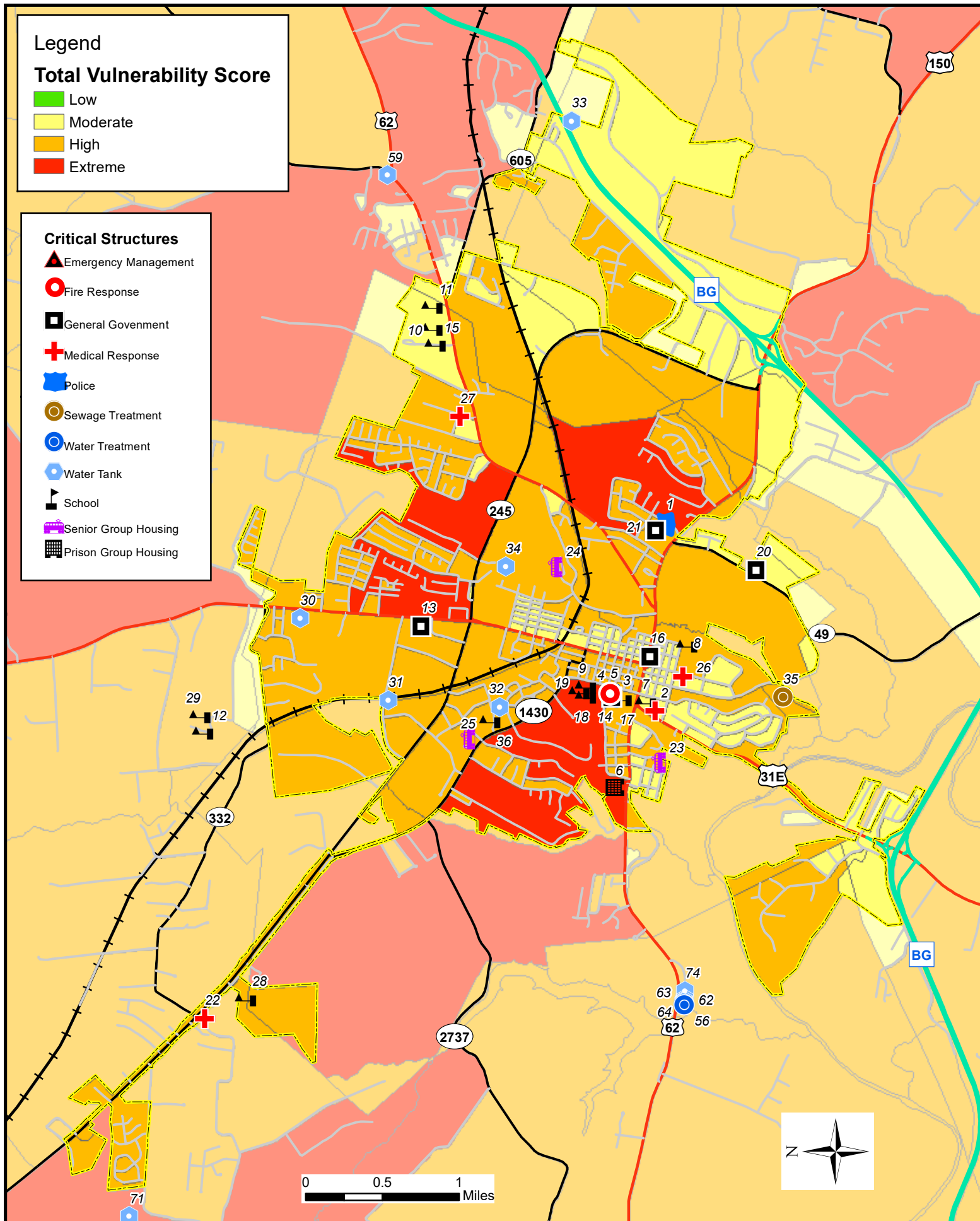
Nelson County

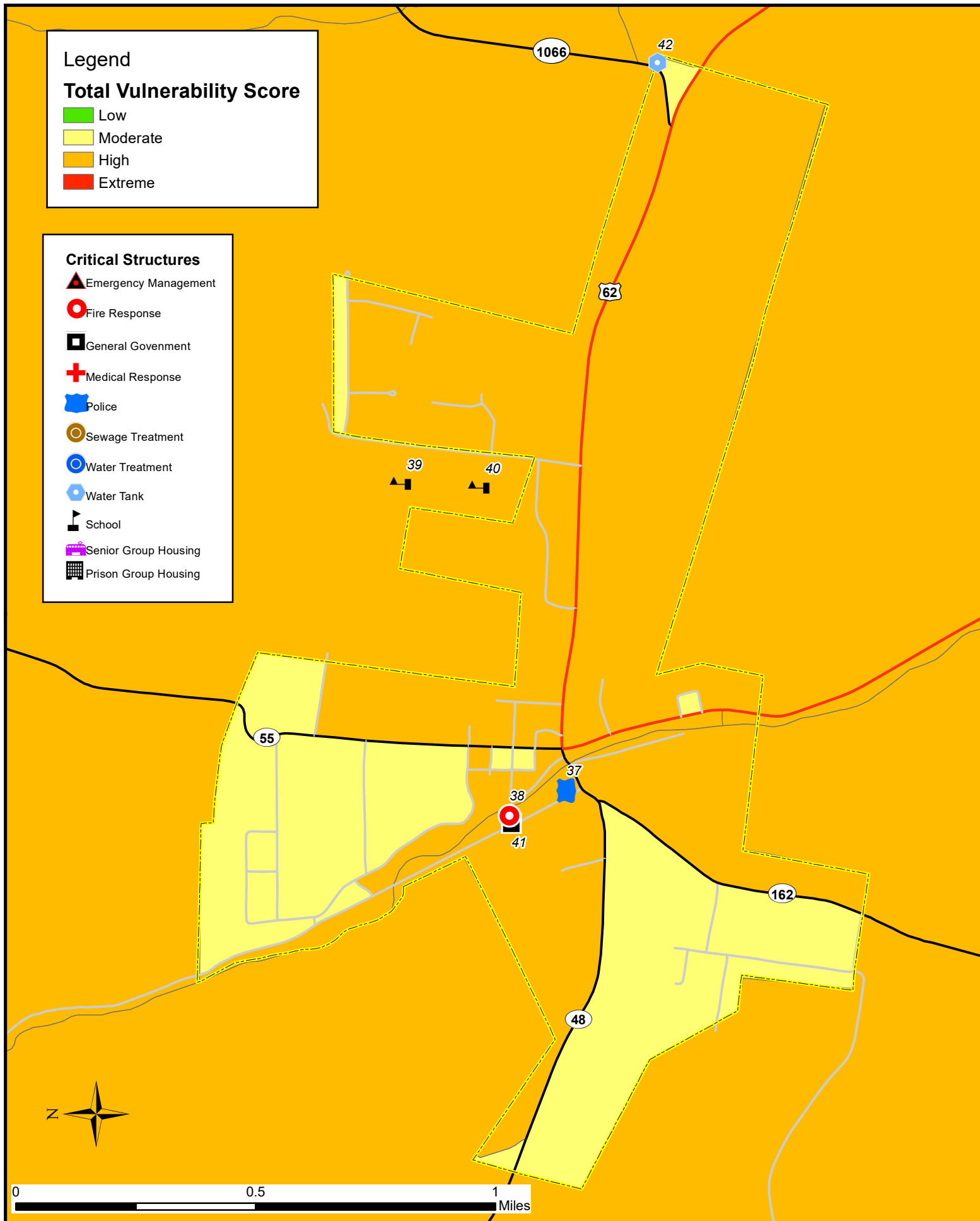
Map #	Facility	Function	Vulnerability Zone
1	Nelson County Sheriff	Police	Moderate
2	Flaget Memorial Hospital	Medical Response	Moderate
3	Bardstown Police	Police	Moderate
4	Bardstown VFD	Fire Response	Moderate
5	Bardstown-Nelson County Fire Dept	Fire Response	Moderate
6	Nelson County Jail	Prison Group Housing	High
7	Bethlehem High School	School	Moderate
8	Foster Heights Elementary School	School	Moderate
9	Bardstown High School	School	High
10	Nelson County Area Tech Center	School	Moderate
11	Nelson County High School	School	Moderate
12	Spalding College Extension Center	School	Moderate
13	National Guard Armory	General Government	Moderate
14	Bardstown City Hall	General Government	Moderate
15	Old Kentucky Home Middle School	School	Moderate
16	Nelson County Government	General Government	Moderate
17	St Joseph Elementary School	School	Moderate
18	Bardstown Elementary School	School	High
19	Bardstown Middle School	School	High
20	Nelson County National Guard	General Government	Moderate
21	Nelson County Justice Center	General Government	Moderate
22	Flaget Memorial Hospital	Medical Response	High
23	Colonial House Nursing Home	Senior Group Housing	High
24	Federal Hill Manor Nursing Home	Senior Group Housing	High
25	Windsor Gardens Assisted Living	Senior Group Housing	High
26	Nelson County Health Department	Medical Response	Moderate
27	Nelson County Ems	Medical Response	Moderate
28	Thomas Nelson High School	School	Moderate
29	St Joseph Montessori Children's Center	School	Moderate
30	Fairgrounds Tank	WT	High
31	Withrow Tank Industrial Park	WT	Moderate
32	Hurstland Tank	WT	Moderate
33	Woodlawn / Nc Industrial	WT	Moderate
34	245 Tanks	WT	High

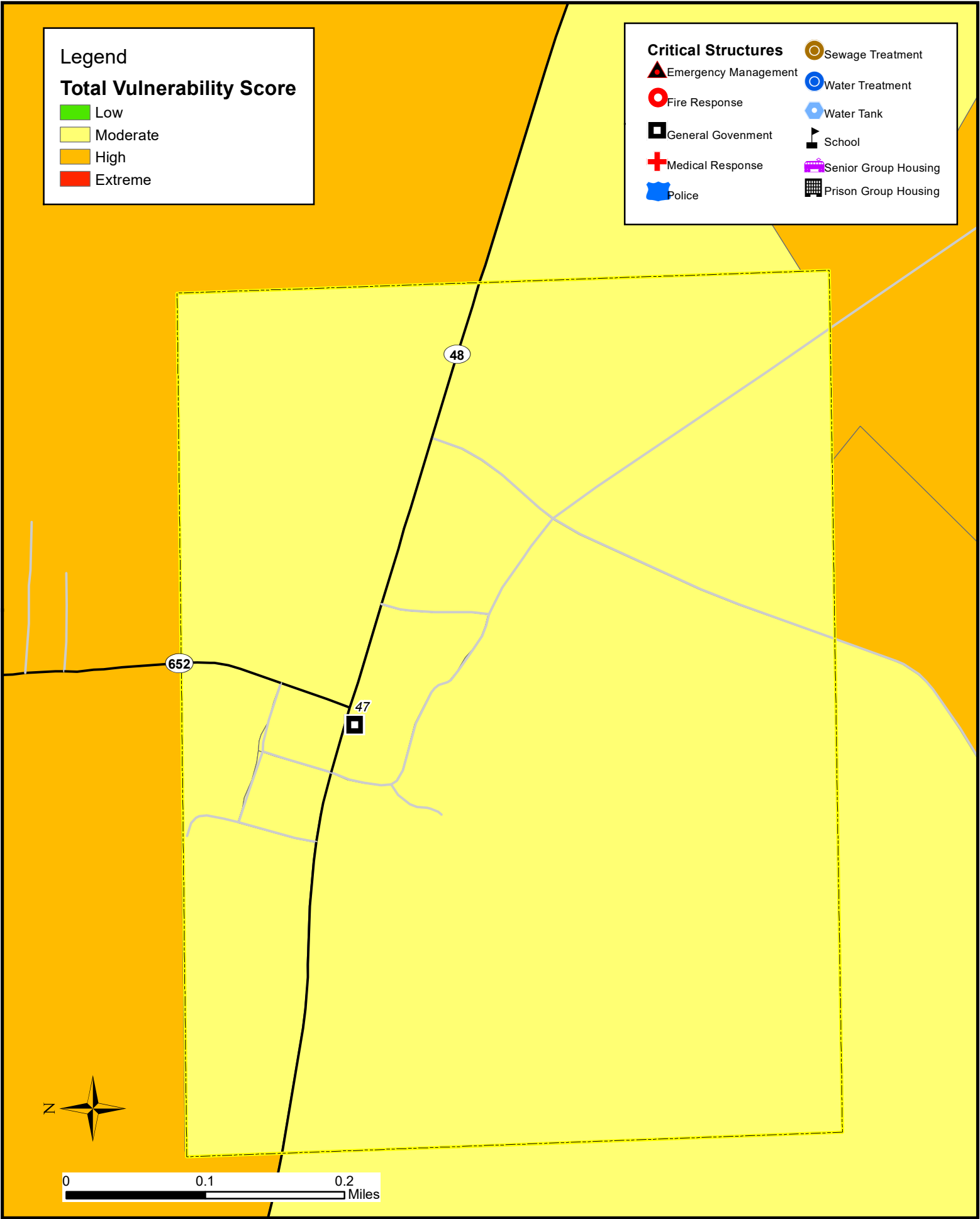
35	Bardstown WWTP	STP	Moderate
36	Bardstown Ps	School	Moderate
37	Bloomfield Police	Police	Moderate
38	Northeast Nelson VFD	Fire Response	Moderate
39	Bloomfield Elementary School	School	Moderate
40	Bloomfield Middle School	School	Moderate
41	Bloomfield City Hall	General Government	Moderate
42	Bloomfield	WT	Moderate
43	Boston VFD	Fire Response	Moderate
44	Boston Elementary School	School	High
45	Cox's Creek Elementary School	School	Moderate
46	St Gregory Elementary School	School	Moderate
47	Fairfield City Hall	General Government	Moderate
48	St Ann Elementary School	School	Moderate
49	New Haven Police	Police	Moderate
50	New Hope Fire Dept	Fire Response	Moderate
51	Rolling Fork Fire Dept	Fire Response	Moderate
52	New Haven City Hall	General Government	Moderate
53	New Haven School	School	Moderate
54	New Haven Fire Department	Fire Response	Moderate
55	St Catherine Academy	School	Moderate
56	Sympson Lake	WTP	Moderate
57	Nat Rodgers	WT	High
58	Culvertown	WT	High
59	East Bardstown Tank	WT	High
60	Boston Tank	WT	Moderate
61	Balltown Tank	WT	High
62	Clearwell Tank	WT	Moderate
63	Clearwell Tank	WT	Moderate
64	Clearwell Tank	WT	Moderate
65	Botland Tank	WT	High
66	Wire Ln	WT	High
67	Chaplin	WT	Moderate
68	Indian Hills	WT	High
69	Vittitow	WT	Moderate
70	Murray's Run	WT	Moderate
71	Lutheran Church Rd	WT	High
72	Howardstown Tank	WT	High
73	Weller Loop	WT	High

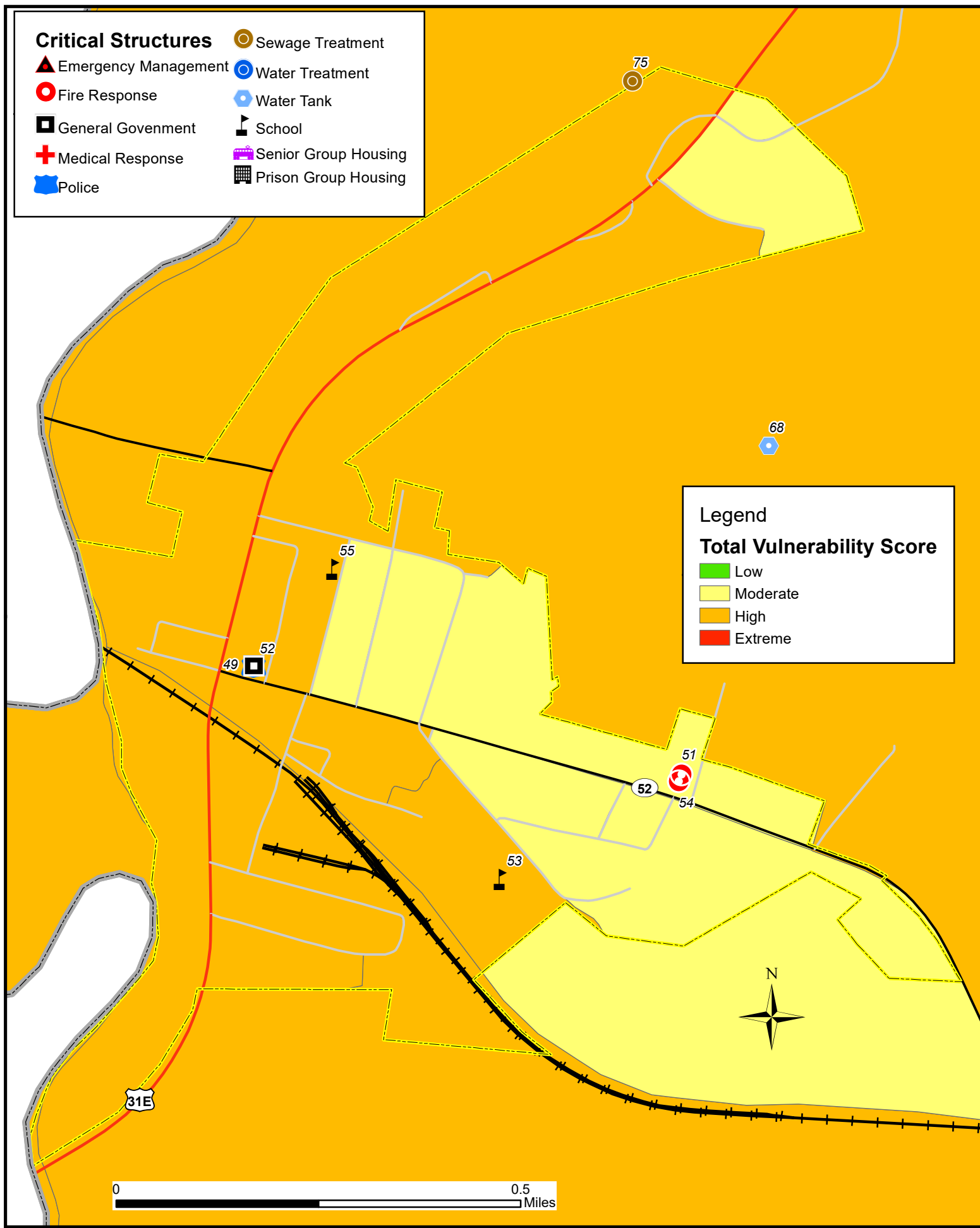
74	Glass Clearwell Tank	WT	Moderate
75	New Haven WWTP	STP	Moderate
76	Jerry L Riley WWTP	STP	Moderate





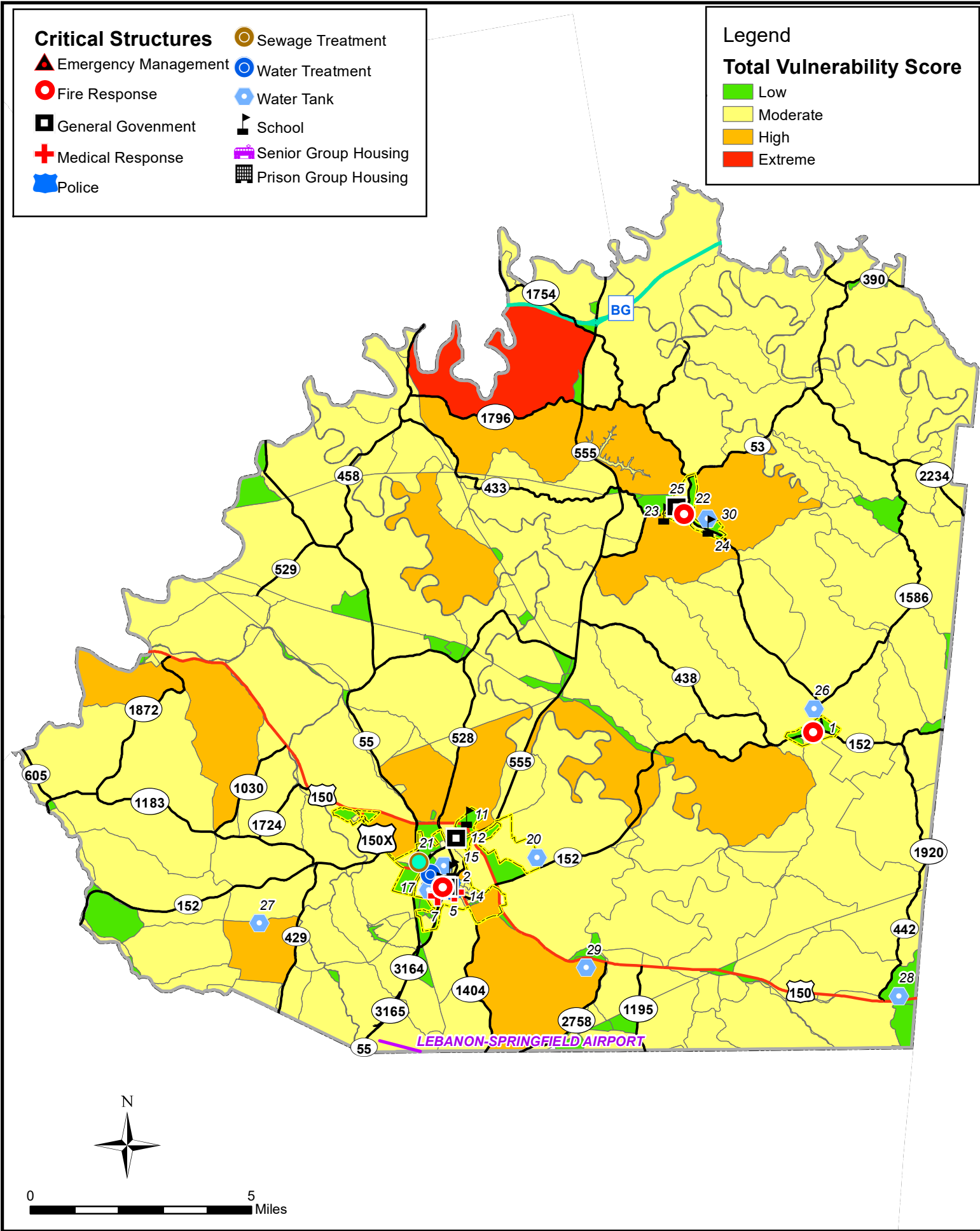


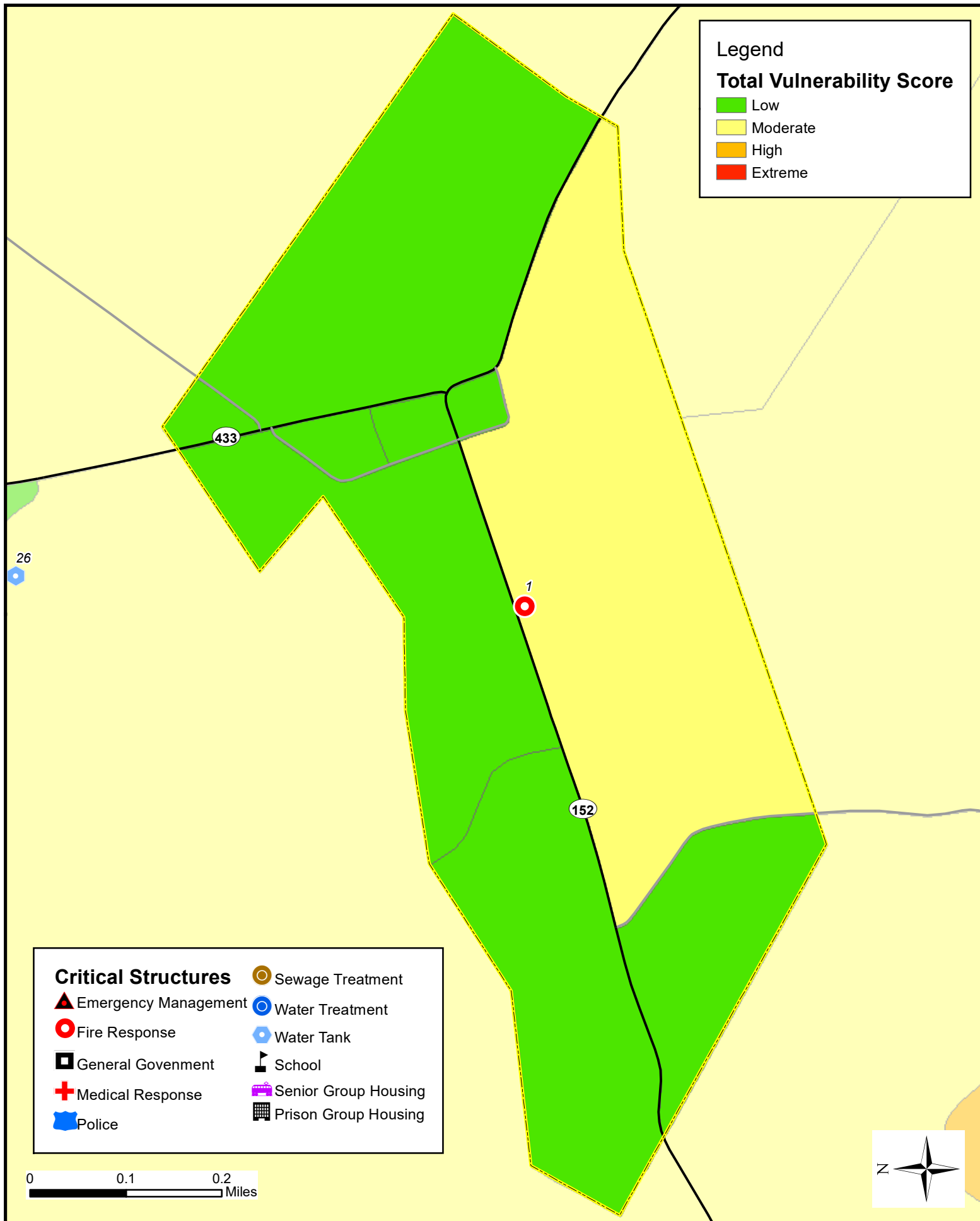


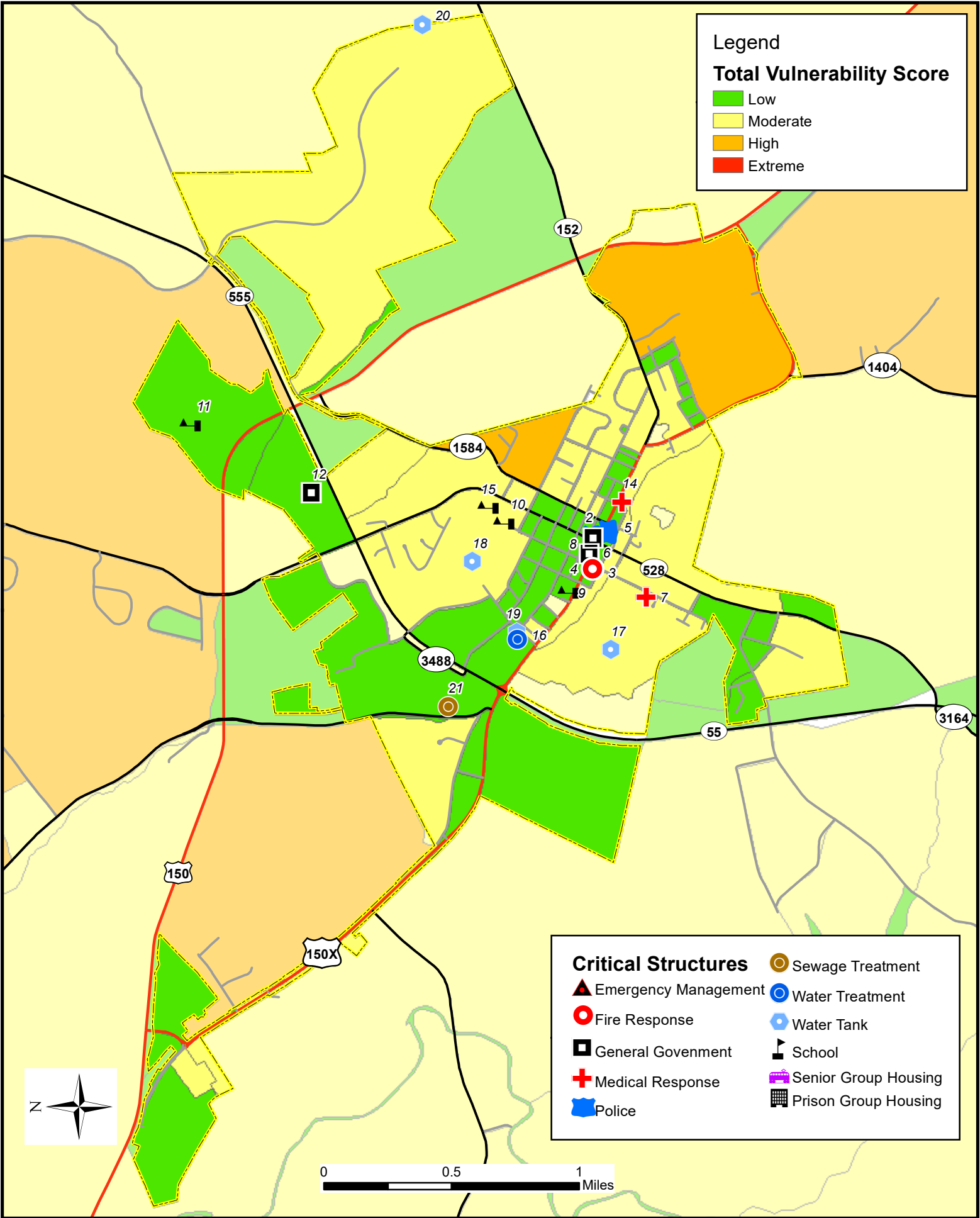


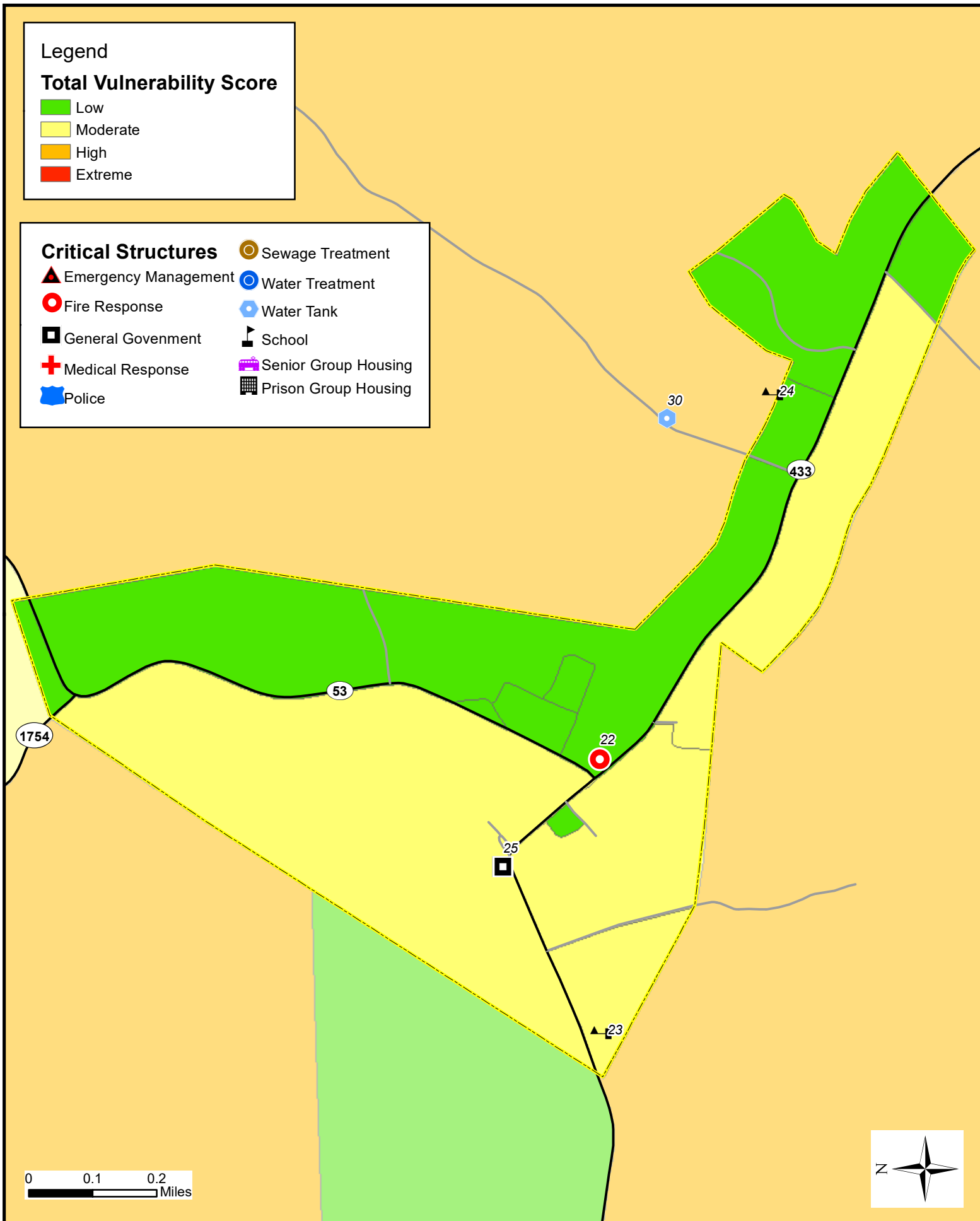
Washington County

Map #	Facility	Function	Vulnerability Zone
1	Mackville Fire Dept	Fire Response	Low
2	Washington County Sheriff	Police	Low
3	Springfield Fire Dept	Fire Response	Low
4	Washington County Fire Dept	Fire Response	Low
5	Springfield Police	Police	Low
6	Washington County Jail	Prison Group Housing	Low
7	Washington County Ems	Medical Response	Moderate
8	Springfield City Hall	General Government	Low
9	St Dominic Elementary School	School	Low
10	Washington County Elementary School	School	Moderate
11	Washington County High School	School	Low
12	National Guard Armory	General Government	Low
13	Washington County Courthouse	General Government	Low
14	Washington County Health Office	Medical Response	Moderate
15	Washington County Middle School	School	Moderate
16	Springfield	WTP	Low
17	Armory Hill	WT	Moderate
18	High School	WT	Moderate
19	WTP Tank	WT	Low
20	Industrial Park	WT	Moderate
21	Springfield STP	STP	Low
22	Willisburg Fire Dept	Fire Response	Low
23	Central Kentucky Youth Academy	School	Low
24	North Washington Elementary School	School	Moderate
25	Willisburg City Hall	General Government	Low
26	Mackville	WT	Moderate
27	Old Elizabethtown Rd	WT	Moderate
28	Wesley Chapel	WT	Low
29	Simmstown	WT	Moderate
30	Willisburg	WT	Moderate









II. Loss Estimation: Potential and Actual Losses

Losses can be reviewed and evaluated in terms of actual past losses and potential future losses. They can include not only human life, physical structures, crops, etc. but also many other economic factors such as lost rents, wages, and production. The overall lack of data pertaining to structures/assets and their values does not allow us to generate a comprehensive loss analysis. To evaluate and run scenarios on a “typical” disaster for a specific area and review the data on a micro level, this information would have to be converted into block or zip code level data.

Therefore, the loss estimation will be based on past event losses and compiled at a higher level than might be desired. The economic and human costs are given for each of the six primary focus hazards and broken out by county with a regional summary. The averages for any event or year are assumed to be the estimated loss. The factor of population and economic growth over time, would cause the loss estimates to continue to rise without implementation of any mitigation measures. A review of the data available is contained in the following tables.

Potential losses consider estimated values of structures and their vulnerability to type and extent of a specific event.

The data in the tables below is gathered from numerous sources and defined as follows:

The structure sources for each county vary. LTADD maintains a critical structure GIS layer of various facilities including, EOC’s, Police & Fire Stations, Government Buildings, Hospitals, Water and Wastewater Utility infrastructure, Schools, Airports, and many other miscellaneous buildings. In addition, LTADD has access to point structure data from many of the individual county’s 911 systems as described in the following table.

COUNTY	DATA CURRENCY
BRECKINRIDGE	APR - 2019
GRAYSON	N/A
HARDIN	JAN - 2020
LARUE	OCT - 2018
MARION	SE[T - 2019
MEADE	OCT - 2020
NELSON	SEPT - 2020
WASHINGTON	AUG - 2019

The LTADD staff also used GPS to map structures located in floodplains for Grayson, Hardin, Meade, and Nelson Counties in 2010. All this data was compared against the calculated landslide and FEMA DFIRM flood plain polygon datasets in a GIS program to generate an approximate count of residences within each of the county’s landslide and flood plain hazard areas. This data is used for estimate purposes only and should not be considered definitive or complete counts.

For consistency, Residential and Mobile Home facilities counts are based on US Census, American Community Survey 2019 5-year estimates for Total Housing Units. Data represents the total Housing Unit count minus the percentage figure of Mobile Homes to reach the values for each.

Replacement value for homes is from the US Census “Median value of owner-occupied housing units” and the “Median Value for Mobile Homes”, both 2019 5-year ACS data

Replacement value for other specific data types is based on FEMA’s HAZUS data. The Kentucky statewide data layer was accessed for this information. FEMA parameters for this data are as follows:

The November 2019 release has made significant updates to the below datasets. Essential Facility, Transportation and Utility data have been updated using the latest versions (as of November 1, 2019) of the HIFLD Open datasets. All valuations have been updated to RSMeans 2018 values and reflect Census 2010 data. Sourced from: <https://msc.fema.gov/portal/resources/hazus>

The individual data valuation in the following tables was taken from the following sources:

Residential	US Census, 2019 5-year ACS, Median value of owner-occupied housing units. B25077 MEDIAN VALUE (DOLLARS)
Mobile Homes	US Census, 2019 5-year ACS, Tot Mobile Home ACSDP5Y2019, B25083 MEDIAN VALUE (DOLLARS) FOR MOBILE HOMES
Emergency Operations Center	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Broadcast Facility	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Hospital	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Sewage Treatment Plant	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-2, Table 10-2
Water Treatment Plant	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-5, Table 10-3
Pumping Stations (Large, >10 MGD)	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-4, Table 10-3
Pumping Stations (Small, < 10 MGD)	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-4, Table 10-3
Wells	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-5, Table 10-3
Storage Tanks (Concrete)	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 10-5, Table 10-3
Storage Tanks (Steel)	p. 10-5, Table 10-3
Schools (Elementary & Secondary)	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Airport Facilities (excluding runway cost)	Hazus Inventory Technical Manual, Hazus 4.2 Service Pack 3, Feb. 2021, p. 9-3, Table 9-2, 2019
Natural Gas Facilities	Hazus 5.1, KY HFLD Data, Download Jan. 2022.
Power Plants/Oil Refineries	Hazus 5.1, KY HFLD Data, Download Jan. 2022.

Table 3.3.4.8 - Current inventory of existing structures and their potential loss estimate by County/City

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Breckinridge County	Residential	7,927	\$102,900	\$815,688,300	302	\$31,075,800	230	\$23,667,000
Cloverport Hardinsburg Irvington	Mobile Homes	2,902	\$55,900	\$162,221,800	9	\$503,100	52	\$2,906,800
	Emergency Operations Center	1	n/a	\$2,460,950				
	Broadcast Facility	4	98,000	\$392,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	23	Hazus data is aggregated for total value.	\$14,964,000	3	Unable to determine due to Hazus data aggregation methods.		
	Hospital	1	n/a	\$2,993,000				
	Sewage Treatment Plant	3	111,000,000	\$333,000,000				
	Water Treatment Plant	1	30,000,000	\$30,000,000				
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	7	150,000	\$1,050,000				
	Wells	3	400,000	\$1,200,000				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	13	800,000	\$10,400,000				
	Schools (Elementary & Secondary)	9	Hazus data is aggregated for total value.	\$48,312,853				
	Airport Facilities (excluding runway cost)	1	5,000,000	\$5,000,000				
	Natural Gas Facilities	1	1,548,460	\$1,548,460				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Total		10,895	\$151,278,260	\$1,429,231,363	314	\$31,578,900	282	\$26,573,800

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Grayson County	Residential ¹	10,706	\$113,900	\$1,219,413,400	65	\$7,403,500	1	\$113,900
Caneyville Clarkson Leitchfield	Mobile Homes	2,961	\$36,800	\$108,964,800				
	Emergency Operations Center	1	n/a	\$2,405,020				
	Broadcast Facility	2	98,000	\$196,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	19	Hazus data is aggregated for total value.	\$11,083,000				
	Hospital	1	n/a	\$8,775,709				
	Sewage Treatment Plant	3	111,000,000	\$333,000,000				
	Water Treatment Plant	2	30,000,000	\$60,000,000				
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	11	150,000	\$1,650,000	1	\$150,000		
	Wells	0	400,000	\$0				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	14	800,000	\$11,200,000				
	Schools (Elementary & Secondary)	7	Hazus data is aggregated for total value.	\$58,461,181				
	Airport Facilities (excluding runway cost)	2	5,000,000	\$10,000,000				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Totals		13,729	\$151,270,160	\$1,825,149,110	66	\$7,553,500	1	\$113,900

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Hardin County	Residential ¹	42,037	\$156,600	\$6,582,994,200	863	\$135,145,800	22	\$3,445,200
Elizabethtown Radcliff Sonora Upton Vine Grove West Point	Mobile Homes ²	4,640	\$46,200	\$214,368,000	101	\$4,666,200		
	Emergency Operations Center	2	n/a	\$4,810,040				
	Broadcast Facility	7	98,000	\$686,000	2	\$196,000		
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	42	Hazus data is aggregated for total value.	\$75,080,000	5	Unable to determine due to Hazus data aggregation methods.		
	Hospital	3	Hazus data is aggregated for total value.	\$54,409,396				
	Sewage Treatment Plant	5	111,000,000	\$555,000,000	2	\$222,000,000		
	Water Treatment Plant	5	30,000,000	\$150,000,000	2	\$60,000,000		
	Pumping Stations (Large, >10 MGD)	1	525,000	\$525,000	1	\$525,000		
	Pumping Stations (Small, < 10 MGD)	19	150,000	\$2,850,000	3	\$450,000		
	Wells	18	400,000	\$7,200,000	18	\$7,200,000		
	Storage Tanks (Concrete)	4	1,500,000	\$6,000,000				
	Storage Tanks (Steel)	28	800,000	\$22,400,000	1	\$800,000		
	Schools (Elementary & Secondary)	38	Hazus data is aggregated for total value.	\$237,634,789				
	Airport Facilities (excluding runway cost)	2	5,000,000	\$10,000,000				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	1	98,000	\$98,000				
County Total		46,852	\$151,322,260	\$7,924,055,425	998	\$430,983,000	22	\$3,445,200

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
LaRue County	Residential	5,483	\$115,600	\$633,834,800	78	\$9,016,800	7	\$809,200
Hodgenville	Mobile Homes ¹	899	\$50,900	\$45,759,100				
	Emergency Operations Center	1	n/a	\$2,377,050				
	Broadcast Facility	1	98,000	\$98,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	10	Hazus data is aggregated for total value.	\$10,482,000	1	Unable to determine due to Hazus data aggregation methods.		
	Hospital	0	n/a	n/a				
	Sewage Treatment Plant	1	111,000,000	\$111,000,000	1	\$111,000,000		
	Water Treatment Plant	1	30,000,000	\$30,000,000	1	\$30,000,000		
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	7	150,000	\$1,050,000				
	Wells	0	400,000	\$0				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	11	800,000	\$8,800,000				
	Schools (Elementary & Secondary)	4	Hazus data is aggregated for total value.	\$30,506,621				
	Airport Facilities (excluding runway cost)	0	5,000,000	\$0				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Totals		6,418	\$151,285,960	\$873,907,571	81	\$150,016,800	7	\$809,200

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Marion County	Residential	7,230	\$105,400	\$762,042,000	185	0	19	\$2,002,600
Bradfordsville	Mobile Homes	1,078	\$31,200	\$33,633,600			1	\$31,200
Lebanon	Emergency Operations Center	1	n/a	\$2,460,950				
Loretto	Broadcast Facility	3	98,000	\$294,000			1	\$98,000
Raywick	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	18	Hazus data is aggregated for total value.	\$14,021,000				
	Hospital	1	n/a	\$8,979,795				
	Sewage Treatment Plant	2	111,000,000	\$222,000,000	1	\$111,000,000		
	Water Treatment Plant	1	30,000,000	\$30,000,000	1	\$30,000,000		
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	4	150,000	\$600,000				
	Wells	0	400,000	\$0				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	11	800,000	\$8,800,000				
	Schools (Elementary & Secondary)	9	Hazus data is aggregated for total value.	\$45,461,229				
	Airport Facilities (excluding runway cost)	0	5,000,000	\$0				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Total		8,358	\$151,256,060	\$1,128,292,574	187	\$141,000,000	0	\$2,131,800

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Meade County	Residential	10,244	\$153,500	\$1,572,454,000	141	\$21,643,500	39	\$5,986,500
Brandenburg Ekron Muldraugh	Mobile Homes	2,198	\$74,200	\$163,091,600	3	\$222,600	1	\$74,200
	Emergency Operations Center	1	n/a	\$2,460,950				
	Broadcast Facility	2	98,000	\$196,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	19	Hazus data is aggregated for total value.	\$13,901,000	1	Unable to determine due to Hazus data aggregation methods.		
	Hospital	0	n/a	n/a				
	Sewage Treatment Plant	1	111,000,000	\$111,000,000				
	Water Treatment Plant	2	30,000,000	\$60,000,000				
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	9	150,000	\$1,350,000				
	Wells	3	400,000	\$1,200,000	3	\$1,200,000		
	Storage Tanks (Concrete)	1	1,500,000	\$1,500,000				
	Storage Tanks (Steel)	8	800,000	\$6,400,000				
	Schools (Elementary & Secondary)	10	Hazus data is aggregated for total value.	\$74,142,233				
	Airport Facilities (excluding runway cost)	0	5,000,000	\$0				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Total		12,498	\$151,347,160	\$2,007,695,783	148	\$23,066,100	40	\$6,060,700

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Nelson County	Residential ¹	17,543	\$154,700	\$2,713,902,100	92	\$14,232,400	0	0
Bardstown Bloomfield Fairfield New Haven	Mobile Homes	1,508	\$40,400	\$60,923,200				
	Emergency Operations Center	1	n/a	\$2,460,950				
	Broadcast Facility	2	98,000	\$196,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	22	Hazus data is aggregated for total value.	\$19,365,000	4	Unable to determine due to Hazus data aggregation methods.		
	Hospital	1	n/a	\$4,789,224				
	Sewage Treatment Plant	3	111,000,000	\$333,000,000	1	\$111,000,000		
	Water Treatment Plant	1	30,000,000	\$30,000,000				
	Pumping Stations (Large, >10 MGD)	1	525,000	\$525,000				
	Pumping Stations (Small, < 10 MGD)	13	150,000	\$1,950,000	1	\$150,000		
	Wells	0	400,000	\$0				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	24	800,000	\$19,200,000			2	\$1,600,000
	Schools (Elementary & Secondary)	20	Hazus data is aggregated for total value.	\$107,347,817				
	Airport Facilities (excluding runway cost)	1	5,000,000	\$5,000,000				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Total		19,140	\$151,314,560	\$3,298,659,291	98	\$125,382,400	2	\$1,600,000

Jurisdiction	Type of Facility	# of Existing Structures	Estimated Replacement Value Per Unit	Total Potential Loss	# of Existing Structures in Floodplain	Potential Loss in Floodplain	# of Existing Structures in Landslide Prone Area	Potential Loss in Landslide Prone Area
Washington County	Residential	4,475	\$128,300	\$574,142,500	87	\$11,162,100	10	\$1,283,000
Mackville Springfield Willisburg	Mobile Homes	710	\$45,700	\$32,447,000	19	\$868,300	3	\$137,100
	Emergency Operations Center	1	n/a	\$2,460,950				
	Broadcast Facility	1	98,000	\$98,000				
	Government Building (Includes County & Municipal Government Structures, Fire & Police Stations, etal)	13	Hazus data is aggregated for total value.	\$10,407,000				
	Hospital	0	n/a	n/a				
	Sewage Treatment Plant	1	111,000,000	\$111,000,000				
	Water Treatment Plant	1	30,000,000	\$30,000,000				
	Pumping Stations (Large, >10 MGD)	0	525,000	\$0				
	Pumping Stations (Small, < 10 MGD)	5	150,000	\$750,000	1	\$150,000		
	Wells	0	400,000	\$0				
	Storage Tanks (Concrete)	0	1,500,000	\$0				
	Storage Tanks (Steel)	9	800,000	\$7,200,000				
	Schools (Elementary & Secondary)	6	Hazus data is aggregated for total value.	\$25,525,207				
	Airport Facilities (excluding runway cost)	1	5,000,000	\$5,000,000				
	Natural Gas Facilities	0	1,548,460	\$0				
	Power Plants/Oil Refineries	0	98,000	\$0				
County Total		5,223	\$151,293,460	\$799,030,657	107	\$12,180,400	13	\$1,420,100

Table 3.3.4.9 - Actual Losses Based on Past Events

Thunderstorm/Wind	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$1,761,803	265	60.5	0.25	4.21	\$29,121	\$6,648	0.00	0.00	0.07	0.02
Grayson	\$1,740,288	224	62.5	0.25	6.62	\$27,845	\$7,769	0.00	0.00	0.11	0.03
Hardin	\$65,915,949	366	64.5	4.45	133.17	\$1,021,953	\$180,098	0.07	0.01	2.06	0.36
LaRue	\$1,869,787	217	60.5	1.32	11.6	\$30,906	\$8,617	0.02	0.01	0.19	0.05
Marion	\$1,547,735	214	60.5	0.24	1.63	\$25,582	\$7,232	0.00	0.00	0.03	0.01
Meade	\$1,959,733	234	61.5	3.45	46.26	\$31,866	\$8,375	0.06	0.01	0.75	0.20
Nelson	\$1,794,130	294	60.5	0.3	12.58	\$29,655	\$6,102	0.00	0.00	0.21	0.04
Washington	\$1,668,572	200	60.5	0.22	3.58	\$27,580	\$8,343	0.00	0.00	0.06	0.02
LTADD	\$78,257,999	2014	64.5	10.48	219.65	\$1,213,302	\$38,857	0.16	0.01	3.41	0.11

Floods	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$7,811,684	60	54.5	2.09	0.11	\$143,334	\$130,195	0.04	0.03	0.00	0.00
Grayson	\$8,490,065	56	54.5	0.04	0.11	\$155,781	\$151,608	0.00	0.00	0.00	0.00
Hardin	49261888.78	88	54.5	2.17	0.11	\$903,888	\$559,794	0.04	0.02	0.00	0.00
LaRue	\$8,067,971	47	54.5	0.17	0.11	\$148,036	\$171,659	0.00	0.00	0.00	0.00
Marion	\$9,800,835	58	54.5	0.31	2.54	\$179,832	\$168,980	0.01	0.01	0.05	0.04
Meade	\$7,284,005	47	54.5	1.14	0.11	\$133,651	\$154,979	0.02	0.02	0.00	0.00
Nelson	35033005.07	104	54.5	3.17	2.11	\$642,807	\$336,856	0.06	0.03	0.04	0.02
Washington	\$9,124,658	50	54.5	1.17	1.11	\$167,425	\$182,493	0.02	0.02	0.02	0.02
LTADD	\$134,874,112	510	54.5	10.26	6.31	\$2,474,754	\$264,459	0.19	0.02	0.12	0.01

Hail	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$4,925,750	86	58.5	0.01	0.52	\$84,201	\$57,276	0.00	0.00	0.01	0.01
Grayson	\$2,438,935	87	57.5	0.01	0.5	\$42,416	\$28,034	0.00	0.00	0.01	0.01
Hardin	\$26,768,252	113	58.5	0.01	0.52	\$457,577	\$236,887	0.00	0.00	0.01	0.00
LaRue	\$1,969,355	66	65.5	0.06	0.56	\$30,066	\$29,839	0.00	0.00	0.01	0.01
Marion	\$35,497,179	64	60.5	0.06	2.56	\$586,730	\$554,643	0.00	0.00	0.04	0.04
Meade	\$25,032,572	74	66.5	0.01	2.52	\$376,430	\$338,278	0.00	0.00	0.04	0.03
Nelson	22857556	85	60.5	0.06	1.56	\$377,811	\$268,912	0.00	0.00	0.03	0.02
Washington	\$11,037,640	55	60.5	0.06	3.56	\$182,440	\$200,684	0.00	0.00	0.06	0.06
LTADD	\$130,527,238	630	66.5	0.28	12.3	\$1,962,816	\$207,186	0.00	0.00	0.18	0.02

Lightning	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$489,925	26	60.5	0.04	0.36	\$8,098	\$18,843	0.00	0.00	0.01	0.01
Grayson	\$423,574	32	60.5	0.04	4.36	\$7,001	\$13,237	0.00	0.00	0.07	0.14
Hardin	\$869,962	34	60.5	1.11	2.36	\$14,380	\$25,587	0.02	0.03	0.04	0.07
LaRue	\$61,022	33	60.5	0	0	\$1,009	\$1,849	0.00	0.00	0.00	0.00
Marion	\$404,253	36	61.5	0.14	0.39	\$6,573	\$11,229	0.00	0.00	0.01	0.01
Meade	\$129,715	28	60.5	0	0	\$2,144	\$4,633	0.00	0.00	0.00	0.00
Nelson	\$932,717	42	61.5	2.12	2.34	\$15,166	\$22,208	0.03	0.05	0.04	0.06
Washington	\$223,179	36	61.5	0.12	0.34	\$3,629	\$6,199	0.00	0.00	0.01	0.01
LTADD	\$4,265,847	276	60.5	5.57	13.15	\$70,510	\$15,456	0.09	0.02	0.22	0.05

Table 3.3.4.9 - Actual Losses Based on Past Events (cont.)

Snow & Ice	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$1,411,082	46	61.5	0.31	1.83	\$22,944	\$30,676	0.01	0.01	0.03	0.04
Grayson	\$1,981,398	49	61.5	0.29	3.41	\$32,218	\$40,437	0.00	0.01	0.06	0.07
Hardin	\$2,792,155	54	61.5	0.29	3.47	\$45,401	\$51,707	0.00	0.01	0.06	0.06
LaRue	\$1,050,662	44	61.5	0.29	3.36	\$17,084	\$23,879	0.00	0.01	0.05	0.08
Marion	\$2,681,555	37	61.5	0.29	3.36	\$43,603	\$72,474	0.00	0.01	0.05	0.09
Meade	\$1,420,840	47	61.5	0.29	1.81	\$23,103	\$30,231	0.00	0.01	0.03	0.04
Nelson	\$2,307,155	48	61.5	1.29	3.47	\$37,515	\$48,066	0.02	0.03	0.06	0.07
Washington	\$2,697,743	47	61.5	0.37	3.48	\$43,866	\$57,399	0.01	0.01	0.06	0.07
LTADD	\$16,342,589	372	61.5	3.42	24.19	\$265,733	\$43,932	0.06	0.01	0.39	0.07

Tornados	Total Cost	Number Events	Number Years	Total Loss of Life	Total Injuries	Average Cost Per Year	Average Cost Per Event	Average Loss of Life Per Year	Average Loss of Life Per Event	Average Injuries Per Year	Average Injuries Per Event
Breckinridge	\$5,285,260	17	61.5	1.09	20.00	\$85,939	\$310,898	0.02	0.06	0.33	1.18
Grayson	\$56,783,213	16	62.5	3.00	23.09	\$908,531	\$3,548,951	0.05	0.19	0.37	1.44
Hardin	\$16,643,723	26	61.5	2.00	73.09	\$270,630	\$640,143	0.03	0.08	1.19	2.81
LaRue	\$5,210,111	12	69.5	0.00	19.12	\$74,966	\$434,176	0.00	0.00	0.28	1.59
Marion	\$920,833	13	61.5	0.00	4.15	\$14,973	\$70,833	0.00	0.00	0.07	0.32
Meade	\$6,342,324	14	61.5	31.00	268.07	\$103,127	\$453,023	0.50	2.21	4.36	19.15
Nelson	\$2,233,978	14	61.5	1.00	28.15	\$36,325	\$159,570	0.02	0.07	0.46	2.01
Washington	\$1,840,007	11	61.5	0.00	5.15	\$29,919	\$167,273	0.00	0.00	0.08	0.47
LTADD	\$95,259,449	123	63	38.09	440.82	\$1,521,109	\$774,467	0.61	0.31	7.04	3.58

NOTE: The historic frequency of a hazard event over a given period of time determines the historic recurrence interval.

For example: If there have been 10 Thunderstorm events in the County in the past 5 years, statistically you could expect that there will be 2 events a year.

Realize that from a statistical standpoint, there are several variables to consider. 1) Accurate hazard history data and collection are crucial to an accurate recurrence interval and frequency. 2) Data collection and accuracy has been much better in the past 10-20 years (NCDC weather records). 3) It is important to include all significant recorded hazard events which will include periodic updates to this table.

By updating and reviewing this table over time, it may be possible to see if certain types of hazard events are increasing in the past 10-20 years.

These values should be considered low. More events that have occurred than are documented by the sources used in this table.

All data is compiled at the county level due to extremely limited city specific data, therefore all data and analysis represents incorporated and unincorporated areas inclusively.

Compilation of SHEL DUS, NCDC & NCEI. 1967- June 30, 2015.

Chart 3.3.4.4 - Lincoln Trail Region - Average Cost Per Year by Event

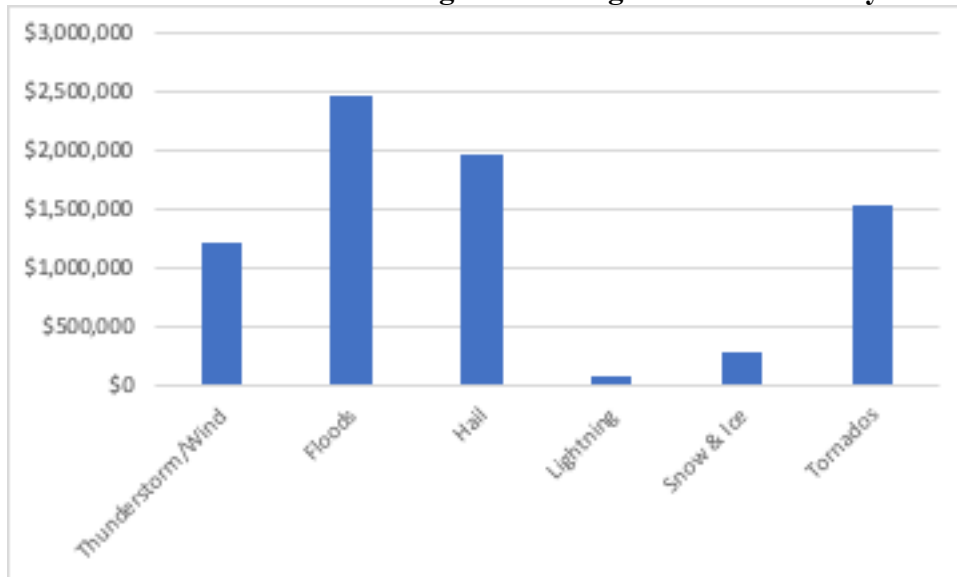


Chart 3.3.4.5 - Lincoln Trail Region - Average Cost Per Event

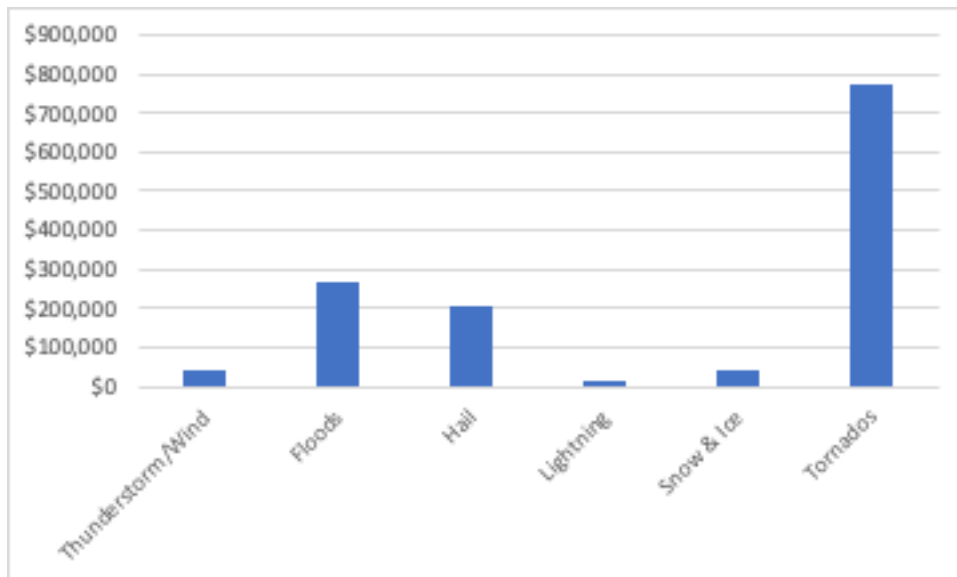


Chart 3.3.4.6 - Lincoln Trail Region - Average Loss of Life Per Year

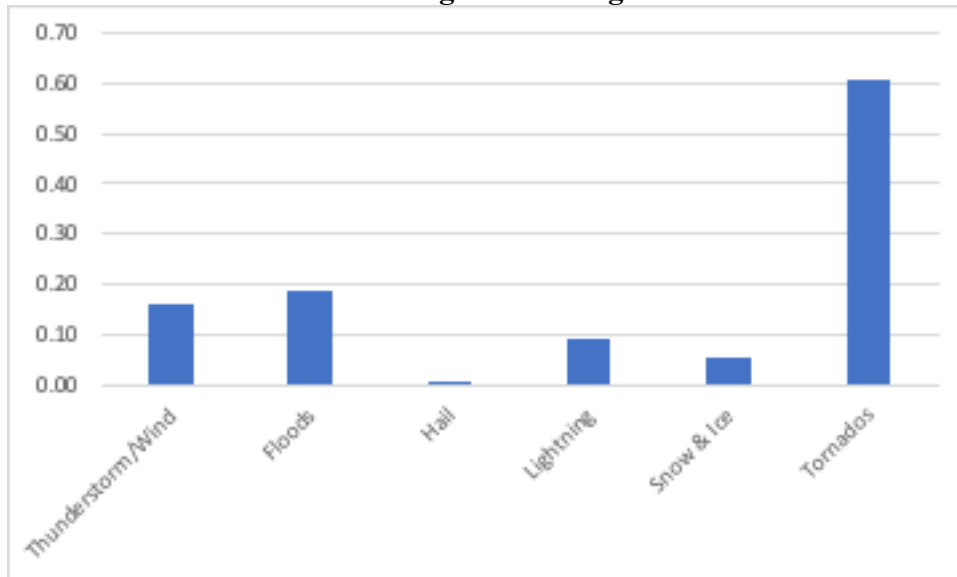


Chart 3.3.4.7 - Lincoln Trail Region - Average Injuries Per Year

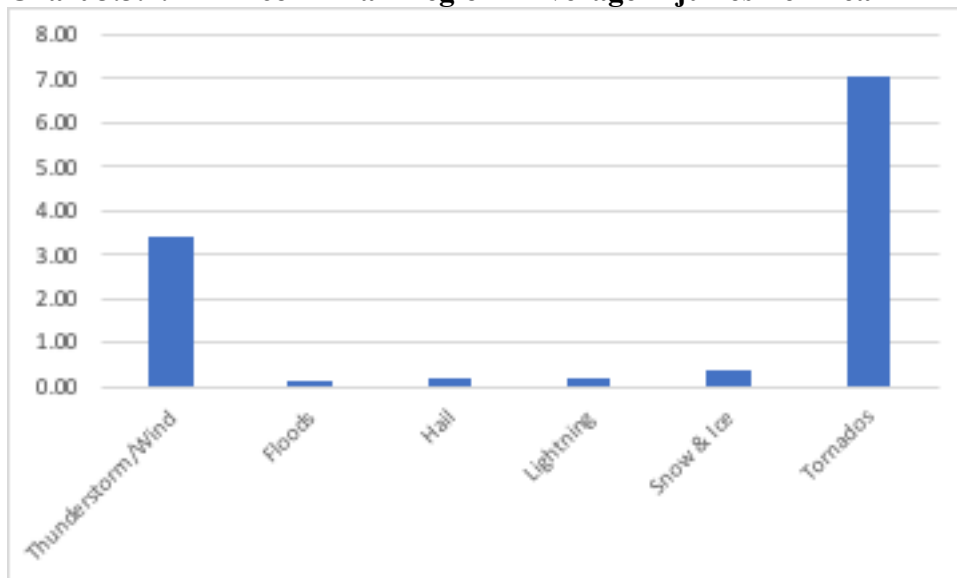


Chart 3.3.4.8 - Lincoln Trail Region – Total Events of Documented Period

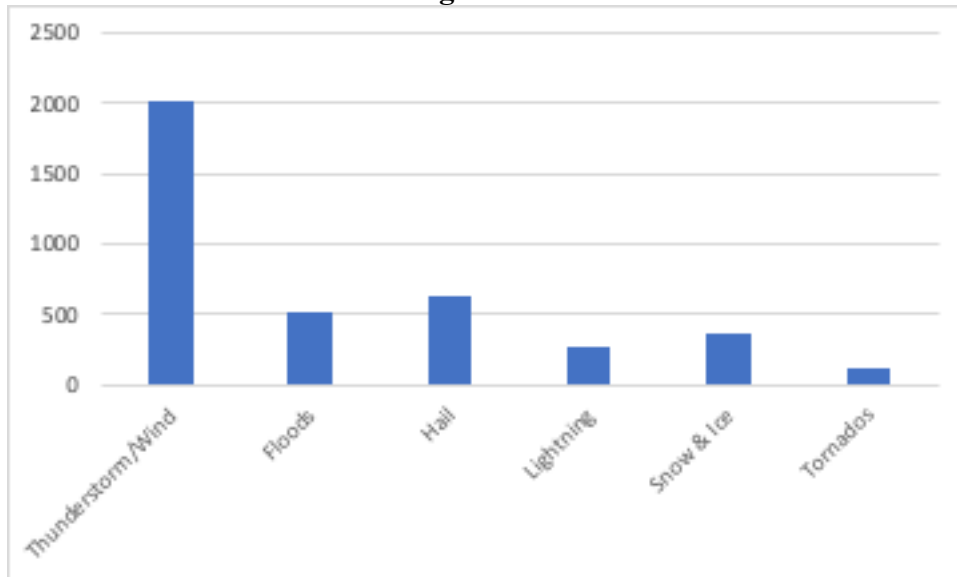
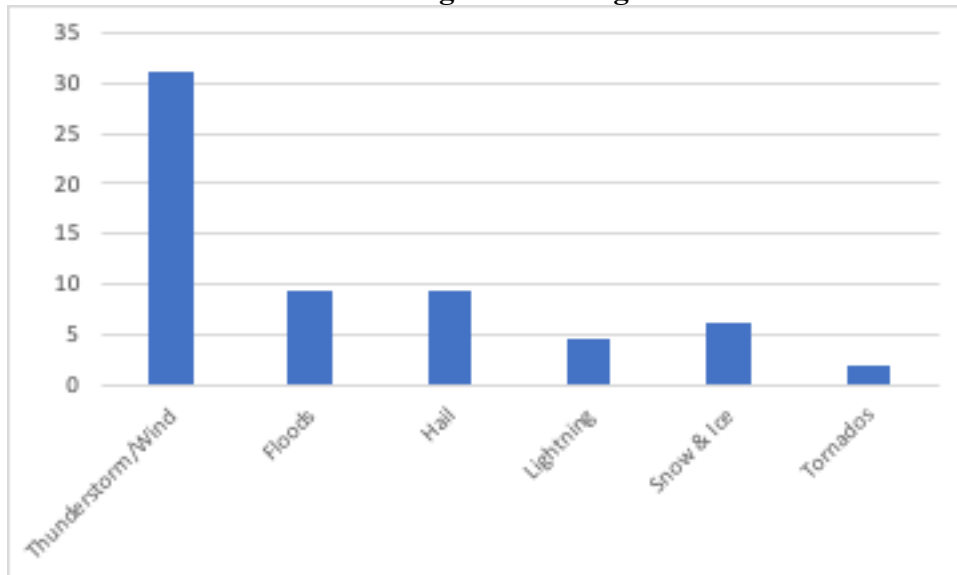


Chart 3.3.4.9 - Lincoln Trail Region – Average Events Per Year



3.3.5 Assessing Vulnerability: Analyzing Develop Trends

Population Growth

The Kentucky State Data Center at the University of Louisville, projects population growth based on the most recent census data. Table 3.3.5.1 illustrates the population growth for each of the eight counties in the Lincoln Trail Region as well as the entire region. At the time of writing, there has been no additional population projections made for the region, actual 2020 population figures are included.

Half of the counties within the region are expected to grow over the next 20 years, while the other half is expected to decrease. Hardin county is expected to see the largest percentage increase of 19.92%. Meade County is expected to see the largest percentage decrease of 12.14%. Meanwhile, the entire region is expected to see an increase of 9.19%.

Tracking population growth offers the region the opportunity to assess how efficiently its first response and preparedness capabilities will effectively serve the population.

Table 3.3.5.1 Population Growth Projections for the Lincoln Trail Region								
Jurisdiction	2015	2020	2020 Actual*	2025	2030	2035	2040	Projected Gain (2020- 2024)
Breckinridge Co.	20,018	19,973	20,432	19,848	19,611	19,246	18,805	-5.85%
Grayson Co.	26,221	26,433	26,420	26,489	26,440	26,275	26,128	-1.15%
Hardin Co.	106,439	112,494	110,702	118,413	124,137	129,638	134,901	19.92%
Larue Co.	14,241	14,311	14,867	14,348	14,309	14,197	14,040	-1.89%
Marion Co.	19,365	19,640	19,581	19,824	19,929	19,961	19,909	1.37%
Meade Co.	27,924	27,395	30,003	26,780	26,025	25,127	24,068	-12.14%
Nelson Co.	45,126	47,473	46,738	49,702	51,695	53,337	54,752	15.33%
Washington Co.	12,063	12,354	12,027	12,656	12,904	13,079	13,198	6.83%
Lincoln Trail Region	271,397	280,073	280,770	288,060	295,050	300,860	305,801	9.19%
<i>Source: Kentucky State Data Center, University of Louisville, 2020</i>								
<i>* 2020 US Census</i>								

Housing

In addition to an increase in population, each county in the Lincoln Trail Region has realized an increase in housing units and number of households. With these increases, each county must assess its level of resiliency and preparedness to meet the needs and responsibility of additional residents and property. Table 3.3.5.2 summarizes the population, number of households and number of housing units in each county in 2010. Table 3.3.5.3 immediately below it, shows the number of households and housing units in each county in 2020, and the increase since the 2010 census.

Table 3.3.5.2 - Households and Housing Units in Lincoln Trail Region - 2010

County	Population	Housing Units	Households
Breckinridge Co.	20,059	10,592	7,213
Grayson Co.	25,743	13,506	9,897
Hardin Co.	105,543	44,211	39,401
LaRue Co.	14,193	6,198	5,221
Marion Co.	19,820	8,164	7,368
Meade Co.	28,602	11,891	10,342
Nelson Co.	43,437	18,189	16,571
Washington Co.	11,717	5,034	4,480
<i>Source: U.S. Census Bureau – 2010 Census</i>			

Table 3.3.5.3 - Households and Households in the Lincoln Trail Region - 2020

County	Housing Units	% change from 2010 to 2020	Households*	% change from 2010 to 2020 (2019 Estimates)*
Breckinridge Co.	10,704	1.06%	7,598	5.34%
Grayson Co.	13,275	-1.71%	9,758	1.40%
Hardin Co.	46,669	5.56%	41,646	5.70%
LaRue Co.	6,474	4.45%	5,741	9.96%
Marion Co.	8,350	2.28%	7,405	0.50%
Meade Co.	11,943	0.44%	10,685	3.32%
Nelson Co.	19,716	8.39%	17,853	7.74%
Washington Co.	5,196	3.22%	4,581	2.25%
<i>Source: 2020 US Census</i>				
<i>*U.S. Census Bureau – 2019 American Communities Survey</i>				

Housing Growth

Table 3.3.5.4 shows data from the U.S. Census Bureau database concerning new, privately-owned, residential building permits reported by each of the eight counties in the Lincoln Trail Region. Most counties have seen a significant decline in residential construction over the past 20 years, due in part, to the decline in the economy and the reduction of troops and programs at Fort Knox. However, growth in Hardin County and Nelson County in recent has led to total increases across the Lincoln Trail region.

Table 3.3.5.4 - Residential Building Permits Totals							
Jurisdiction	2004	2006	2008	2010	2012	2014	2020
Breckinridge Co. Total	21	12	10	5	5	2	2
Grayson Co. Total	1	0	1	12	6	2	10
Hardin Co. Total	936	872	433	714	273	212	595
LaRue Co. Total	88	56	25	33	38	36	37
Marion Co. Total	15	6	8	7	10	10	58
Meade Co. Total	140	147	113	145	79	79	130
Nelson Co. Total	416	328	183	146	112	176	282
Washington Co. Total	5	7	3	2	7	8	12
LTADD Total	1622	1428	776	1064	530	525	1126

Source: U.S. Bureau of the Census

Land Use

There has been no significant change in land use within the Lincoln Trail Region over the last five years. The growth areas of Hardin and Nelson Counties have continued to realize some population growth, and several counties have completed work on highway bypass projects. However, the region remains largely rural in nature and has a strong agricultural presence. According to the U.S. Department of Agriculture's Natural Agriculture Statistics Services (NASS), there were 1,476,006 acres of farmland in the Region in 2017. Across each county's farmland acreage approximately 51.37% is used as cropland, 23.5% as pastureland, 20.87% as woodland, and 4.75% for other purposes.

The economic impact of agricultural activities in the region is significant. In 2017, NASS estimated the value of agricultural products sold was \$466,884,000.00. Of that amount, about \$ 252,310.00 was in crop sales and \$ 214,574.00 in the sale of livestock.

Changes and development in the region are guided and controlled by the comprehensive plans of each jurisdiction, and development in hazard prone areas is restricted.

Table 3.3.5.5 summarizes agricultural land use and data for each of the eight counties in the region. The data illustrates that between 1997 and 2017, each county in the Lincoln Trail region averaged a 9.45% decrease in the number of farms, a decrease of 1.6% in the number of acres of land used for farmland; and an overall increase of about 83.64% in the estimated market value of farm products sold.

Table 3.3.5.5 - Lincoln Trail Region Agricultural Statistics: 1997 to 2017

Jurisdiction	Year	Number of Farms	Number of Acres in Farmland	Estimated Market Value of Farm Products Sold
Breckinridge County	1997	1,501	281,261	\$32,712,000
	2002	1,443	276,456	\$28,714,000
	2007	1,509	274,473	\$56,081,000
	2012	1,304	259,774	\$79,537,000
	2017	1,357	275,105	\$99,439,000
% Change from 1997 to 2017				
		-9.59%	-2.18%	203.98%
Grayson County	1997	1,568	221,081	\$34,860,000
	2002	1,650	233,136	\$31,642,000
	2007	1,513	216,492	\$41,192,000
	2012	1,407	200,895	\$45,663,000
	2017	1,339	212,343	\$59,578,000
% Change from 1997 to 2017				
		14.60%	-3.95%	70.90%
Hardin County	1997	1,854	236,346	\$40,418,000
	2002	1,732	239,740	\$35,898,000
	2007	1,588	222,267	\$46,907,000
	2012	1,357	202,970	\$57,949,000
	2017	1,305	199,201	\$59,242,000
% Change from 1997 to 2017				
		-29.61%	-15.71%	46.57%
LaRue County	1997	896	122,658	\$25,272,000
	2002	888	134,410	\$21,057,000
	2007	811	125,432	\$26,579,000
	2012	720	111,975	\$41,877,000
	2017	718	110,371	\$41,112,000
% Change from 1997 to 2017				
		-19.86%	-10.01%	62.67%

Marion County	1997	1,072	172,011	\$34,336,000
	2002	1,054	171,252	\$28,754,000
	2007	1,055	160,684	\$39,653,000
	2012	1,016	166,417	\$56,491,000
	2017	954	162,949	\$60,230,000
% Change from 1997 to 2017				
		-11.01%	-5.27%	75.41%
Meade County	1997	964	129,046	\$19,480,000
	2002	955	134,771	\$16,171,000
	2007	887	121,448	\$28,712,000
	2012	754	119,495	\$36,571,000
	2017	781	141,054	\$45,793,000
% Change from 1997 to 2017				
		-18.98%	9.31%	135.08%
Nelson County	1997	1,401	185,507	\$39,525,000
	2002	1,407	189,104	\$33,242,000
	2007	1,406	196,225	\$54,803,000
	2012	1,326	187,755	\$64,439,000
	2017	1,434	213,534	\$67,099,000
% Change from 1997 to 2017				
		2.35%	15.11%	69.76%
Washington County	1997	1,142	162,741	\$32,833,000
	2002	1,119	149,739	\$27,060,000
	2007	1,119	162,993	\$33,000,000
	2012	1,011	140,948	\$33,770,000
	2017	1,102	161,449	\$34,391,000
% Change from 1997 to 2017				
		-3.50%	-0.08%	4.74%
Source: U.S. Department of Agriculture, National Agriculture Statistics Service				

Economic and Social Growth

According to the *Lincoln Trail Occupational Outlook to 2024*, published by the Education and Workforce Development Cabinet, the Department of Workforce Investment and the Kentucky Office of Employment and Training, employment in the Lincoln Trail Region is projected to grow from a 2014 level of 90,037 to 99,094 by 2024: a projected gain of 10.06%.

Total annual job openings are expected to be about 3,094, with an annual growth in job openings of approximately 956. About 2,138 of the annual job openings are expected to result from separations from the labor force due to retirements or job transfers. 31% percent of job openings will result from growth, with the remaining 69% resulting from separations from the labor force.

The greatest number of annual job openings is expected to be in Production Occupations, followed by Office and Administrative Support Occupations and Sales and Related Occupations. The two occupations with the greatest number of job openings are Combined Food Preparation and Serving Workers, Including Fast Food and Team Assemblers.

The highest growth rate occupations for the decade are most likely to be:
 Healthcare Support Occupations (16.03%)
 Healthcare Practitioners and Technical Occupations (15.72%)
 Computer and Mathematical Occupations (15.42%)

Table 3.3.5.6 - Lincoln Trail Region Industrial Sites by County	
Breckinridge County	Meade County
Breckinridge County Commerce Park	Wolf Creek -- Preliminary Site 163-013
Old Cloverport Holt Road Site	
Grayson County	Nelson County
Judge K.H. Goff Industrial Park 085-001	Wilson Industrial Park 179-003
Leitchfield Industrial Site 085-008	Bardstown -- Nelson County Industrial Park
	Bardstown TEBCO 179-009
	C Ballard Property
Hardin County	Washington County
Hughes Center of Commerce & Industry	Washington County Commerce Center 229-004
T.J. Patterson Industrial Park 093-003	Springfield -- Terrell Ridge Site 229-005
Millpond Business Center 093-004	
Glendale Mega Site 093-005	
Marion County	
Crossroads Industrial Park 155-004	
<i>Source: Kentucky Cabinet for Economic Development 2021</i>	

Table 3.3.5.7 – Employment by Type and County (U.S. Census Bureau)

Type of Employment	Breckinridge				Grayson				Hardin				LaRue			
Year	2005	2010	2015	2020	2005	2010	2015	2020	2005	2010	2015	2020	2005	2010	2015	2020
Accommodation and Food Services	223	207	229	232	443	471	530	608	3,623	4,086	4,788	4,156	177	190	193	171
Admin. & Support, Waste Man. & Remediation Services	27	**	22	23	486	319	306	275	2,115	2,535	4,037	2,269	58	90	84	130
Agriculture, Forestry, Fishing & Hunting	18	15	19	14	30	29	21	12	50	24	32	58	10	32	38	48
All Gov't	909	943	913	803	1,639	1,708	1,689	1,475	11,131	13,720	13,194	11,460	636	658	641	489
Arts, Entertainment, and Recreation	17	**	**	28	40	14	14	20	151	145	184	287	34	30	19	11
Construction	268	223	195	270	434	401	336	389	2,075	1,311	1,158	1,248	201	173	275	163
Education	**	**	**	**	0	0	**	**	116	194	237	85	**	0	0	0
Finance & Insurance	131	122	131	139	202	234	254	221	1,691	1,425	1,310	1,299	131	149	123	138
Health Care and Social Assistance	428	506	524	535	675	726	748	746	3,614	4,088	3,938	3,976	258	379	413	312
Information	34	28	**	**	44	43	28	30	867	932	809	872	**	**	**	**
Man. of Companies/Enterprises	**	**	**	0	**	**	**	**	166	346	517	871	0	0	0	0
Manufacturing	246	229	293	287	2,324	1,482	1,975	1,628	6,123	4,616	7,271	6,629	706	469	538	448
Mining, Quarrying, & Oil & Gas Extraction	24	30	**	**	**	**	**	**	**	**	**	**	0	0	0	0
Other Services (except Public Admin.)	57	99	81	59	77	141	150	89	1,166	1,243	1,327	998	83	87	75	77
Professional, Scientific, & Technical Services	47	64	132	86	64	70	66	60	1,617	1,788	1,472	1,255	28	27	35	33
Real Estate & Rental & Leasing	22	39	39	27	49	80	59	56	390	438	407	511	12	5	4	5
Retail Trade	478	520	517	522	1,111	1,061	1,022	1,013	5,849	5,813	5,917	5,759	226	209	202	217
Transportation and Warehousing	54	41	48	58	106	97	101	57	889	833	899	1,145	65	35	45	40
Unclassified	0	**	0	0	**	**	0	**	**	**	8	5	**	0	0	**
Utilities	**	**	**	**	**	**	**	**	**	**	**	134	0	**	**	**
Wholesale Trade	79	87	218	198	287	325	374	349	725	721	723	726	31	22	12	8

Type of Employment	Marion				Meade				Nelson				Washington			
Year	2005	2010	2015	2020	2005	2010	2015	2020	2005	2010	2015	2020	2005	2010	2015	2020
Accommodation and Food Services	438	522	371	325	377	419	400	458	912	887	1,304	1,296	193	205	189	175
Admin. & Support, Waste Man. & Remediation Services	822	602	241	188	29	44	31	56	791	1,050	856	557	76	56	42	48
Agriculture, Forestry, Fishing & Hunting	40	14	**	**	7	10	19	17	10	11	51	40	30	21	47	66
All Gov't	974	1,016	779	906	1,103	1,155	1,149	674	1,839	1,925	1,973	1,528	530	506	550	391
Arts, Entertainment, and Recreation	41	23	39	21	**	**	**	**	107	85	92	69	**	**	**	**
Construction	193	172	216	201	368	426	386	387	1,405	964	1,118	1,337	283	191	272	284
Education	0	**	**	**	**	**	**	0	36	41	34	31	**	**	**	0
Finance & Insurance	127	135	147	143	112	114	125	129	364	331	348	355	82	88	88	81
Health Care and Social Assistance	708	814	975	893	280	302	271	331	1,515	1,619	1,637	1,579	211	251	322	377
Information	**	27	**	**	95	124	95	86	109	105	109	89	**	**	**	**
Man. of Companies/Enterprises	0	**	**	**	**	0	**	**	**	**	**	41	0	0	0	0
Manufacturing	2,885	2,742	3,757	2,786	289	300	367	336	3,991	3,624	4,154	4,891	911	843	1,055	1,068
Mining, Quarrying, & Oil & Gas Extraction	0	0	0	0	99	105	110	125	**	**	**	**	**	**	0	0
Other Services (except Public Admin.)	86	159	123	122	142	194	192	160	269	337	345	262	81	108	121	92
Professional, Scientific, & Technical Services	90	84	130	124	46	148	72	86	225	237	240	265	32	30	35	34
Real Estate & Rental & Leasing	23	13	22	16	81	85	91	88	78	62	92	91	14	7	**	**
Retail Trade	555	688	650	620	669	615	607	639	1,809	1,757	1,829	1,868	259	257	253	235
Transportation and Warehousing	57	35	104	90	94	37	34	39	356	464	556	557	80	84	96	87
Unclassified	0	0	**	**	**	0	**	0	21	**	**	6	**	0	**	**
Utilities	0	0	0	0	**	**	**	**	**	**	**	**	**	0	0	0
Wholesale Trade	92	135	224	176	52	34	50	27	390	399	458	507	76	68	98	137

Source: Kentucky Center for Statistics: Labor Market Information

3.3.6 Multi-Jurisdictional Risk Assessment

Overall Summary

As previously stated, most of the natural hazards documented to significantly affect the Lincoln Trail Region, do not adhere to geographic boundaries. The exceptions are floods, landslides, and karst. That data enabled the LTHMC to determine that the entire region is at risk for those hazards identified in table 3.3.1.1. On a more definitive level, the tables below summarize the degree or level of risk each hazard poses to the individual counties and the region, as it pertains to the annual frequency chance and economic loss. With limited data at the city level for each hazard, any data that was gathered was merged to create a comprehensive county risk level. For county specific frequency percentages please refer to table 3.3.2.1, or for dollar losses, table 3.3.4.9

Risk Level	Frequency Chance Per year
High Risk Hazard	61%+
Moderate Risk Hazard	31%-60%
Low Risk Hazard	11%-30%
Negligible Risk Hazard	0%-10%

Table 3.3.6.1 - Risk Level based on Historical Frequency Chance Per Year

Economic Loss: In reviewing the economic loss table below, an annual loss of \$100,000 for an entire county may not seem to justify being categorized as “High Risk”. For a large metropolitan area, it probably shouldn’t be. However, six of the eight Lincoln Trail Region counties have less than 30,000 residents and three of the six have populations less than 20,000. The limited tax base and low-to- moderate-income (LMI) index* in most of these areas further exacerbates their circumstances and it is difficult for them to handle even the “Low Risk” hazards. Few of the Lincoln Trail jurisdictions have a LMI below 40% while only some have a LMI over 50%. In an area where 40%+ of the families have an income below 80% of the median, local units of government experience immense social and economic responsibilities that are compounded by the damages caused by annual weather events.

*Low to Moderate Income Index: Low- or moderate-income census tracts are considered to be those in which the median family income is below 80% of the median family income for the Metropolitan Statistical Area (MSA) or Primary Metropolitan Area (PMSA) in which they are located.

Risk Level	Economic Loss Per Year
High Risk Hazard	\$100,000+
Moderate Risk Hazard	\$50,000-\$99,999
Low Risk Hazard	\$25,000-\$49,999
Negligible Risk Hazard	0-\$24,999

Table 3.3.6.2 - Risk Level based on Annual Historical Economic Loss

	Thunderstorms/ Winds	Floods	Hail	Lightning	Snow & Ice	Tornados
Breckinridge	Low	High	Moderate	Negligible	Low	Moderate
Grayson	Low	High	Moderate	Negligible	Low	High
Hardin	High	High	High	Low	Low	High
LaRue	Low	High	Low	Negligible	Negligible	Moderate
Marion	Low	High	High	Negligible	Low	Negligible
Meade	Low	High	High	Negligible	Negligible	High
Nelson	Low	High	High	Negligible	Low	Low
Washington	Low	High	High	Negligible	Low	Low
LTADD	Low	High	High	Negligible	Low	High