

# MILITARY OCEAN TERMINAL SUNNY POINT JOINT LAND USE STUDY



ADVISORY COMMITTEE MEETING  
AUGUST 28, 2018

# MEETING AGENDA

- Study Updates
- Public Meeting Summary
- Review Compatibility Analysis
- Set Upcoming Meeting Dates
- General Discussion
- Adjourn

# STUDY UPDATES

- Briefing to MG Farmen (SDDC Commander)
- Stakeholder interview with NC DNCR representatives:
  - Chief Deputy Secretary
  - Deputy Sec. for Archives & History
  - Director of Historical Resources
  - Director of Eastern NC Historic Sites
  - NC State Parks
  - Clean Water Management Trust Fund
  - Office of State Archaeology
  - NC Aquariums
- Interview with consultant preparing Brunswick County Economic Development Plan

# PROJECT SCHEDULE

Date	Meeting
<b>2018</b>	
February 23	Project Team Meeting
April 11	Project Kickoff, Installation Tour & Committee Meetings
May 21-24	Stakeholder Interviews
June	Advisory Committee Meeting – Review Background Research
July 30	Public Meeting – Overview & Research - 1 Day (2 locations)
August	Advisory Committee Meeting – Review Compatibility Analysis
October	Advisory Committee Meeting - Review Conflict Resolution Strategies
November	Policy Committee Meeting – Review Conflict Resolution Strategies
December	Public Meetings – Interim Findings - 1 Day (2 locations)
December	Advisory Committee Meeting – Draft Recommendations
<b>2019</b>	
January	Policy Committee Meeting – Draft Recommendations
February	Advisory Committee Meeting – Present Draft Study Documents
March	Advisory & Policy Committee Meetings – Finalize Study Documents
April/May	Public Meetings – Final Presentation - 1 Day (2 locations)



# JULY 30 PUBLIC MEETINGS



# COMPATIBILITY ANALYSIS

BENCHMARK

# INSTALLATION CHARACTERISTICS

- Purpose-built ammunition transshipment terminal – **SAFETY**
- Ammunition is staged *temporarily* at the terminal, while waiting to be shipped.
- Composed of three geographically separate areas:
  - Main Terminal: 8,600 acres
  - Pleasure Island Buffer Zone: 2,200 acres
  - Leland Interchange Yard: 650 acres
- Main Terminal linked to Leland Interchange by a 16 mile rail line.

# MOTSU Components

**LELAND YARD**



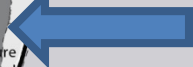
**RAIL CORRIDOR**



**MAIN TERMINAL**



**BUFFER ZONE**



**MOTSU**

0 2 4 8 Miles



# MISSION COMPATIBILITY

- Primary points of potential compatibility concern:
  - Maintaining use of the full extent of ESQD for temporary staging, as well as loading and unloading vessels during transshipment operations.
  - Maintaining safe and efficient transportation access:
    - Highway
    - Rail
    - Marine
  - Maintaining minimal levels of environmental constraint.

# EXPLOSIVES SAFETY ZONES

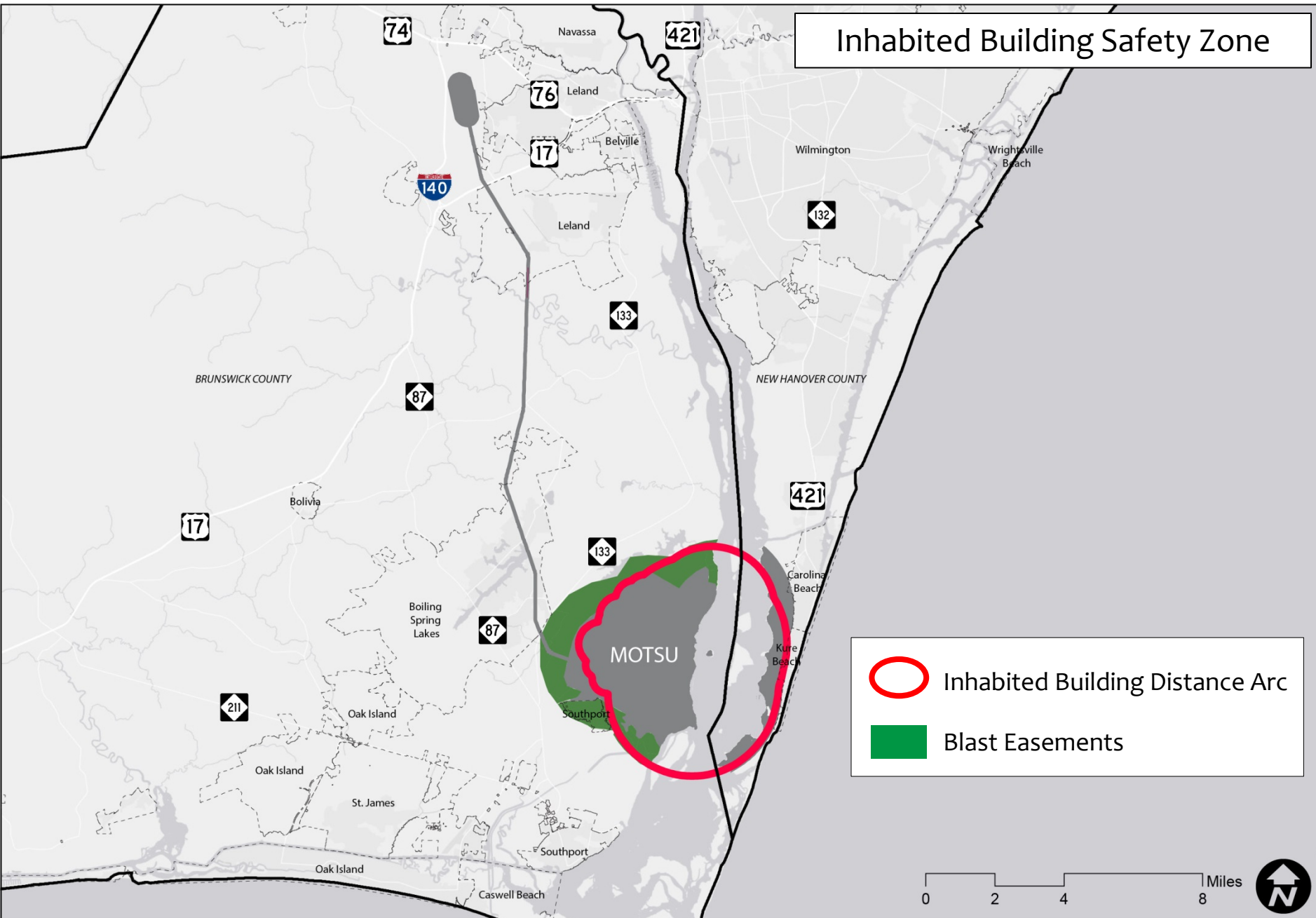
- ESQD = Explosive Safety Quantity Distance
- K Factor = Assumed degree of risk used in calculating ESQD.
- Example ESQD Arcs:
  - Public Traffic Route (PTRD) (K24/30)
  - Inhabited Building (IBD) (K40/50)
  - K88
  - Absolute Safe Distance = K328
- ESQD Formula:  $D=KW^{1/3}$ 
  - D = Distance (ft.)
  - W = Net Explosive Weight (lbs.)



# EXPLOSIVES SAFETY ZONES

- ESQD Zones are not applicable to munitions during their transportation:
  - Truck traffic on local highways
  - Rail traffic, including in the Leland Yard and on the Army railroad
  - Ship traffic in the Cape Fear River
- Once on the Terminal, ammunition is *temporarily* staged per the license and applicable ESQD arcs for each holding area.
- ESQD zones expand and contract as munitions are temporarily staged and then shipped out.

# Inhabited Building Safety Zone



# IBD COMPATIBILITY

- DoD Manual 6055.09 / DA Pamphlet 385-64 establish siting criteria for certain uses within the Inhabited Building Distance (as well as other safety zones).
- Primarily focused on uses typically found on a military installation / ammunition facility.
- Best guidance available, and can be translated to apply to civilian uses.

# DA PAM 385-64 USE TABLES

**Table 8-5**  
Type of exposed sites and safe separation distance required—Continued

Type of structure/activity	Safe separation distance required	Notes
Loading docks serving operating buildings	ILD	Separate loading docks will be sited on the basis of use.
POV Parking Lots for administrative areas	PTRD	Minimum fragment distances apply.
POV Parking Lots serving multiple PESS	ILD	Access for emergency vehicles must be provided.
POV Parking Lots serving a single potential explosion site	ILD	1. May be separated at less than ILD only from its associated facility but no less than 100 feet is required to the associated facility to protect it from vehicle fires. 2. Access for emergency vehicles must be provided.
Rail holding yards	Aboveground magazine	Rail holding yards will be laid out on a unit car-group basis with each car-group separated by the applicable aboveground magazine distance. Separate from other facilities by applicable QD criteria.
Rail holding yards -Christmas tree	Aboveground magazine	1. Separated by the applicable aboveground magazine distance for the net quantity of HE in the cars on the spurs. 2. Will be separated from other facilities by the applicable QD criteria. 3. Arrangement consisting of a ladder track with diagonal dead-end spurs projecting from each side at alternate intervals.
Rail yards two parallel ladder tracks connected by diagonal spurs	Aboveground magazine	1. Separated by applicable aboveground magazine distance for the unit-group quantities of HE. 2. Will be separated from other facilities by the applicable QD criteria.
Railcar holding yards	QD separations are not required	May be used to interchange truck trailers or railcars between the commercial carrier and the Army activity and to conduct visual inspections.
Railcar inspection stations	QD separations are not required	1. They should be as remote as practical from hazardous or populated areas. 2. Activities that may be performed at the inspection station after railcars containing ammunition and explosives are received from the delivering carrier and before further routing within the garrison or installation are as follows: External visual inspection of the railcars. 3. Visual inspection of the external condition of the cargo packaging in vehicles (such as, trailers, railcars) that have passed the external inspection indicated above. 4. Interchange of railcars or MILVANS between the common carrier and the Army activity.
Railcar interchange yards	Applicable QD tables apply unless meets remarks.	1. Railcar interchange yards are not subject to QD regulations when they are used exclusively— a. For the interchange of railcars containing ammunition and explosives between the commercial carrier and Army activities. b. To conduct external inspection of the railcars, or MILVANS containing ammunition and explosives. c. To conduct visual inspection of the external condition of the cargo

Recreational facilities - open air - no structures	Sited at not less than PTRD and preferably as near IBD as practical.	Open areas between explosive storage and handling sites and between these sites and non-explosive buildings and structures shall be controlled carefully regarding use for recreation or training facilities. As a general rule, the fragment hazard will be severe from the explosion site out to approximately the PTRD. For an exception, see table 8-16 and paragraph 8-15b.
Recreational facilities - structures, including bleachers	Sited at not less than IBD.	Open areas between explosive storage and handling sites and between these sites and non-explosive buildings and structures shall be controlled carefully regarding use for recreation or training facilities. As a general rule, the fragment hazard will be severe from the explosion site out to approximately the PTRD. For an exception, see table 8-16 and paragraph 8-15b.

**Table 8-5**  
Type of exposed sites and safe separation distance required—Continued

Type of structure/activity	Safe separation distance required	Notes
Roll-on or roll-off operations (not involving lifting)	QD criteria apply to all roll-on or roll-off operations.	Site plans will be submitted in accordance with DA Pam 385-65. When QD requirements cannot be met the following mitigation factors should be considered: 1. Total NEVOD present shall not exceed 50,000 lbs. 2. Conducted on garrisons or installations under U.S. control, when possible, to limit exposures to the public. 3. All ammunition and explosives present (such as, in trailers, railcars, barges, ships) must be associated only with the RORO operation being conducted. 4. Roll-on or roll-off operations shall not exceed 24 hours following arrival of ammunition and explosives, including ammunition and explosives staged at a transshipment point. 5. Roll-on or roll-off operations shall be located as remote as practicable from populated areas, in order to minimize exposure of unrelated personnel. 6. Off-installation military vans/International Standardization Organization (MILVAN/ISO) container inter- or intra-modal transfers (involving highway and rail modes only) where containers are not stored or other operations performed.
Secure explosives holding area.	Aboveground magazine	1. Will be laid out on a unit truck-group basis with each group separated by the applicable aboveground magazine distances. 2. Will be separated from other facilities by the applicable QD criteria. 3. An area designated for the temporary parking of commercial carriers' motor vehicles transporting DOD-owned Arms, Ammunition, and Explosives (AAE), classified (SECRET or CONFIDENTIAL) materials, and controlled cryptographic item (CCI). There are two types of secure holding areas. (Note: Although the intent of such areas is to provide a secure storage location for commercial carriers while in-transit, or during emergencies or other circumstances that are beyond a carrier's control, this Standard imposes no requirement for garrisons or installations to have such areas. The term Secure Holding Area is applicable to areas (CONUS, Hawaii, Alaska, and Puerto Rico) governed by Part 205 of Defense Transportation Regulation (DTR) 4500.9-R, Part II Cargo Movement.
Secure Non-explosives Holding Area	The holding of HD 1.4S materials, without regard to QD, is permitted at this location	No siting required if located outside all QD arcs. If located within a QD arc, provide appropriate safe separation distance.
Security posts and similar locations	Prudent fire protection	May be at explosives operations servicing only one building or operation.
Service tanks - Unprotected	May be sited in accordance with table 8-7 provided the conditions in the notes are met.	1. Unprotected service tanks which support aboveground explosives storage or operating complexes, but not inhabited buildings (such as those in administrative, supply, industrial, and housing areas). 2. The Command must accept the possible loss of the tanks and any collateral damage that a fire might cause if the tanks were punctured by fragments. 3. A dike system must be installed meeting the requirements of NFPA, part 30 to provide spill containment. 4. If the tank is supplied by a pipe system as opposed to a tank truck, then the supply pipe must be protected from blast and fragments to prevent a spill larger than the contents of the tank. If the supply pipe is underground, it will be located from PESSs in accordance with be-

Storage tanks for water	-QD does not apply if the loss of the water tank is acceptable -IBD applies if the loss of the water tank is unacceptable -Buried tanks and associated components of like value shall meet the siting requirements below for underground tanks	1. A key QD consideration is whether loss of the water tank is acceptable. If a water tank is used for firefighting and no adequate alternate water supplies exist, the tank is essential and its loss is unacceptable. If adequate alternate water supplies do exist, loss of the tank may be acceptable. However, consider other factors, such as the replacement cost of the tank and the effect of its loss on the garrison or installation mission, before making a final determination. 2. The Command shall designate the approval authority level for the siting of aboveground water tanks within IBD of PESS, and for buried tanks or pipelines sited at less than the distances required see "Underground pipelines".
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# DA PAM 385-64 USE TABLE EXAMPLES

## RECREATION USES

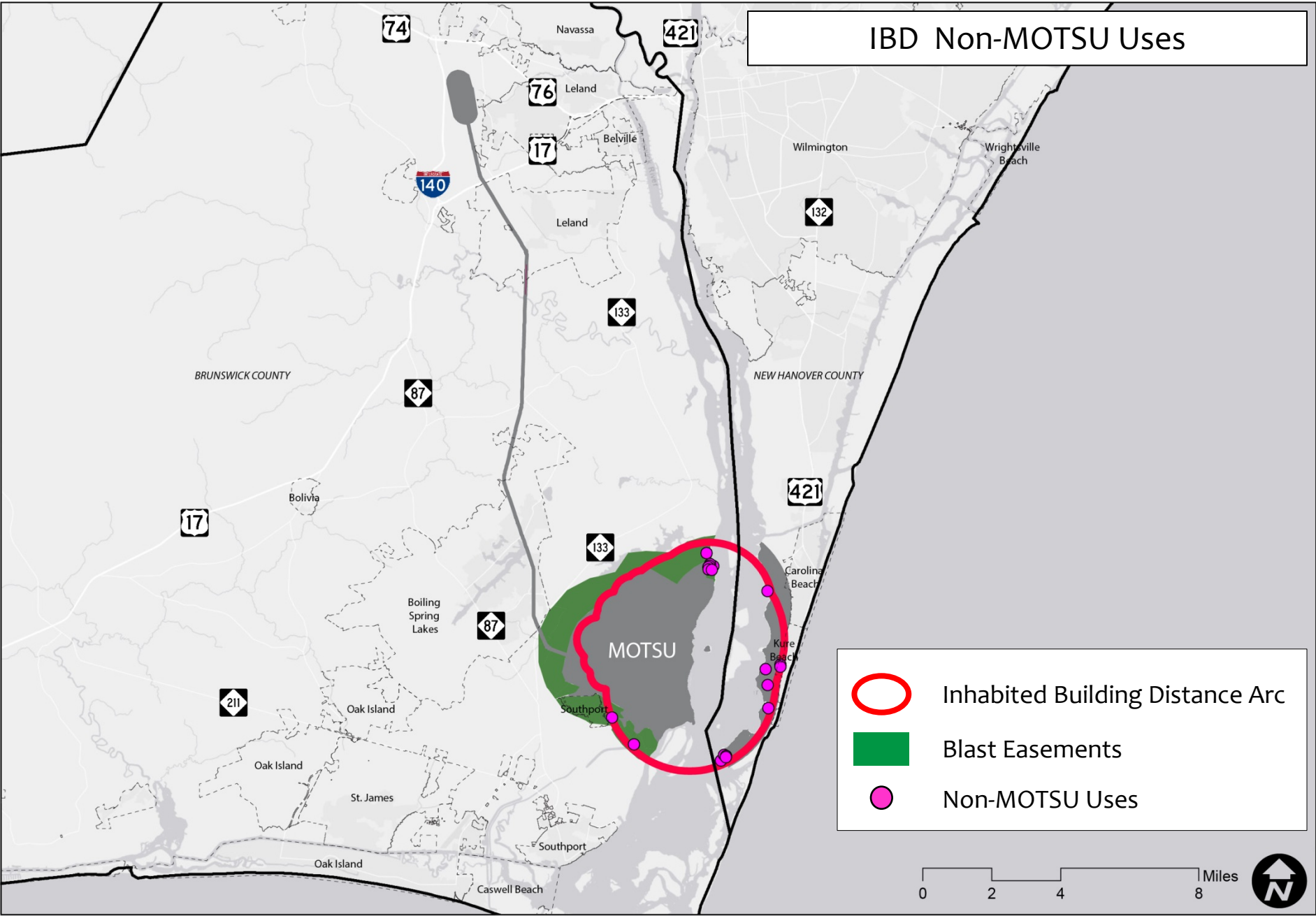
Recreational facilities - open air - no structures	Sited at not less than PTRD and preferably as near IBD as practical.	Open areas between explosive storage and handling sites and between these sites and non-explosive buildings and structures shall be controlled carefully regarding use for recreation or training facilities. As a general rule, the fragment hazard will be severe from the explosion site out to approximately the PTRD. For an exception, see table 8-16 and paragraph 8-15b.
Recreational facilities - structures, <i>including bleachers</i>	Sited at not less than IBD.	Open areas between explosive storage and handling sites and between these sites and non-explosive buildings and structures shall be controlled carefully regarding use for recreation or training facilities. As a general rule, the fragment hazard will be severe from the explosion site out to approximately the PTRD. For an exception, see table 8-16 and paragraph 8-15b.

## WATER STORAGE TANKS

Storage tanks for water	<ul style="list-style-type: none"><li>-QD does not apply if the loss of the water tank is acceptable</li><li>-IBD applies if the loss of the water tank is unacceptable</li><li>-Buried tanks and associated components of like value shall meet the siting requirements below for underground tanks</li></ul>	<ol style="list-style-type: none"><li>1. A key QD consideration is whether loss of the water tank is acceptable. If a water tank is used for firefighting and no adequate alternate water supplies exist, the tank is essential and its loss is unacceptable. If adequate alternate water supplies do exist, loss of the tank may be acceptable. However, consider other factors, such as the replacement cost of the tank and the effect of its loss on the garrison or installation mission, before making a final determination.</li><li>2. The Command shall designate the approval authority level for the siting of aboveground water tanks within IBD of PESs, and for buried tanks or pipelines sited at less than the distances required see "Underground pipelines".</li></ol>
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# IBD Non-MOTSU Uses





# IBD USE CHARACTERISTICS

- Identified 19 sites / uses / structures within the Inhabited Building Distance ESQD arc.
  - 17 public / 2 private
  - 9 on MOTSU land (excludes USAF Rec. Area)
  - USAF recreation area is on US Government (not MOTSU land) and is subject to a separate compatible use agreement
  - 9 within compatible use easements
  - Uses on MOTSU land subject to licenses granted by the Department of the Army

# IBD USE CHARACTERISTICS

- Public works facilities (water / wastewater)
- Public park in Kure Beach
- USAF Recreation Area – not part of MOTSU
- FAA Joint Surveillance System Radar Facility
- Fort Fisher Ferry – landing, admin building, parking area, etc.
- NCWRC Boat Ramp
- Brunswick Town / Fort Anderson – historic sites and structures, visitors center, support bldgs.
- Duke Energy firing range

# IBD COMPATIBILITY

- Compliance with DoD / DA use guidance
- Frequency of use / time of occupation
- Density of occupation
- Can it be relocated?
- Is it critical to public safety?
- Public vs. private
- Existing mitigation measures / agreements
- Ability to improve compatibility through design or operational considerations.

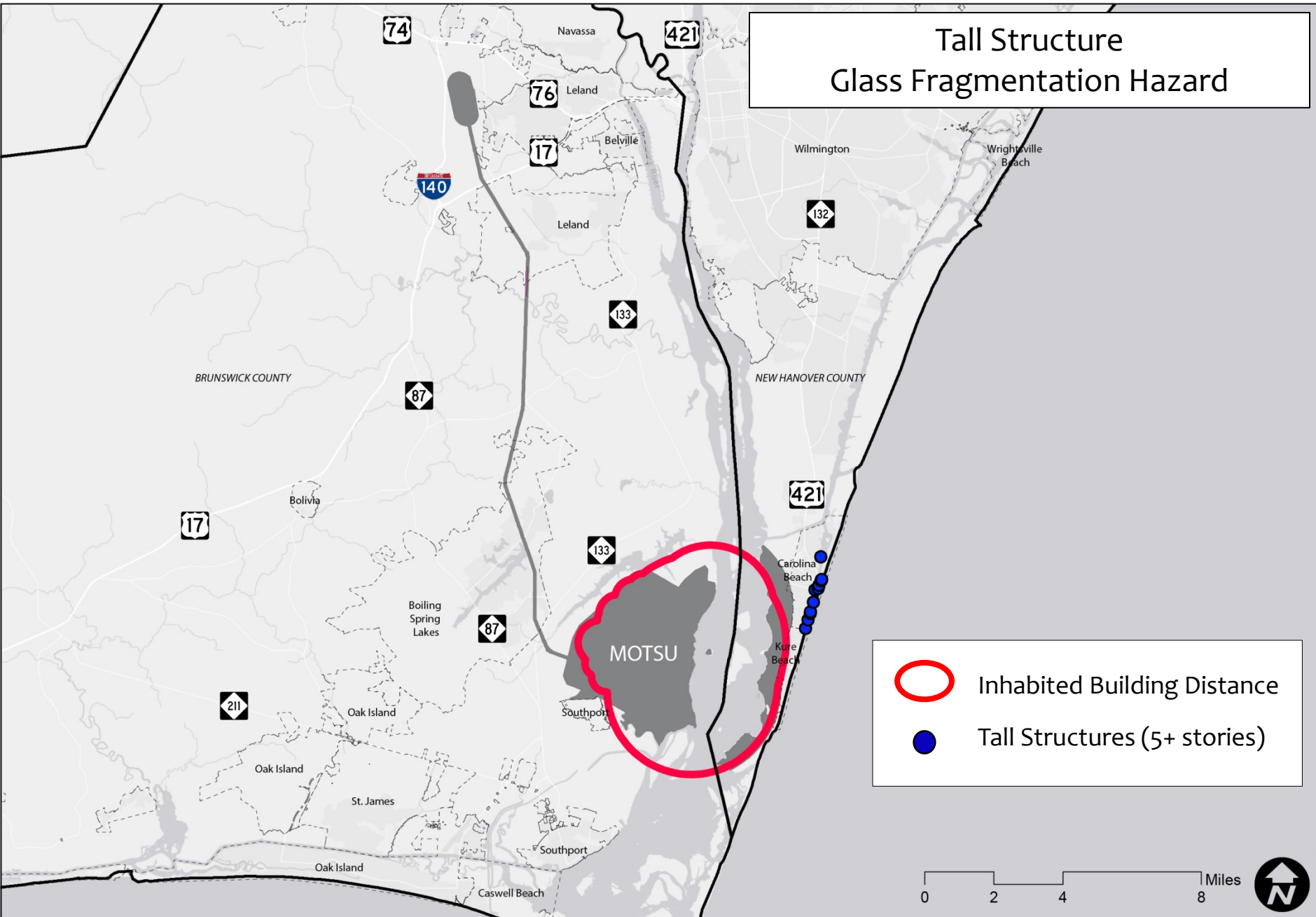
# GLASS FRAGMENTATION HAZARDS

## DoD Manual 6055.09 Extract

Table V1.E8.T3. Probability of Window Breakage from Incident Pressure

K-Factor (ft/lb <sup>1/3</sup> )	Incident Pressure (psi)	Probability of Breakage (%) for Windows Facing PES		
K <sub>m</sub> -Factor [m/kg <sup>1/3</sup> ]	Incident Pressure [kPa]	Window 1 <sup>a</sup>	Window 2 <sup>b</sup>	Window 3 <sup>c</sup>
40	1.2	85	100	100
15.87	8.3			
50	0.9	60	100	100
19.84	6.2			
60	0.7	41	100	100
23.80	4.8			
70	0.6	26	100	100
27.77	4.1			
80	0.5	16	94	100
31.74	3.4			
90	0.4	10	76	100
35.70	2.8			
100	0.3	6	55	100
39.67	2.1			
150	0.2	1	8	49
59.51	1.4			
328	0.0655	0	0.1	0.8
130.12	0.45			
a	12 inches x 24 inches x 0.088 inches float annealed (area = 2 ft <sup>2</sup> )			
	30.5 centimeters (cm) x 61 cm x 0.223 cm float annealed (area = 0.186 square meters ( m <sup>2</sup> ))			
b	24 inches x 24 inches x 0.088 inches float annealed (area = 4 ft <sup>2</sup> )			
	61 cm x 61 cm x 0.223 cm float annealed (area = 0.372 m <sup>2</sup> )			
c	42 inches x 36 inches x 0.12 inches float annealed (area = 10.5 ft <sup>2</sup> )			
	106.7 cm x 91.4 cm x 0.305 cm float annealed (area = 0.975 m <sup>2</sup> )			

# Tall Structure Glass Fragmentation Hazard



# EMERGENCY EVACUATION CRITERIA

- DoD Manual 6055.09 / DA Pamphlet 385-64 establish identical “Emergency Withdrawal Distances for Nonessential Personnel”
- Distances are intended for initial response to an incident involving ammunition/explosives.
- Substitute guidance in the absence of ESQD arcs for the rail line.
- Applies to both transportation and facilities



# EVACUATION DISTANCES

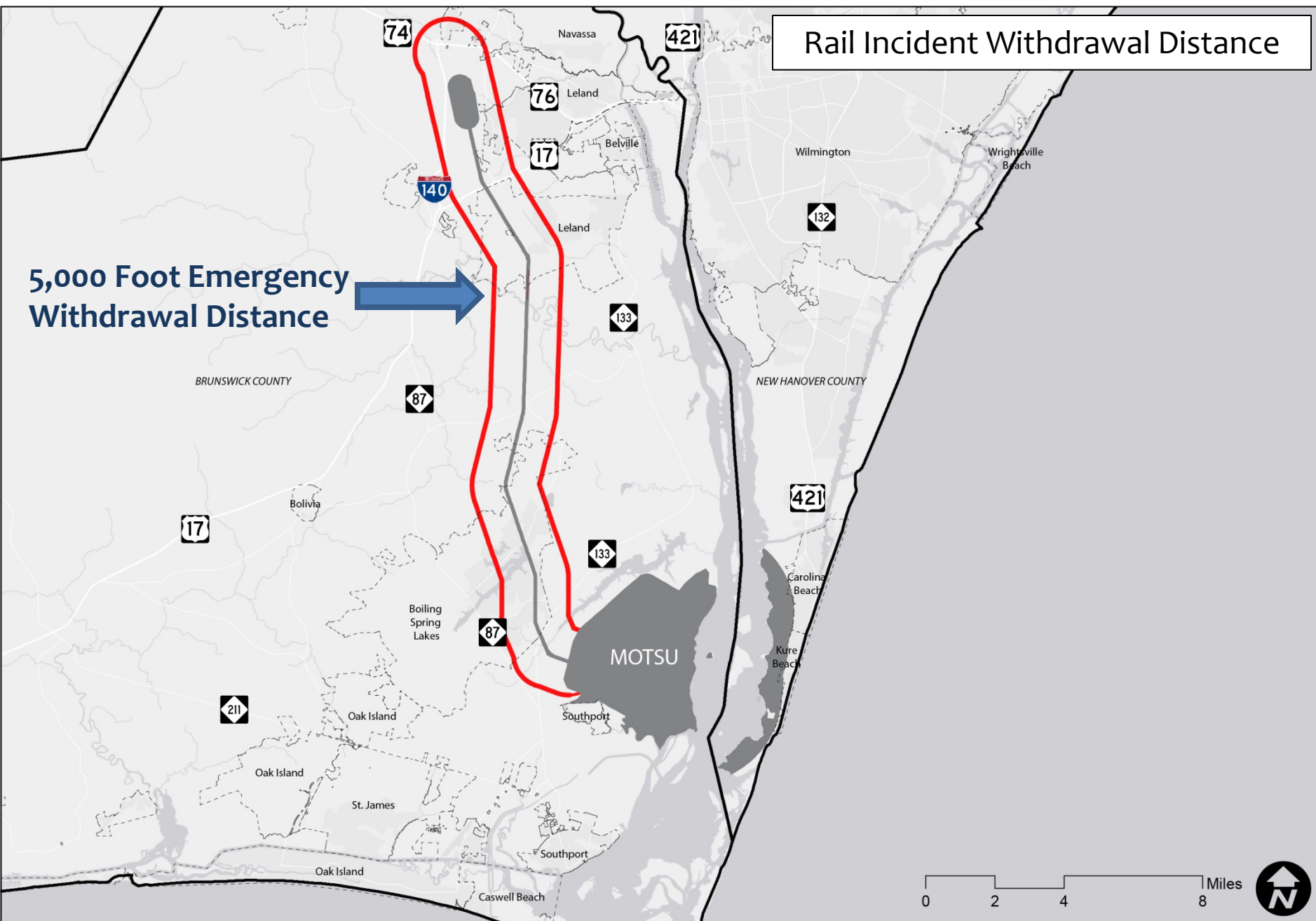
- Railcar incident evacuation distance when over 500 lbs: 5,000 ft.
- Facility incident evacuation distance when over 55,285 lbs:  $D = 105W^{1/3}$

Table V1.E10.T10. Emergency Withdrawal Distances for Nonessential Personnel<sup>a</sup>

HD	Unknown Quantity (ft)	Known Quantity (ft)
	[m]	[m]
Unknown, located in facility, truck, or tractor trailer	4,000 [1,219]	4,000 [1,219]
Unknown, located in railcar	5,000 [1,524]	5,000 [1,524]
1.1 <sup>b</sup> and 1.5	Same as unknown facility, truck, trailer, or railcar as appropriate	For Transportation: NEWQD ≤ 500 lbs: D = 2,500 ft
		NEWQD ≤ 226.8 kg: D = 762 m
		NEWQD > 500 lbs: D = 5,000 ft for railcars D = 4,000 ft for other modes
		NEWQD > 226.8 kg: D = 1,524 m for railcars D = 1,219 m for other modes
		For bombs and projectiles with caliber 5 inch [127 mm] or greater: D = 4,000 ft
		D = 1,219 m
		For Facilities: NEWQD ≤ 15,000 lbs: D = 2,500 ft
		NEWQD ≤ 6,804 kg: D = 762 m
		15,000 lbs < NEWQD ≤ 55,285 lbs: D = 4,000 ft
		6,804 kg < NEWQD ≤ 25,077 kg: D = 1,219 m
		NEWQD > 55,285 lbs: D = 105W <sup>1/3</sup>
		NEWQD > 25,077 kg: D = 41.65Q <sup>1/3</sup>
1.2 <sup>b</sup> and 1.6	2,500 [762]	2,500 [762]
1.3	600 [183]	Twice IBD with a 600 ft [183 m] minimum (V3.E3.T13)
1.4	300 [91.5]	300 [91.5]
a	Emergency withdrawal distances do not consider the potential flight range of propulsion units.	
b	For HD 1.1 and HD 1.2 AE, if known, the maximum range that fragments and debris will be thrown (including the interaction effects of stacks of items, but excluding lugs, strongbacks, and/or nose and tail plates) may be used to replace the distances given.	

## Rail Incident Withdrawal Distance

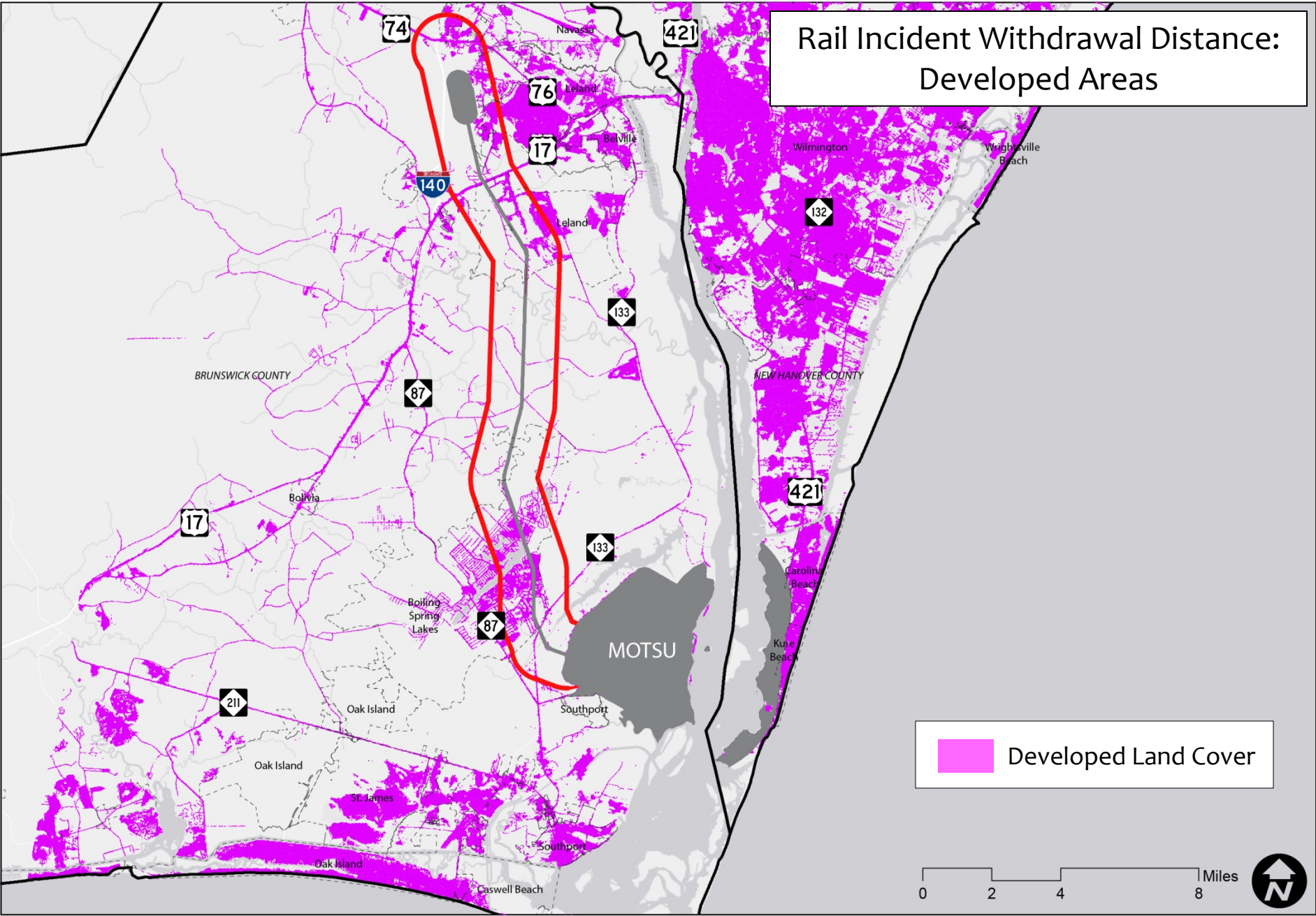
**5,000 Foot Emergency  
Withdrawal Distance**



# RAIL INCIDENT WITHDRAWAL AREA

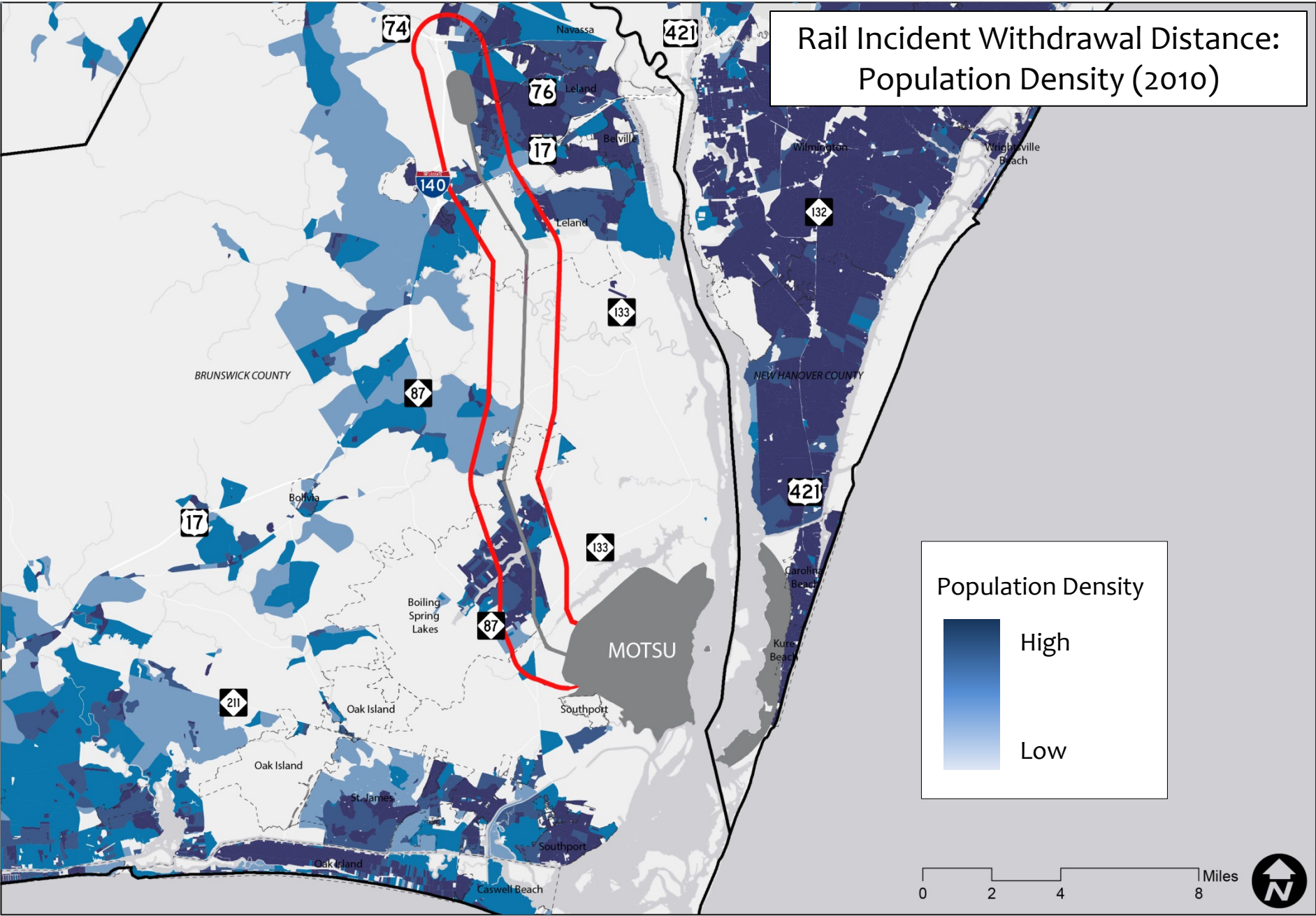
- Distance applies to any given point on the line where an incident occurs, not the entire line.
- Withdrawal distance may be increased based on the specific situation.
- Area Characteristics:
  - 2010 Population: +/- 11,200
  - 2010 Dwelling Units: +/- 5,200
- Concerns:
  - South Brunswick School Campus
  - Northwest District Park
  - US 17 Commercial Area
  - US 74/76 Industrial Area

# Rail Incident Withdrawal Distance: Developed Areas





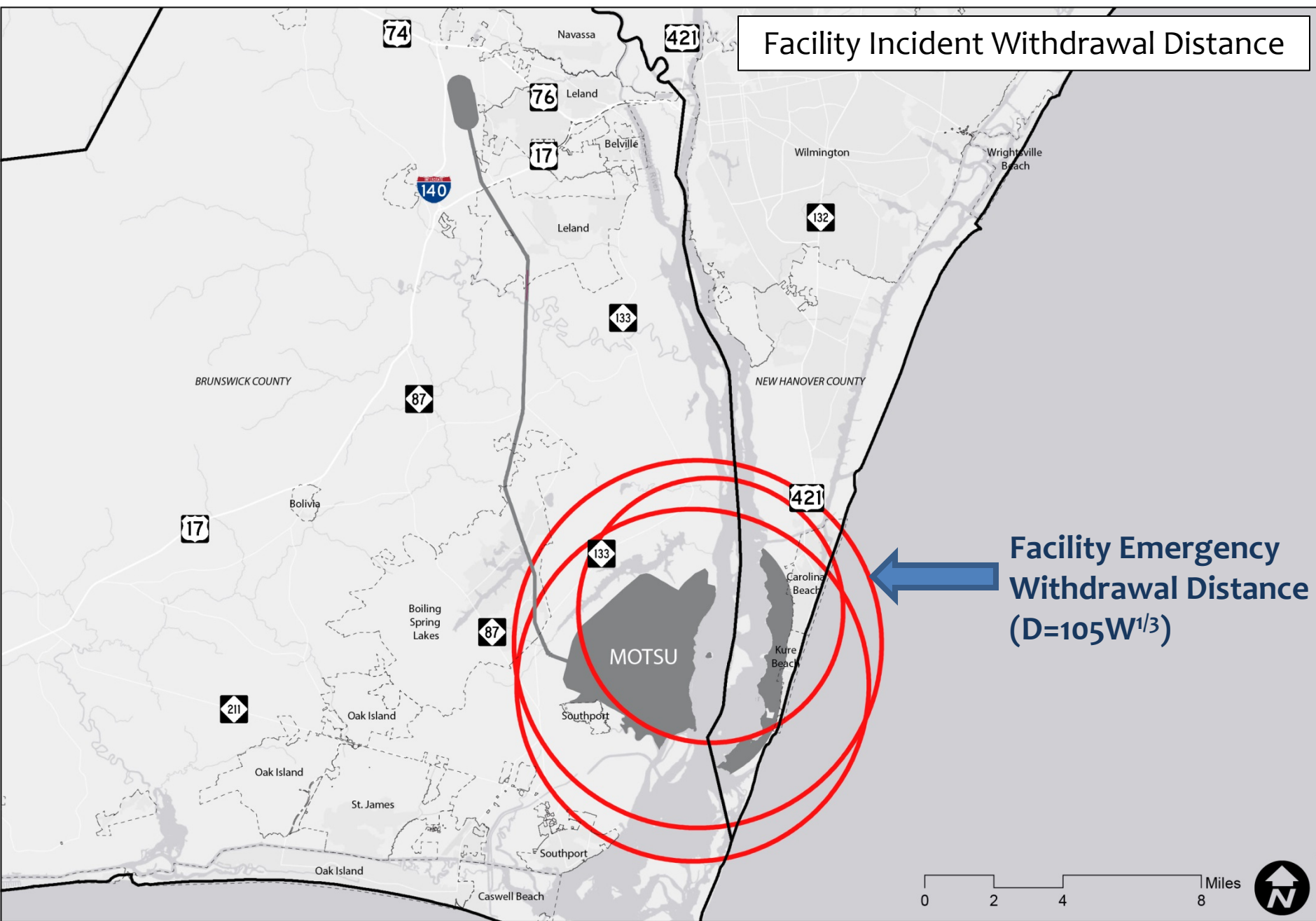
# Rail Incident Withdrawal Distance: Population Density (2010)



## Facility Incident Withdrawal Distance

Facility Emergency  
Withdrawal Distance  
( $D=105W^{1/3}$ )

0 2 4 8 Miles

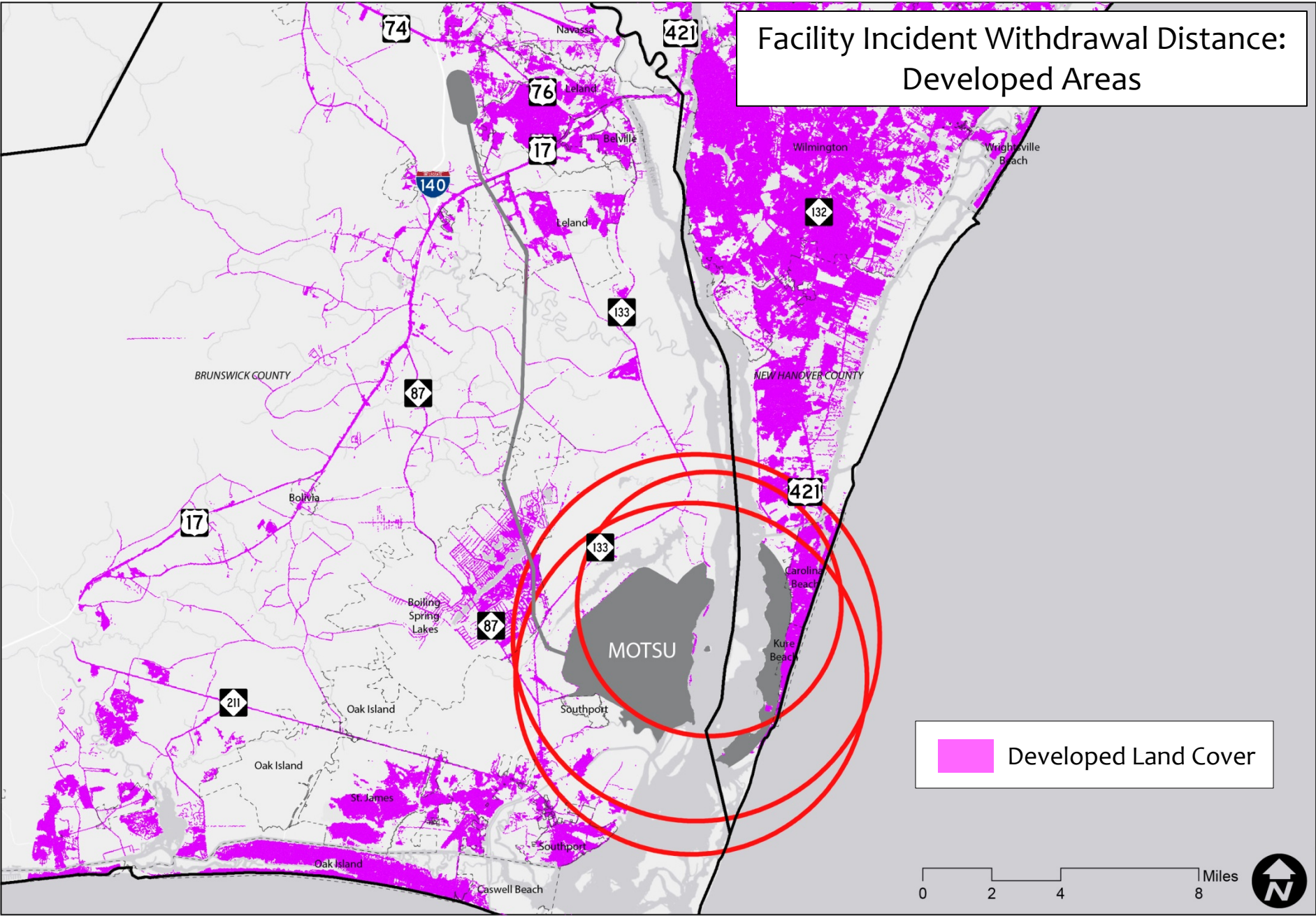




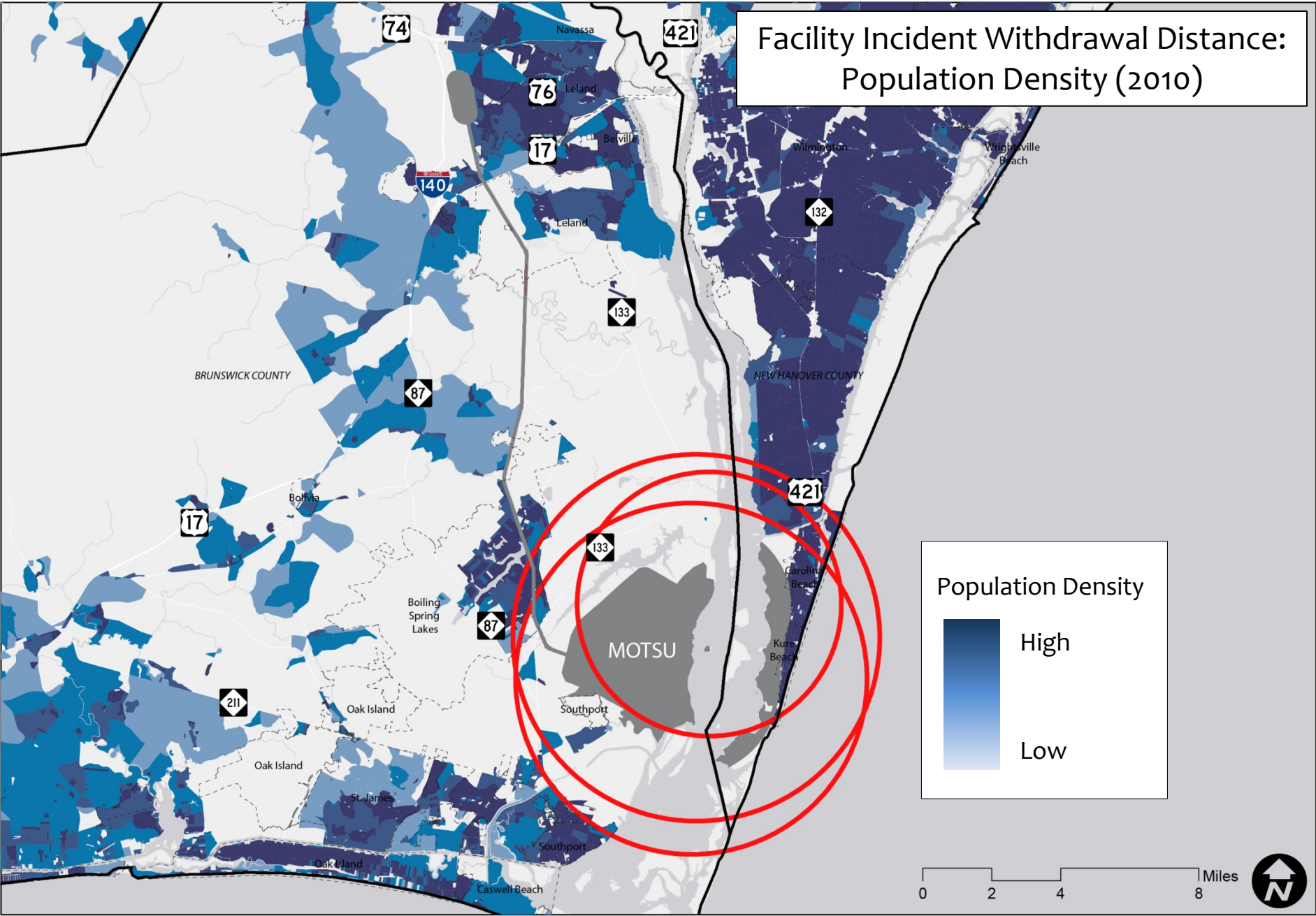
# FACILITY INCIDENT WITHDRAWAL AREA

- Distance applies to any given facility – docks were used as an example.
- Withdrawal distance may be increased based on the specific situation.
- Area Characteristics:
  - 2010 Population: +/- 14,300
  - 2010 Dwelling Units: +/- 10,850
- Concerns
  - Brunswick Nuclear Station
  - Pleasure Island Evacuation Route
  - South Brunswick School Campus

# Facility Incident Withdrawal Distance: Developed Areas



# Facility Incident Withdrawal Distance: Population Density (2010)





## Brunswick Nuclear Plant | Emergency Planning Zones, Shelters, Reception Centers and Relocation Schools



# OTHER AREAS OF POTENTIAL COMPATIBILITY CONCERN

- Cape Fear main shipping channel and ICWW channel from Snows Cut (pass-by traffic) within safety zones.
- Regional traffic congestion concerns
- Flooding – maintaining road and rail access
- Grade crossings on the rail line to Leland
- Brunswick Nuclear Station

# UPCOMING ADVISORY COMMITTEE MEETINGS



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# PROPOSED MEETING DATES

- October 10: Advisory Committee
- November 8 or 13: Policy Committee
- December 4:
  - Advisory Committee Meeting
  - Public Meetings (Afternoon + Evening)

# GENERAL DISCUSSION

BENCHMARK

# MILITARY OCEAN TERMINAL SUNNY POINT JOINT LAND USE STUDY



ADVISORY COMMITTEE MEETING  
AUGUST 28, 2018