

Appendix B: Network Analysis Assumptions and Volume Data Tables

SEACOAST TRANSPORTATION CORRIDOR VULNERABILITY ASSESSMENT

Network Analysis Assumptions

The Regional Travel Demand Model (Model) is a TransCAD based tool for predicting, analyzing, and understanding how the transportation system responds to changes in the network or land use at a regional level. The model is what is known as a “Standard 4-Step” system that includes modules for trip generation, trip distribution, mode choice, and assignment. The model simulates the movement of people and vehicles within the region during an average day (2015 base year) and produces daily and hourly traffic assignments for each roadway included. The model includes 600 internal Transportation Analysis Zones (TAZs) organized around Census Block Groups and which incorporate data such as housing units, employment, vehicle ownership, and other socio-economic factors. The 4-step process is an iterative process that seeks to assign all origin-destination trip pairs and to the most efficient routes available:

1. A model analysis starts by calculating the total number of trips (trip generation) between each TAZ based on land use and socio-economic data.
2. These trips are then paired into origins and destinations in the distribution model.
3. The trips are then split into travel modes (auto, bus, walking, biking) in the mode split module.
4. Vehicle-based trips are assigned to the highway network in the assignment module.

Four SLR scenarios were developed to compare to the baseline (current 2015) condition. Scenario analysis requires a number of assumptions. Some of these are particular to the Model and some are specific to this assessment. The most critical of these are listed here and the full set are listed in Appendix B.

Model Specific Assumptions

- The model includes all state highways and many, but not all, local roadways. This can result in some obvious and direct alternate routes not being utilized. Island Path in Hampton Beach is an example of this.
- The travel demand model is calibrated and validated at the regional level and individual links and intersections can sometimes show significant deviation from observed traffic volumes.
- Traffic Analysis Zones (TAZs) are aggregations of land use because each individual land parcel cannot be modeled. Trips starting in a zone load onto the roadway network via “load

links” which are aggregations of the driveways and non-model streets within the zone. These connect to the network in 2-3 locations around the edge of each zone. Placement of these load links can have an impact on traffic volume, especially under the SLR scenarios which close some of the segments where the load links tie into the roadway network.

Scenario Specific Assumptions

- Each scenario utilizes identical trip generation, distribution, mode split however the assignment portion is unique to each. This means that the land use and socio-economic components are consistent, that residences and business are still in the areas that are inundated, and that traffic still desires to get to all areas.
- Roadway links impacted directly by SLR are restricted with a very low (or zero) capacity for traffic and are, in essence, “shut off” to simulate road closures. This forces the model to assign the traffic to the next most efficient route available.
- The links in the model are longer than the areas directly flooded from sea-level rise. Operationally, if part of a link is inundated, the entire link is considered not accessible to traffic for the purposes of this analysis.
- This analysis uses model volume outputs to estimate the scale of expected changes under each SLR condition. The percent change in volume estimated by the model is applied to Annualized Average Daily Traffic (AADT) information calculated from current traffic count data to produce outputs consistent with current traffic volume. If information is available to indicate that peak summer traffic is significantly higher than the annual average, that information is included as well.
- Small changes in volume ($\pm 5\%$ or less) are generally not addressed

Volume Data Tables

For this assessment, the percent change in volume estimated by the model was applied to Annualized Average Daily Traffic (AADT) information to produce outputs consistent with current observed traffic volumes. Current traffic volume data was obtained from NHDOT's Transportation Data Management System (TDMS). Additional volume and turning movement count data for Hampton Beach was obtained from the ongoing work for NHDOT's Ocean Boulevard (Hampton 40797) reconstruction project, including some pedestrian and bicycle volume information.

The following tables show existing conditions and estimated volumes for each scenario. Locations highlighted in orange are those directly impacted by sea-level rise and in most cases the associated volumes drop to zero. AADT Year indicates the year in which the observed data was collected, and in most cases volumes predating 2020 were utilized.

AADT = Average Annualized Daily Traffic and is based on observed counts over a 3 or more day period at the site. These count volumes are adjusted with seasonal and vehicle type factors to produce an annual average volume.

1.0 Feet SLR

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
Rye						
2019	NH 1A West of Brackett Road	3,700	4,800	-27%	2,700	3,500
2017	NH 1A North of Wallis Rd	2,100	6,300	50%	3,200	9,500
2019	NH 1A South of Wallis Rd	2,400	4,800	5%	2,500	5,000
2019	NH 1A at Causeway Road	3,900	6,300	4%	4,100	6,600
Est	Marsh Road/Parsons Road	1,000	1,700	-100%	0	0
2019	Brackett Road Near NH 1A	1,500	2,600	-80%	300	500
Est	Brackett Road North of Wallis Rd	500	750	63%	800	1,200
Est	Wallis Road East of Brackett Road	1,000	1,400	100%	2,000	2,800
2017	Wallis Road West of Sagamore Road	2,800	4,000	3%	2,900	4,100
2017	Clark Road	450	600	48%	700	900
2019	Sagamore Road North of Clark Road	3,800	5,200	8%	4,100	5,600

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
North Hampton						
2017	Atlantic Ave (East of Sea Road)	1,900	4,900	9%	2,100	5,300
2017	Atlantic Ave (West of Woodland Rd)	4,200	5,600	3%	4,300	5,800
2017	NH 1A north of Atlantic Ave	5,300	8,200	2%	5,400	8,400
Hampton						
2018	Cusack Road	900	1,000	28%	1,200	1,300
2019	High Street	5,600	8,900	-100%	0	0
2019	Winnacunnet Road	4,800	7,200	166%	12,800	19,200
2017	NH 101 (Bi-directional)	8,100	17,700	-22%	6,300	13,800
2019	NH 101 (Highland Ave)	3,300	7,000	-100%	0	0
	Brown Avenue	4,000	9,200	50%	6,000	13,800
	Island Path	2,600	5,700	50%	3,900	8,600
2017	Woodland Road (N of N. Shore Rd)	1,000	1,300	17%	1,200	1,500
2019	Little River Rd/Woodland Rd (S of N. Shore Rd)	1,400	2,500	200%	4,200	7,500
2017	North Shore Road (West of Cusack Rd)	1,300	2,800	28%	1,700	3,600
Est	North Shore Road (East of Cusack Rd)	200	250	800%	1,800	2,300
2019	NH 1A north of High Street	5,600	11,800	-50%	2,800	5,900
2019	NH 1A north of Winnacunnet Road	5,300	6,900	30%	6,900	9,000
2018	NH 1A south of Winnacunnet Road	8,000	10,700	143%	19,400	26,000
2018	NH 1A north of Church Street	6,800	9,200	91%	13,000	17,600
2018	Ashworth Ave (SB) (N. of Brown Ave)	3,400	8,400	-60%	1,400	3,400

1.7 Feet SLR Scenario Volume Tables

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
Rye						
2019	NH 1A West of Brackett Rd	3,700	4,800	-27%	2,700	3,500
2017	NH 1A North of Wallis Rd	2,100	6,300	81%	3,800	11,400
2019	NH 1A South of Wallis Rd	2,400	4,800	6%	2,500	5,100
2019	NH 1A at Causeway Rd	3,900	6,300	68%	6,600	10,600
Est	Marsh Rd/Parsons Rd	1,000	1,700	-100%	0	0
2019	Brackett Rd Near NH 1A	1,500	2,600	-80%	300	500
Est	Brackett Rd North of Wallis Rd	500	750	64%	800	1,200
Est	Wallis Rd East of Brackett Rd	1,000	1,400	82%	1,800	2,500
2017	Wallis Rd West of Sagamore Rd	2,800	4,000	9%	3,100	4,400
2017	Clark Rd	450	600	66%	700	1,000
2017	Sagamore Rd North of Wallis Rd	2,800	3,700	7%	3,000	4,000
2019	Sagamore Rd North of Clark Rd	3,800	5,200	13%	4,300	5,900
Model	Lang Rd	3,800	NA	18%	4,500	NA
Model	Central Rd South of Lang Rd	6,600	NA	15%	7,600	NA
Model	Central Rd South of Washington Rd	2,900	NA	35%	3,900	NA
Model	Central Rd South of Love Lane	1,200	NA	80%	2,200	NA
Model	South Rd	1,800	NA	17%	2,100	NA
Model	Washington Rd	1,200	NA	0%	1,200	NA
Est	Locke Rd	500	NA	0%	500	NA
Model	Cable Rd	1,400	NA	0%	1,400	NA

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
North Hampton						
2017	Atlantic Ave (East of Sea Rd)	1,900	4,900	70%	3,200	8,300
2017	NH 1A north of Atlantic Ave	5,300	8,200	68%	8,900	13,800
Hampton						
2018	Cusack Road	900	1,000	-100%	0	0
2019	High Street	5,600	8,900	-100%	0	0
2019	Winnacunnet Road	4,800	7,200	682%	37,500	56,300
2017	NH 101	8,100	17,700	-78%	1,800	3,900
2019	NH 101 (Highland Ave)	3,300	7,000	-100%	0	0
2019	NH 101 (Church St)	5,100	8,400	-100%	0	0
Est	Brown Avenue	4,000	9,200	-100%	0	0
Est	Island Path	2,600	5,700	250%	9,100	20,000
2017	Woodland Road	1,000	1,300	-4%	1,000	1,200
2019	Little River /Woodland Rd	1,400	2,500	200%	4,200	7,500
2017	North Shore Road (West of Cusack Rd)	1,300	2,800	28%	1,700	3,600
Est	North Shore Road (East of Cusack Rd)	200	250	1608%	3,400	4,300
2019	NH 1A north of High Street	5,600	11,800	-24%	4,300	9,000
2019	NH 1A north of Winnacunnet Road	5,300	6,900	57%	8,300	10,800
2018	NH 1A south of Winnacunnet Road	8,000	10,700	275%	30,000	40,100
2018	NH 1A north of Church Street	6,800	9,200	275%	25,500	34,500
2018	Ashworth Ave (SB) (N. of Brown Ave)	3,400	8,400	-11%	3,000	7,500
2018	Ocean Blvd south of D St (NB)	6,900	12,000	85%	12,800	22,200
Seabrook						
2019	NH 286	14,300	18,600	28%	18,300	23,800
2017	South Main Street	1,200	1,600	0%	1,200	1,600
2018	US 1 South of Lake Shore Drive	18,300	29,200	15%	21,000	33,600

4.0 Feet SLR Traffic Volume Tables

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
Portsmouth						
1999	US 1 at Sagamore Creek Portsmouth	24,000	29,400	-100%	0	0
Est	Greenleaf Avenue	4,800	6,500	147%	11,900	16,100
2019	Peverly Hill Road	9,500	12,800	166%	25,300	34,000
2019	US 1 Bypass N. of US 1	17,200	24,600	-20%	13,800	19,700
2018	US 1 South of South Street	11,200	14,600	-25%	8,400	11,000
Est	Banfield Road	2,200	3,700	42%	3,100	5,300
2018	Marcy Street North of Pierce Island Road	2,800	3,500	-100%	0	0
2017	Marcy Street at South Mill Pond Bridge	5,300	7,300	-54%	2,400	3,400
2018	New Castle Ave at New Castle TL	3,200	3,800	-92%	300	300
2018	NH 1B at Rye TL	3,200	5,100	-16%	2,700	4,300
2019	NH 1B East of NH 1A at Portsmouth TL	4,900	5,900	-47%	2,600	3,100
2017	South Street near Junkins Ave	3,200	3,700	47%	4,700	5,400
2018	South Street near Middle Road	7,400	8,900	-8%	6,800	8,200
Est	Junkins Avenue	500	750	-95%	0	0
Est	Daniel Street	1,500	2,500	-100%	0	0
Est	Parrott Avenue	1,000	2,000	-100%	0	0
2017	Sagamore Rd (NH 1A) south of South St	2,900	3,800	21%	3,500	4,600
2019	Sagamore Rd (NH 1A) at Sagamore Creek	7,100	8,900	20%	8,500	10,700
New Castle						
2018	New Castle Ave at New Castle TL	3,200	3,800	-92%	300	300
2018	NH 1B at Rye TL	3,200	5,100	-16%	2,700	4,300

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
Rye						
2019	NH 1B East of NH 1A at Portsmouth TL	4,900	5,900	-47%	2,600	3,100
2019	NH 1A South of NH1B	4,700	9,500	12%	5,300	10,600
2019	NH 1A West of Brackett Road	3,700	4,800	-71%	1,100	1,400
2017	NH 1A South of Odiorne Point	1,400	4,100	-88%	200	500
2017	NH 1A North of Wallis Rd	2,100	6,300	-52%	1,000	3,000
2019	NH 1A South of Wallis Rd	2,400	4,800	-100%	0	0
2019	NH 1A At Rye Harbor Bridge	3,300	5,800	-100%	0	0
2019	NH 1A At Causeway R (N. Hampton TL)	3,900	6,300	-97%	100	200
Est	Marsh Road/Parsons Road	1,000	1,700	71%	1,700	2,900
2019	Brackett Road Near NH 1A	1,500	2,600	49%	2,200	3,900
Est	Brackett Road North of Wallis Rd	500	750	10%	600	800
Est	Wallis Road East of Brackett Road	1,000	1,400	-38%	600	900
2017	Wallis Road West of Sagamore Road	2,800	4,000	7%	3,000	4,300
2017	Clark Road	450	600	-3%	400	600
2017	Sagamore Road North of Wallis Road	2,800	3,700	11%	3,100	4,100
2019	Sagamore Road North of Clark Road	3,800	5,200	9%	4,100	5,700
Model	Lang Road	3800	NA	-24%	2,900	NA
Model	Central Road South of Lang Rd	6600	NA	-9%	6,000	NA
Model	Central Road South of Washington Rd	2900	NA	-13%	2,500	NA
Model	South Road	1800	NA	-5%	1,700	NA
Model	Washington Rd	1200	NA	14%	1,400	NA
Est	Locke Rd	500	NA	-100%	0	NA
Model	Cable Rd	1400	NA	4%	1,500	NA

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
Hampton						
2018	Cusack Road	900	1,000	-100%	0	0
2019	High Street	5,600	8,900	-100%	0	0
2019	Winnacunnet Road	4,800	7,200	-64%	1,700	2,600
2017	NH 101	8,100	17,700	-87%	1,100	2,300
2019	NH 101 (Highland Ave)	3,300	7,000	-100%	0	0
2019	NH 101 (Church St)	5,100	8,400	-100%	0	0
2020*	Brown Avenue	4,000	9,200	-100%	0	0
2020*	Island Path	2,600	5,700	-100%	0	0
2017	Woodland Road (N of N. Shore Rd)	1,000	1,300	140%	2,400	3,100
2019	Little River Rd (S of N. Shore Rd)	1,400	2,500	667%	10,700	19,200
2017	North Shore Road (West of Cusack Rd)	1,300	2,800	675%	10,100	21,700
Est	North Shore Road (East of Cusack Rd)	200	250	7852%	15,900	19,900
2019	NH 1A north of High Street	5,600	11,800	64%	9,200	19,400
2019	NH 1A north of Winnacunnet Road	5,300	6,900	48%	7,800	10,200
2018	NH 1A south of Winnacunnet Road	8,000	10,700	169%	21,500	28,800
2018	NH 1A north of Church Street	6,800	9,200	-20%	5,400	7,400
2018	Ashworth Ave (SB) (N. of Brown Ave)	3,400	8,400	-77%	800	1,900
2018	Ocean Blvd south of D St (NB)	6,900	12,000	-28%	5,000	8,600
2019	NH 1A south of Hampton Harbor Bridge	9,200	19,800	-55%	4,100	8,900
2019	US 1 South of NH 101 Hampton	20,600	26,700	-100%	0	0
2018	NH 88 (Hampton Falls)	4,000	4,600	96%	7,800	9,000
2018	Brown Rd (H. Falls)/Towle Farm Rd	2,400	3,100	87%	4,500	5,800
2019	NH 27	11,300	15,300	30%	14,700	19,900
2019	I-95 at Hampton Toll	71,700	116,800	6%	76,000	123,800
2018	I-95 Exit 2 SB On-Ramp	9,500	11,100	46%	13,900	16,200
2018	I-95 Exit 2 NB Off-Ramp	7,900	11,600	43%	11,300	16,600

AADT Year	Location of Count	Existing Conditions		1.0 Feet SLR Scenario Estimates		
		AADT	Summer Peak	Percent Change	AADT	Summer Peak
North Hampton						
2017	Atlantic Avenue (East of Sea Road)	1,900	4,900	86%	3,500	9,100
2017	Atlantic Avenue (West of Woodland Rd)	4,200	5,600	86%	7,800	10,400
2017	NH 1A north of Atlantic Avenue	5,300	8,200	68%	8,900	13,800
Seabrook						
2019	NH 286	14,300	18,600	-70%	4,300	5600
2017	South Main Street	1,200	1,600	-100%	0	0
2018	US 1 South of Lake Shore Drive	18,300	29,200	-5%	17,400	27700
Stratham						
Model	Squamscott Road	7,000		-100%	0	0
2019	NH 108 North of Squamscott Road	13,700	17,600	-27%	10,000	12,800
2017	NH 108 North of Stratham Circle	9,800	12,000	24%	12,200	14,900
2017	NH 33 East of Stratham Circle	13,900	16,900	48%	20,600	25,000
Exeter						
2018	Water Street Exeter south of NH 101	6,500	7,700	-6%	6,100	7,200

Appendix C: Site Profiles