Appendix A

Conceptual Plans for Wallace to Castle Hayne Rail Restoration

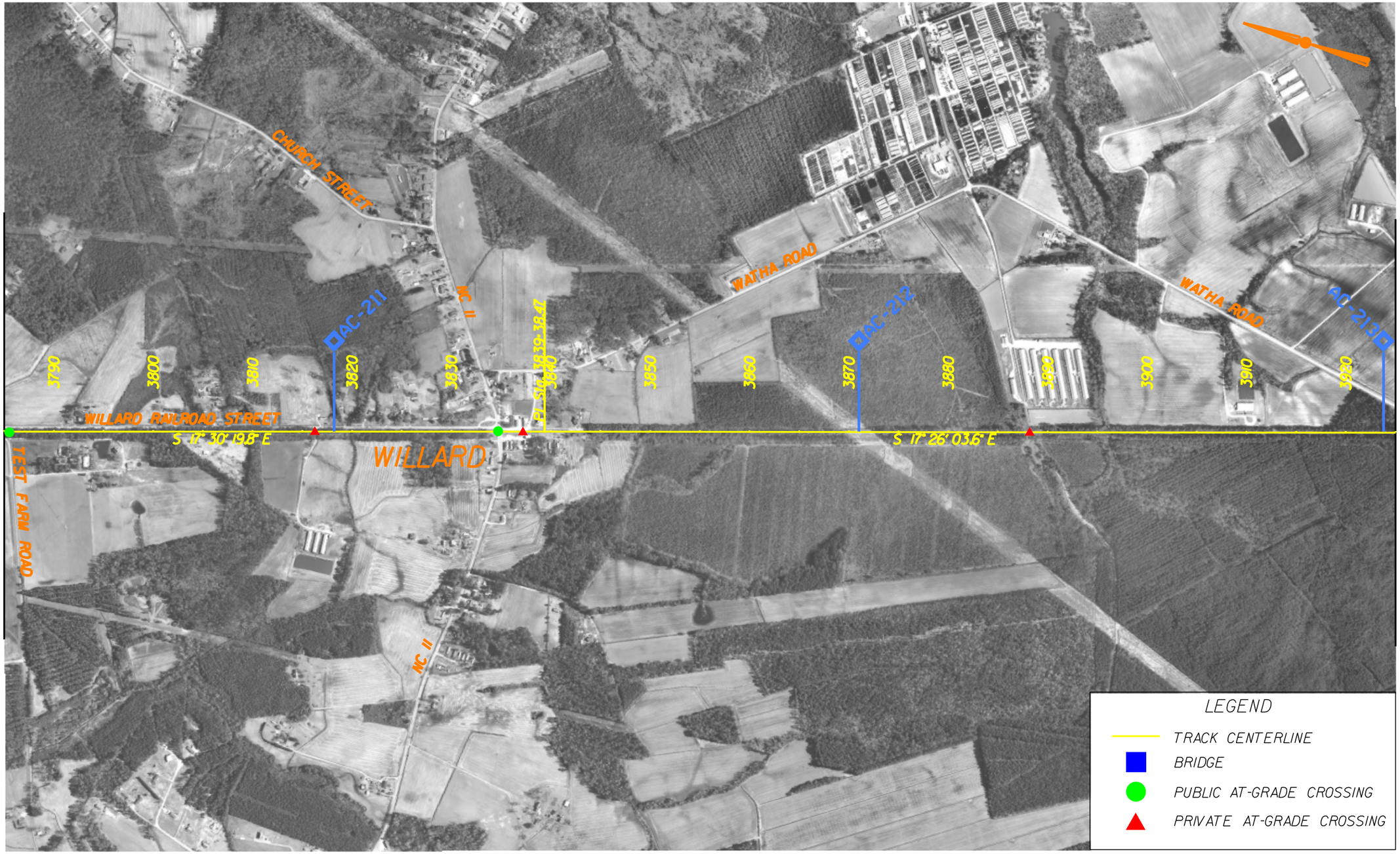
NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY
TITLE: CONCEPTUAL PLANS
STA. 3660+00 TO STA. 3785+00
LOCATION: PENDER COUNTY, NC
DGN BY: SMK | RAILROAD: NCDOT | MILE POST: AC-208 TO AC-235
DWN BY: SMK | VAL SEC: V.9N.C. | SHEET 001
CHK BY: | DATE: AUG. 22, 2014 | SCALE: 1"=1000'



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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA.3785+00 TO STA.3925+00

LOCATION: PENDER COUNTY, NC			
DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
DWN BY: SMK	VAL SEC: V.9N.C.		SHEET 002
CHK BY:	DATE: AUG. 22, 2014	SCALE: 1"=1000'	

NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY
TITLE: CONCEPTUAL PLANS
STA. 3925+00 TO STA. 4065+00

LOCATION: PENDER COUNTY, NC			
DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
DWN BY: SMK	VAL SEC: V.9N.C.		SHEET 003
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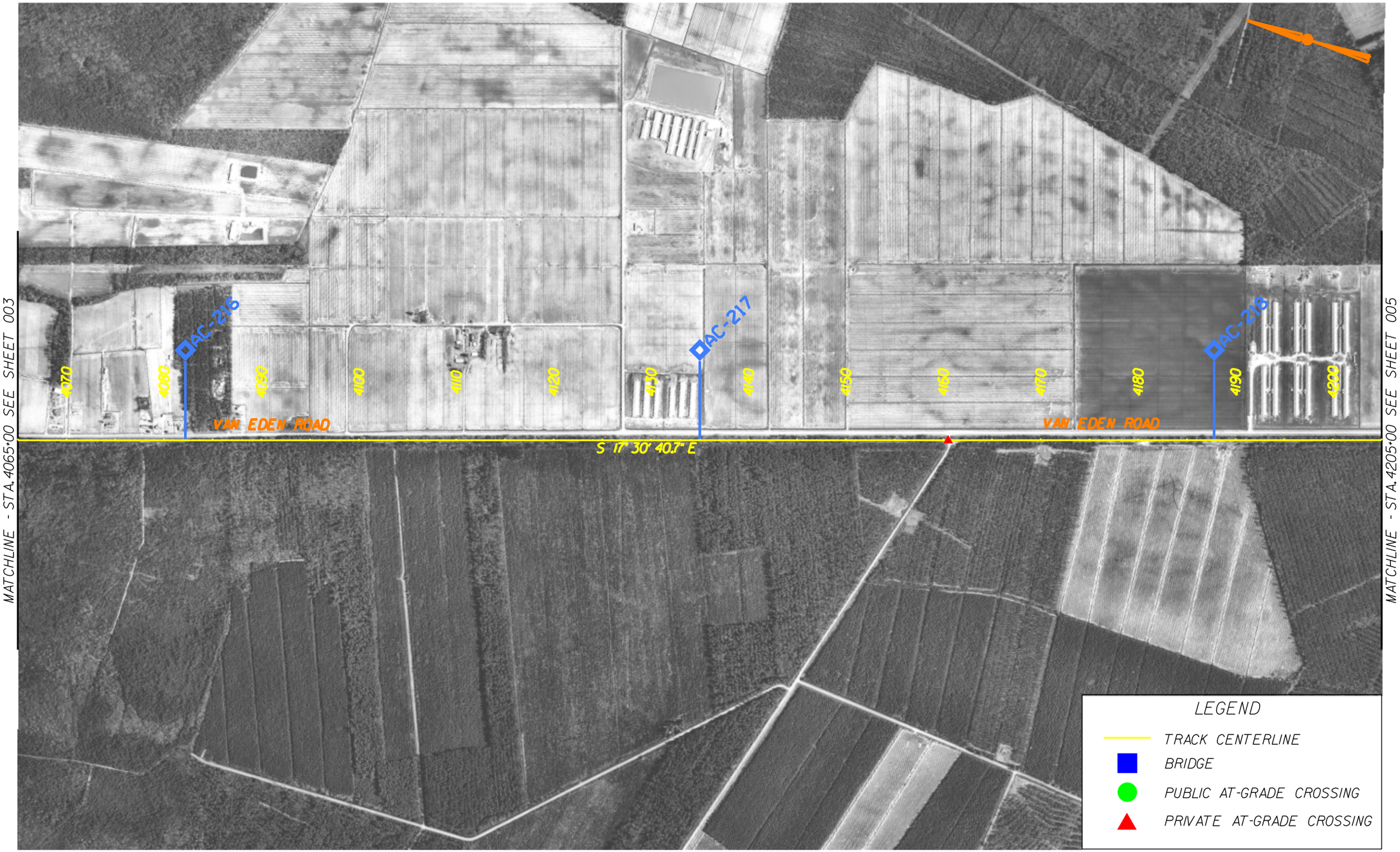

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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

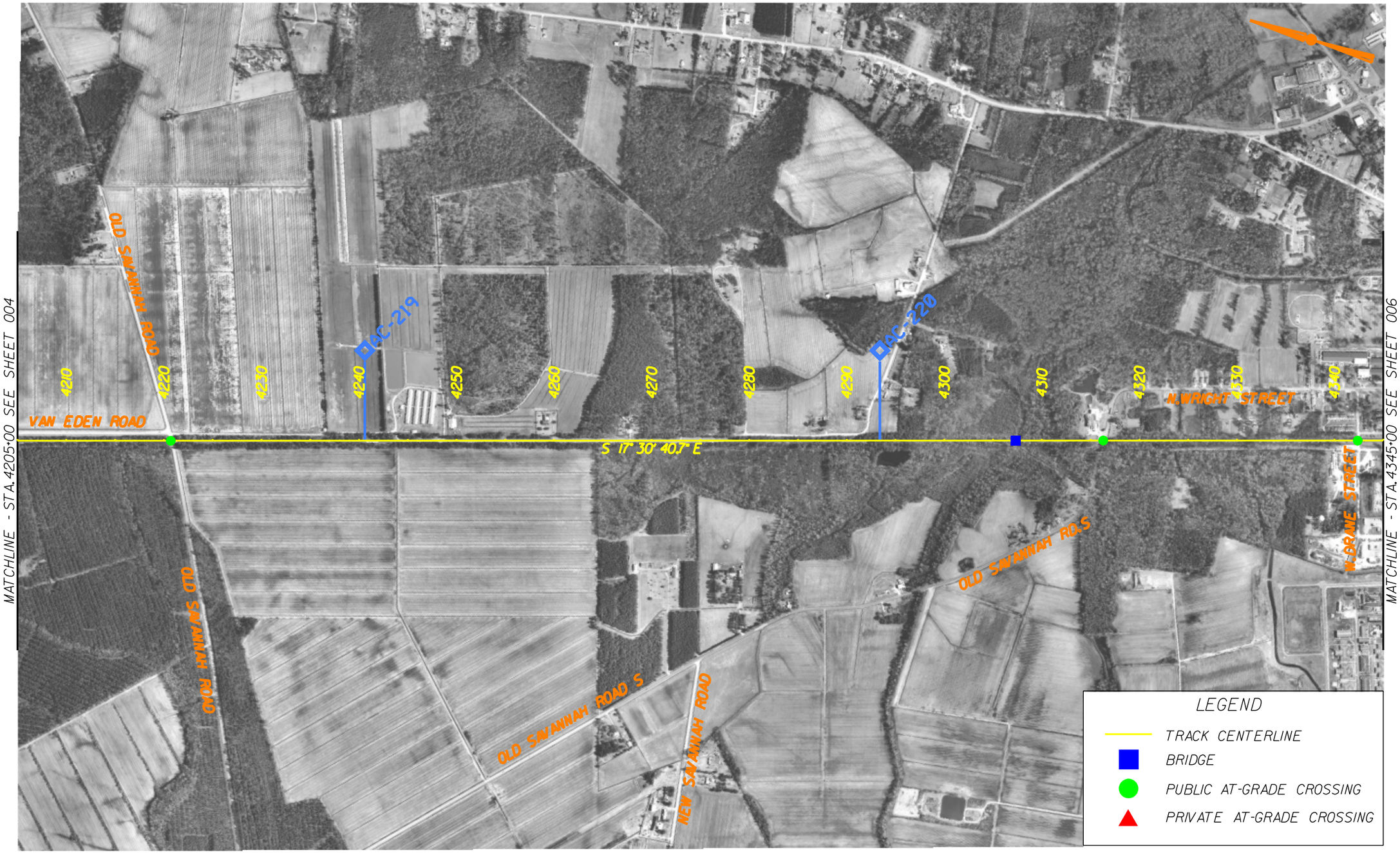
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA. 4065+00 TO STA. 4205+00

LOCATION: PENDER COUNTY, NC			
DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
DWN BY: SMK	VAL SEC: V.9N.C.		SHEET 004
CHK BY:	DATE: AUG. 22, 2014	SCALE: 1"=1000'	



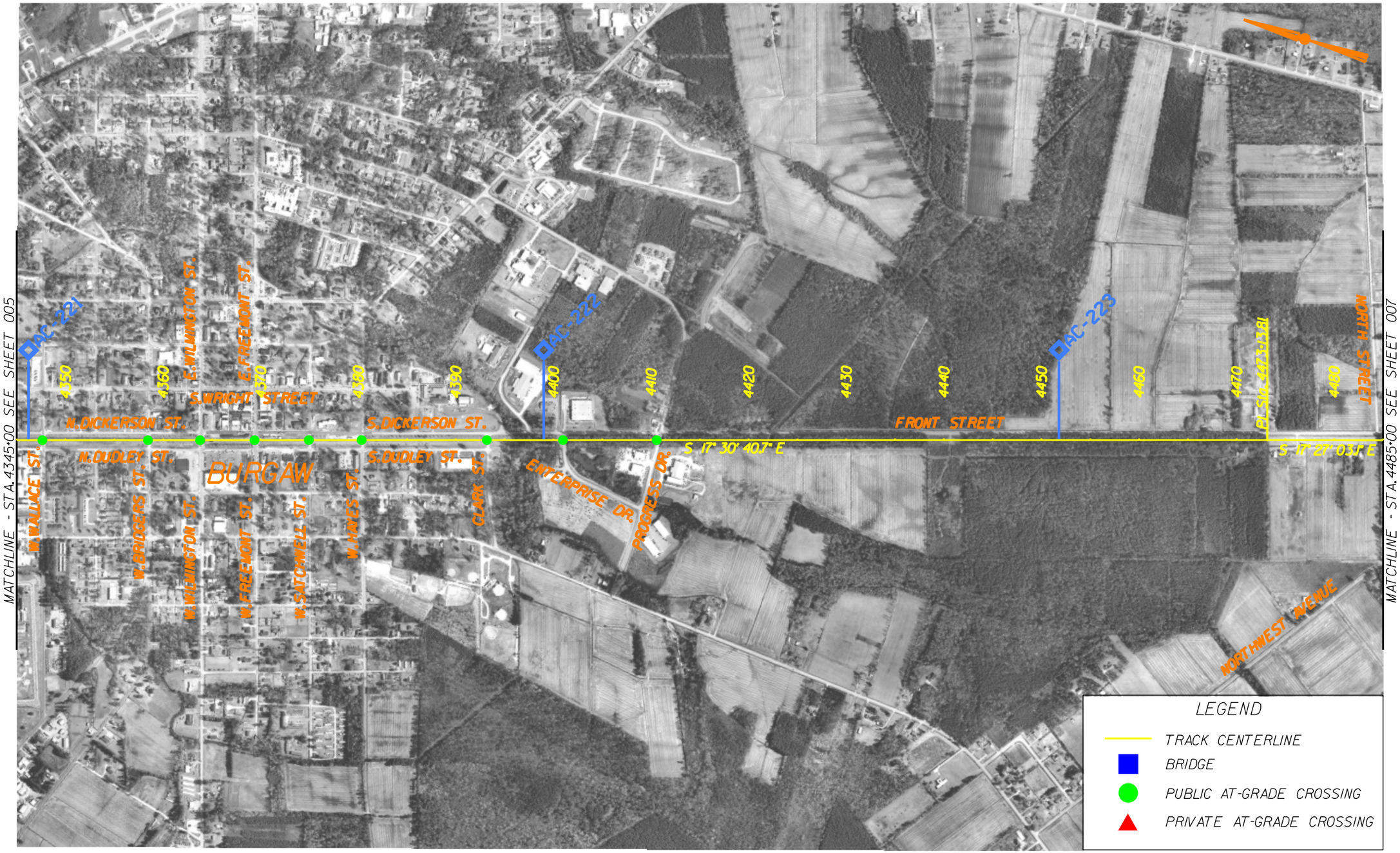
NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY
TITLE: CONCEPTUAL PLANS STA. 4205+00 TO STA. 4345+00
LOCATION: PENDER COUNTY, NC
DGN BY: SMK | RAILROAD: NCDOT | MILE POST: AC-208 TO AC-235
DWN BY: SMK | VAL SEC: V.9N.C.
CHK BY: | DATE: AUG. 22, 2014 | SCALE: 1"=1000'
SHEET 005



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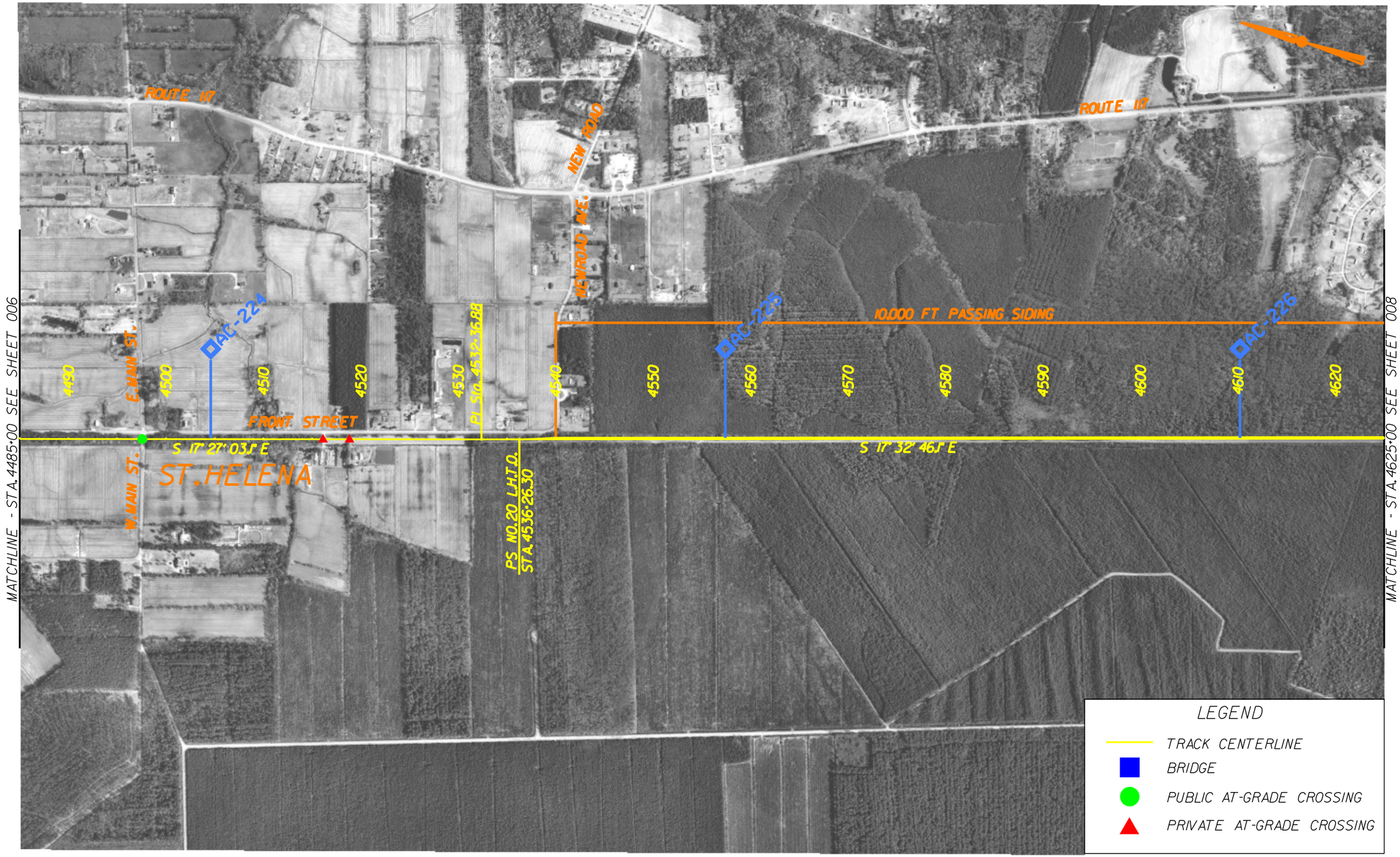
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT	WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY
TITLE	CONCEPTUAL PLANS STA.4205+00 TO STA.4345+00
LOCATION	PENDER COUNTY,NC
DGN BY	SMK
RAILROAD	NCDOT
MILE POST	AC-208 TO AC-235
DWN BY	SMK
VAL SEC	V.9N.C.
CHK BY	
DATE	AUG.22.2014
SCALE	1"=1000'
	SHEET 006



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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA.4345+00 TO STA.4625+00

LOCATION: PENDER COUNTY, NC			
DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
DWN BY: SMK	VAL SEC: V.9N.C.		SHEET 007
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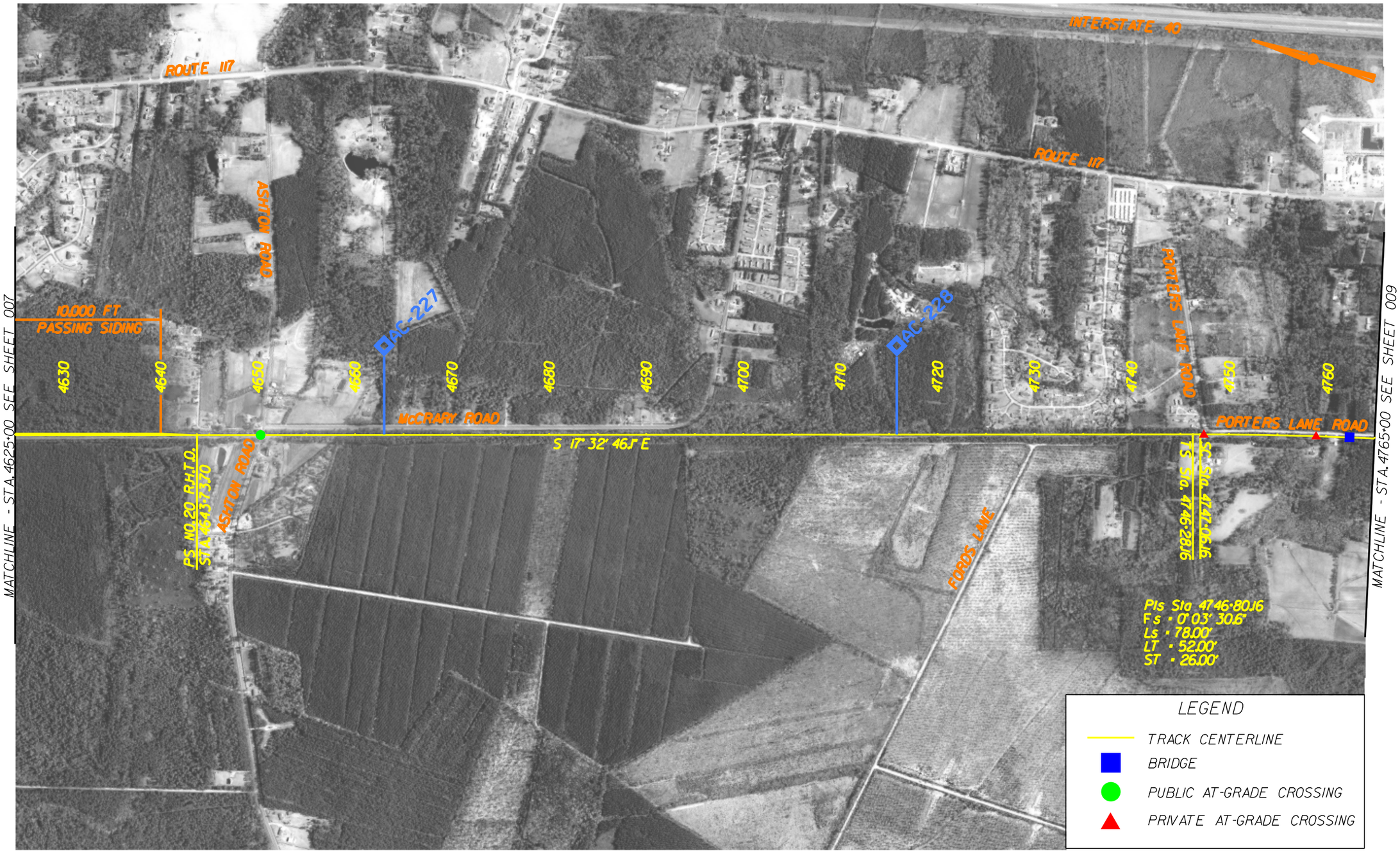

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DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA. 4625+00 TO STA. 4765+00

LOCATION: PENDER COUNTY, NC

DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
DWN BY: SMK	VAL SEC: V.9N.C.		SHEET 008
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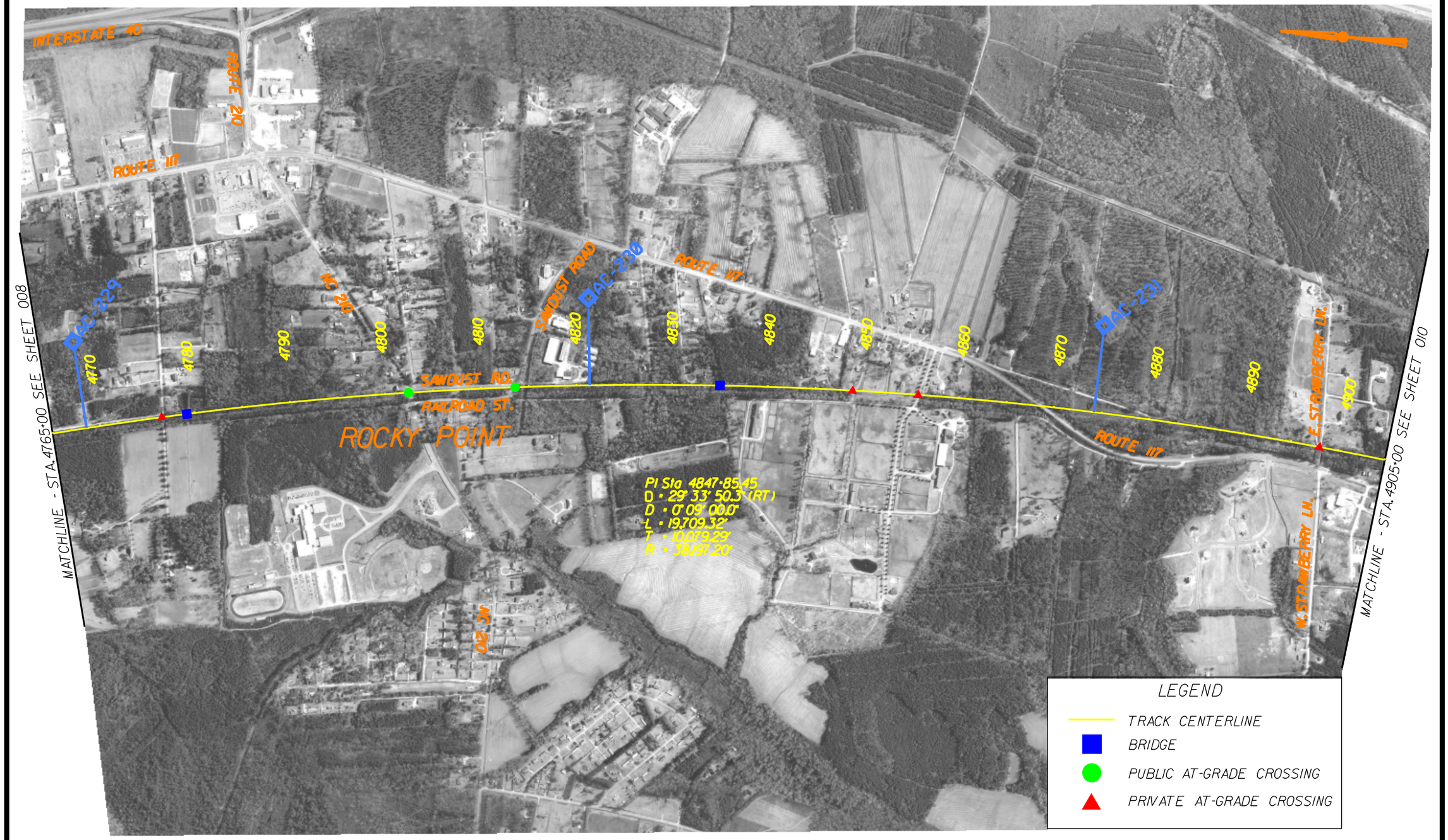

NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY

TITLE: CONCEPTUAL PLANS
STA. 4765+00 TO STA. 4905+00

LOCATION: PENDER COUNTY, NC

DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
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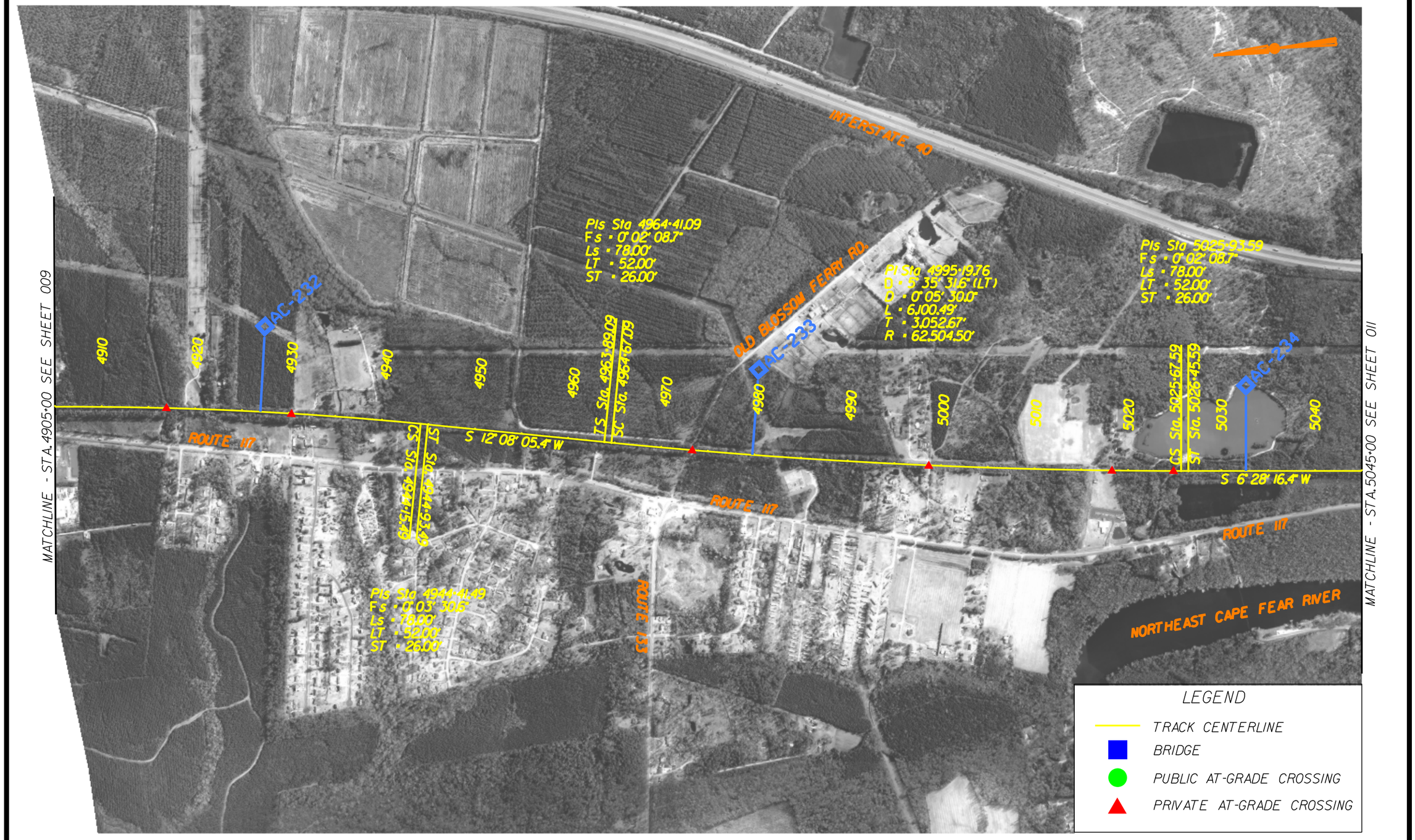

NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA.4905+00 TO STA.5045+00

LOCATION: PENDER COUNTY,NC

DGN BY: SMK	RAILROAD: NCDOT		MILE POST: AC-208 TO AC-235
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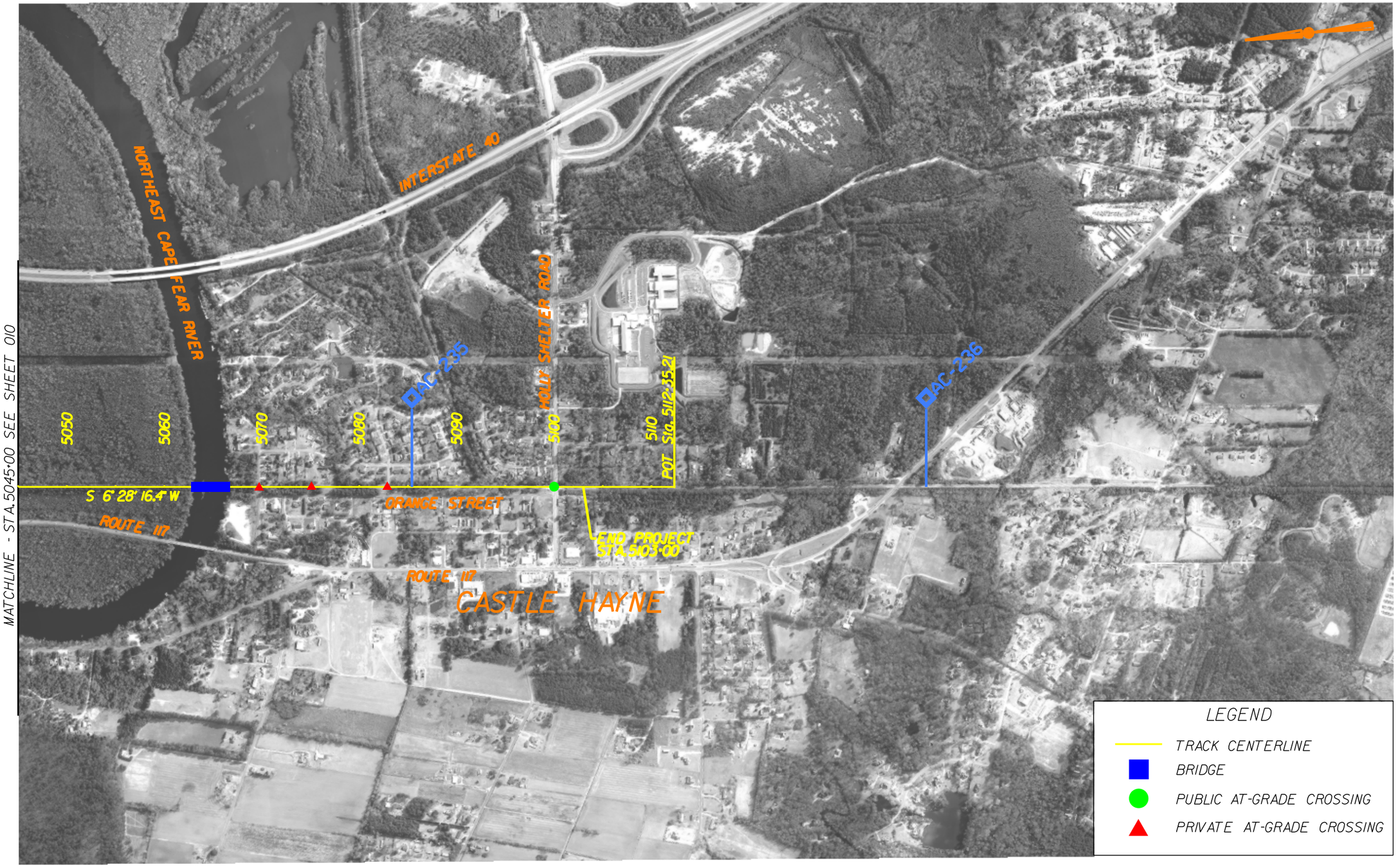

NO.	BY	DATE	REVISION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

PREPARED BY: PB PARSONS BRINCKERHOFF

PROJECT: WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST.STUDY

TITLE: CONCEPTUAL PLANS
STA. 5045+00 TO STA. 5103+00

LOCATION: PENDER COUNTY, NC

DGN BY: SMK	RAILROAD: NCDOT	MILE POST: AC-208 TO AC-235	
DWN BY: SMK	VAL SEC: V.9N.C.	SHEET 011	
CHK BY:	DATE: AUG. 22, 2014	SCALE: 1"=1000'	

Appendix B

Wallace to Castle Hayne Cost Estimate

Wallace to Castle Hayne Cost Estimate Item	Unit	Quantity	Unit Cost	Cost	Allocated Contingency	Total
I. Guideway						**$63,451,302**
At Grade Track						
New	TF	140,976	$339	$47,772,044	20%	$57,326,452
Rehab	TF	5,280	$99	$524,795	20%	$629,754
Special Trackwork						
No. 10 Turnouts	EA	5	$133,400	$667,000	20%	$800,400
No. 20 Turnouts	EA	2	$247,020	$494,040	20%	$592,848
Roadway Crossings						
Asphalt Crossing Surface - 2 lanes	TF	780	$319	$249,132	20%	$298,958
Asphalt Crossing Surface - 1 lane	TF	450	$319	$143,730	20%	$172,476
Concrete Panels	TF	156	$862	$134,485	20%	$161,382
Passing Siding	TF	10,000	$289	$2,890,860	20%	$3,469,032
II. Systems						**$5,480,774**
Crossing protection						
Public Crossing-Gates, Flashers, Bells	EA	27	$143,565	$3,876,267	20%	$4,651,520
Public Crossing-Cantilever, Gates, Flashes, Bells	EA	3	$215,348	$646,044	20%	$775,253
Private Crossing Crossbucks	EA	30	$1,500	$45,000	20%	$54,000
III. Drainage						**$581,446**
Drainage Culvert Items						
18" RCP, Class III Reinforcement	LF	150	$ 32.11	$4,817	25%	$6,021
18" RCP, Class V Reinforcement	LF	120	$ 46.00	$5,520	25%	$6,900
24" RCP, III	LF	150	$ 44.00	$6,600	25%	$8,250
24" RCP, V	LF	470	$ 68.00	$31,960	25%	$39,950
30" RCP, V	LF	80	$ 85.00	$6,800	25%	$8,500
36" RCP, V	LF	950	$ 125.00	$118,750	25%	$148,438
42" RCP, V	LF	270	$ 135.00	$36,450	25%	$45,563
48" RCP, V	LF	100	$ 148.00	$14,800	25%	$18,500
60" RCP, V	LF	200	$ 300.00	$60,000	25%	$75,000
72" RCP, V	LF	450	$ 340.00	$153,000	25%	$191,250
Pipe Removal	LF	2940	$ 9.00	$26,460	25%	$33,075
IV. Structures (Required for all Bridge Alternatives)						**$12,703,200**
New Bridges (Average of two calculation methods)						
Stream Crossing 1 (SF Method)	SF	1980	$700	$1,386,000	20%	$1,641,600
Stream Crossing 1 (TF Method)	TF	90	$15,000	$1,350,000	20%	
Stream Crossing 2	SF	1980	$700	$1,386,000	20%	$1,641,600
Stream Crossing 2	TF	90	$15,000	$1,350,000	20%	
Stream Crossing 3	SF	1320	$700	$924,000	20%	$1,094,400
Stream Crossing 3	TF	60	$15,000	$900,000	20%	
Stream Crossing 4	SF	1320	$700	$924,000	20%	$1,094,400
Stream Crossing 4	TF	60	$15,000	$900,000	20%	
Stream Crossing 5	SF	660	$700	$462,000	20%	$547,200
Stream Crossing 5	TF	30	$15,000	$450,000	20%	
Rockfish Creek Crossing	SF	7700	$700	$5,390,000	20%	$6,384,000
Rockfish Creek Crossing	TF	350	$15,000	$5,250,000	20%	
Crash Walls at Existing US-117 Bridge	LS	1	$250,000	$250,000	20%	$300,000
CONSTRUCTION SUBTOTAL (I to IV)						**$82,216,721**

Wallace to Castle Hayne Cost Estimate Item	Unit	Quantity	Unit Cost	Cost	Allocated Contingency	Total	Bridge Alternative 1	Bridge Alternative 2	Bridge Alternative 3
V. Structures (Additional Items for Bridge Alternatives)							**$11,508,000**	**$11,070,000**	**$75,396,000**
Rehabilitation Items (North East Cape Fear River)									
Structural Steel Repairs & Strengthening (Girders)	LBS	350,000	$5	$1,750,000	20%	$2,100,000	$2,100,000	-	-
Bridge Jacking for Bearing Replacements	LS	1	$100,000	$100,000	20%	$120,000	$120,000	-	-
New Bearings (Steel and Bronze Bearings)	EA	28	$5,000	$140,000	20%	$168,000	$168,000	-	-
Cleaning and Painting of Existing Structural Steel	LS	1	$1,000,000	$1,000,000	20%	$1,200,000	$1,200,000	-	-
Lead Paint Removal, Collection, and Disposal	LS	1	$500,000	$500,000	20%	$600,000	$600,000	-	-
Enclosure to Contain Lead Paint Removal	LS	1	$250,000	$250,000	20%	$300,000	$300,000	-	-
New Electrical and Mechanical Equipment to Refurbish Existing Swing Span	LS	1	$250,000	$250,000	20%	$300,000	-	-	-
New Operators House	LS	1	$250,000	$250,000	20%	$300,000	-	-	-
Retrofitting Existing Fender System	LS	1	$100,000	$100,000	20%	$120,000	$120,000	-	-
New Dolphins for Pier Protection	LS	1	$250,000	$250,000	20%	$300,000	$300,000	-	-
Substucture Concrete Repairs (Spalls, Racks, Unsound Concrete)	LS	1	$500,000	$500,000	20%	$600,000	$600,000	-	-
Additional Bridge Items (Average of two Calculation Methods as Applicable)									
New Ballasted Deck Spans for Existing Height Option (SF Method)	SF	6500	$700	$4,550,000	20%	$5,070,000	-	$5,070,000	-
New Ballasted Deck Spans for Existing Height Option (TF Method)	TF	260	$15,000	$3,900,000	20%				
New Swing Span (140', including E&M, Control House, etc.)	SF	3625	$1,600	$5,800,000	20%	$6,000,000	$6,000,000	$6,000,000	$6,000,000
New Swing Span (140', including E&M, Control House, etc.)	TF	140	$30,000	$4,200,000	20%				
New Through Girder Spans (100' for 29' High Bridge)	SF	2500	$800	$2,000,000	20%	$2,220,000	-	-	$2,220,000
New Through Girder Spans (100' for 29' High Bridge)	TF	100	$17,000	$1,700,000	20%				
Remaining Spans for 29' High Bridge (1800' on both sides)	SF	90000	$500	$45,000,000	20%	$59,400,000	-	-	$59,400,000
Remaining Spans for 29' High Bridge (1800' on both sides)	TF	3600	$15,000	$54,000,000	20%				
Retaining Walls at Approaches to 29' High Bridge	SF	86400	$75	$6,480,000	20%	$7,776,000	-	-	$7,776,000
CONSTRUCTION SUBTOTAL (I to V)							**$93,724,721**	**$93,286,721**	**$157,612,721**
VI. Miscellaneous							**$8,766,250**	**$8,722,450**	**$15,155,050**
Environmental Mitigation Allowance					5%		$4,383,125.09	$4,361,225.09	$7,577,525.09
Temporary Facilities, Indirect Costs for Construction (Demob)					5%		$4,383,125.09	$4,361,225.09	$7,577,525.09
VII. Professional Services							**$20,619,439**	**$20,523,079**	**$34,674,799**
Design					8%		$7,497,977.68	$7,462,937.68	$12,609,017.68
Project Management					5%		$4,686,236.05	$4,664,336.05	$7,880,636.05
Construction Management					5%		$4,686,236.05	$4,664,336.05	$7,880,636.05
Permitting, Environmental					2%		$1,874,494.42	$1,865,734.42	$3,152,254.42
Survey, geotech					2%		$1,874,494.42	$1,865,734.42	$3,152,254.42
PROJECT SUBTOTAL (I to VII)							**$123,110,410**	**$122,532,250**	**$207,442,570**
VIII. Project Contingency					25%		**$30,777,602**	**$30,633,062**	**$51,860,642**
PROJECT TOTAL (I to VIII)							**$153,888,012**	**$153,165,312**	**$259,303,212**

Bridge Alternatives
Alternative 1 - Rehabilitate Existing Fixed Spans and Replace Swing Span with New Swing Span
Alternative 2 - Total Replacement at Existing Height
Alternative 3 - Total Replacement at 29' High

Appendix C

Wallace to Castle Hayne Benefit Cost Report

PARSONS BRINCKERHOFF

Wallace to Castle Hayne Rail Line Restoration Project

Benefit Cost Analysis

Prepared for the North Carolina Department of Transportation

Table of Contents

Benefit Cost Analysis Summary

The estimated benefits of the Wallace to Castle Hayne (W2CH) rail line restoration are between $6 million and $22 million over a 30 year horizon. While these benefits seem large in absolute terms, they are modest relative to the cost needed to reactivate the line. The benefit cost ratio for the project is estimated to range from 0.05 to 0.17, with a net present value of between about l $108 million and l $124 million. The results indicate that the project does not generate sufficient benefits above its costs. A benefit cost ratio of 1 is the threshold by which projects can be considered costl effective.

Table 1: Benefit Cost Analysis Summary Results

Category	Mid Scenario 2014 $	High Scenario 2014 $	Low Scenario 2014 $
Reduced emissions	1,940,390	5,338,682	802,436
Reduced inventory carrying costs	38,951	120,606	23,098
Reduction in accidents	607,983	1,525,896	174,429
Reduction in operating expense	4,404,975	12,313,112	1,899,409
Increase in system redundancy	3,040,407	3,040,407	3,040,407
Total present value of benefits	**10,032,706**	**22,338,703**	**5,939,779**
Total present value of costs	**134,464,950**	**134,464,950**	**134,464,950**
Residual value	**-3,865,548**	**-3,865,548**	**-3,865,548**
Net present value	**-120,566,696**	**-108,260,699**	**-124,659,623**
Benefit/cost ratio	**0.08**	**0.17**	**0.05**

Analysis Assumptions

Discount Rates

Dollar figures in this analysis are expressed in real 2014 dollars. Total cost estimates include an allowance for contingency. Therefore, no additional escalation was assumed. Yearly benefits and costs were discounted to present value using a 7.0 percent rate and a 2014 base year, consistent with U.S. DOT guidance for TIGER VI grants[1] and OMB Circular A-4.[2].

Evaluation Period

The evaluation period includes two years of construction and 30 years of operations beyond the Project completion within which to accrue benefits.

Project costs are incurred in 2015 and conclude in 2016. The operations period begins in 2017 and continues through 2046. The analysis period, therefore, begins with the first expenditures in 2015 and continues to 2046.

[1]TIGER 2014 NOFA: Benefit-Cost Analysis Guidance, Updated March 14, 2014; http://www.dot.gov/tiger/guidance
[2] White House Office of Management and Budget, Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (October 29, 1992). (http://www.whitehouse.gov/omb/circulars_a094).

All benefits and costs are assumed to occur at the end of each year, and benefits begin in the calendar year immediately following the final construction year.

Tonnage Estimation

The estimated benefits reflect probable usage of the W2CH corridor. Benefits have been calculated for each of three categories of potential usage of the W2CH Corridor. Freight tonnage forecasts were developed primarily using rates of expected change in rail traffic from the U.S. Federal Highway Administration (FHWA) Freight Analysis Framework-3 (FAF-3). FAF-3 forecasts extend only to 2040, while the final analysis year of this analysis is 2046. Traffic levels were assumed to remain flat during the final six years between 2040 and 2046 for each case. Due to uncertainty in forecasting freight levels, tonnage levels often appear as high, medium, and low scenarios.

Local Freight

Shippers physically located on the W2CH segment could use rail as a result of the project. It is assumed that if not for the W2CH project, these shippers would be solely reliant on truck freight transportation. Forecasted tons are show below. Shipment distances are assumed to be 570 miles for both rail and truck, the average distance for a rail movement to or from the Wilmington area as calculated from the 2011 STB Waybill Sample.

Table 2: Summary of Forecasted Local Freight on W2CH

Year	Scenario		
	Low	Medium	High
2014	0	2,500	5,000
2020	0	2,777	5,553
2025	0	2,969	5,938
2030	0	3,157	6,182
2035	0	3,202	6,403
2040	0	3,334	6,668

W2CH as a Shortcut

Other freight could use W2CH as a more direct rail routing. In the no build scenario, where W2CH is not constructed, this freight would still use rail but would use a more circuitous routing. The nature of benefits and the extent of the mileage savings depend upon the type of traffic. Freight categories are below.

- Manifest freight. This is freight that is shipped in individual or groups of cars that must be sorted into (switched) and out of trains. Manifest freight is assumed to save 141 miles per trip using W2CH, since freight between Wilmington and points northeast could move directly over W2CH rather than a routing of Wilson – Pembroke- Hamlet – Wilmington.
- Unit train freight. This is freight that moves in complete trains that travel between origin and destination without being stored or split up. Unit train freight is further divided into the following.

- Military cargo. These are shipments between MOTSU and military depots in the Northeast. W2CH saves 68 miles for these shipments, since freight can proceed directly over the W2CH rather than a routing of Wilmington – Pembroke – Wilson.
- Agricultural shipments. These are shipments from the Port of Wilmington to hog and turkey production areas in Duplin, Wayne, and Sampson counties. For simplicity's sake, these are assumed to move between Wilmington and Warsaw. Mileage savings for these movements total 167 miles per trip, since shipments can proceed directly to Warsaw over the W2CH and avoid a circuitous routing of Wilmington – Pembroke – Wilson – Warsaw.

Forecast tonnage for each category of traffic is shown in the table below.

Table 3: Forecast Freight Using W2CH as a Shortcut

Year	Manifest			Agriculture			Military		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
2014	0	102,400	204,800	41,385	82,770	275,900	40,350	40,350	40,350
2020	0	105,188	210,376	48,445	96,890	322,968	40,350	40,350	40,350
2025	0	105,305	210,610	53,446	106,892	356,307	40,350	40,350	40,350
2030	0	102,475	204,949	58,289	116,579	388,596	40,350	40,350	40,350
2035	0	99,833	199,666	62,549	125,097	416,992	40,350	40,350	40,350
2040	0	96,196	192,391	65,164	130,328	434,427	40,350	40,350	40,350

W2CH as Secondary Access to Wilmington

W2CH also provides secondary access to the Wilmington area in case there is an outage on the Wilmington Subdivision. The freight that would benefit from this secondary access includes all freight forecast to originate or terminate in the Wilmington area as listed below.

Table 4: Forecast Freight Benefitting from W2CH Secondary Access to Wilmington

Year	Rail Tonnage
2014	4,727,752
2020	4,601,157
2025	4,732,303
2030	4,894,390
2035	5,028,707
2040	5,166,059

Methodology

Project Benefits

In keeping with the tonnage estimation, all project benefits were calculated based on the three estimation scenarios. Low, medium, and high results were produced for the analysis.

Table 5: Summary of W2CH Benefits

Category	Mid Scenario 2014 $	High Scenario 2014 $	Low Scenario 2014 $
Reduced emissions	1,940,390	5,338,682	802,436
Reduced inventory carrying costs	38,951	120,606	23,098
Reduction in accidents	607,983	1,525,896	174,429
Reduction in operating expense	4,404,975	12,313,112	1,899,409
Increase in system redundancy	3,040,407	3,040,407	3,040,407
Total PV of benefits	**10,032,706**	**22,338,703**	**5,939,779**

The nature of benefits depends upon the type of freight. Table 6 below summarizes freight types and benefits associated.

Table 6: W2CH Benefits by Applicable Freight Traffic

	Local	Manifest	Agriculture	Military	All Wilmington
Reduced truck emissions	Yes	No	No	No	No
Reduced truck accidents	Yes	No	No	No	No
Reduced truck operating expense	Yes	No	No	No	No
Reduced rail emissions	No	Yes	Yes	Yes	No
Reduced rail accidents	No	Yes	Yes	Yes	No
Reduced rail operating expense	No	No	Yes	Yes	No
Reduced rail inventory carrying cost	No	No	Yes	Yes	No
Reduced rail inventory carrying cost due to redundancy	No	No	No	No	Yes

Reduced Emissions

Emission savings result from two direct effects of the reactivation of the rail line. First, the route shortcut reduces miles traveled for existing rail freight. Second, it induces diversion of freight from truck to rail. The diverted freight results in a reduction in truck emissions but also increases rail emissions. The net effect is a positive benefit due to the higher environmental efficiency of rail.

The tables below show the monetized values and emission factors used in this analysis. Because emission factors are based on fuel efficiency, ton-mileage is converted to gallons of diesel fuel by multiplying by efficiency factors as provided by CSX for rail freight. CO_2 emissions for truck are also based on gallons consumed. The following equation shows the computation used to calculate this benefit.

$$Emissions\ Benefit = TM_{yk} * \frac{Gallons}{TM} * \frac{emissons}{Gallons} * \frac{\$value}{emissions}$$

TM_{yk} = Ton-mileage in year y for scenario k

Truck emission factors other than for CO_2 are based on vehicle miles traveled. Therefore, in calculating the results for truck freight, the estimated tonnage was divided by the average tonnage per truck at 22.7 tons per truck, as provided by the Federal Highway Administration's Freight Management and Operations branch[3]. This results in total VMT avoided by this mode. The VMTs are then multiplied by the emission factors and then by the monetized values to arrive at the emission benefit from avoided truck trips.

$$Truck\ emission\ savings = \frac{TM_{yk}}{Tonnage\ per\ truck} * \frac{emissons}{VMT} * \frac{\$value}{emissions}$$

TM_{yk} = Ton-mileage in year y for scenario k

Table 7: Modal Fuel Efficiency

Mode Type	Ton-Miles/Gallon
CSX Rail	470
Truck	134

Source: CSX [4] & MNN[5]

Table 8: Cost per Metric Ton of Pollutants

Emissions type	2014$ per Metric Ton
NO_X	$7,877
PM	$360,383
VOC	$1,999
CO_2	Varies per year

Source: US DOT[6]

3 http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/chap3.htm#32 : value of 22.7 tons per truck
[4] http://www.csx.com/index.cfm/about-csx/projects-and-partnerships/fuel-efficiency/
[5] http://www.mnn.com/earth-matters/energy/stories/fuel-efficient-transportation-an-overview
[6] http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf

Table 9: Cost per Metric Ton of CO_2

SCC in Discounted 2013$ per Metric Ton	2017	2025	2030	2040	2050
Social Cost of CO_2	$44	$53	$57	$68	$78

Source: US DOT[7]

Table 10: Emissions Factors of Truck and Rail for Pollutants

Rail & Truck Emission Factors	
Rail NOX grams/gallon	96.5
Rail PM grams/gallon	4.5
Rail VOC grams/gallon	3.8
Rail CO2 pounds/gallon	22.2
Truck NOX grams/VMT	3.6
Truck PM grams/VMT	0.2
Truck VOC grams/VMT	0.1
Truck CO2 pounds/gallon	22.2

Source: US EPA, US DOE[8]

Reduction in Shippers' Carrying Cost

The reduction in carrying costs result from travel time savings. The route shortcut reduces miles traveled for existing rail freight. These shippers can save on carrying costs as freight spends less time in transit. For diverted freight, the switch results in a net increase in carrying costs due to the relative increase in travel time, as truck is faster than rail. To calculate this benefit, total tonnage is multiplied by the average value per ton of freight rail $246 (US DOT[9]). The total value of the freight in transit is converted to hourly rates and then multiplied by the appropriate rate, assumed to be 13 percent in this analysis per the FHWA Intermodal Transportation and Inventory Cost (ITIC) model estimate for in-transit inventory cost. The resultant calculation can be thought of as a value of freight travel time to the shipper. This value is then multiplied by the amount of hours saved to arrive at the savings. The amount of time saved is a function of mode speed and distance. Since the existing rail freight experiences a reduction in distance, freight hours traveled reduces. In the case of manifest freight, however, it is uncertain whether there would be any time savings associated with more direct routing over the W2CH.

[7] http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf

[8] *Emission Factors for Locomotives*, EPA-420-F-09-025, Office of Transportation and Air Quality, United States Environmental Protection Agency, April 2009; *Voluntary Reporting of Greenhouse Gases Program Fuel Emission Coefficients,* Independent Statistics and Analysis, U.S. Energy Information Administration, U.S. Department of Energy; MOVES Motor Vehicle Emission Simulator, Office of Transportation and Air Quality, United States Environmental Protection Agency.

[9] http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/commodity_flow_survey/2012/united_states/index.html

Because the volume of freight travelling between Hamlet and Wilmington is higher than the volume of freight that would be passing over the W2CH segment, it is uncertain whether train service would be as frequent. This reduced frequency in service may increase total transit time even, since cars would need to wait longer until the next train, even if distances are shorter. Therefore, manifest freight was not included in this benefit category. However, in the case of diverted freight, freight hours traveled increase as the relative mode speed is lower for rail. Therefore, while there are net benefits that result from carrying cost savings, the portion attributable to diverted freight is negative.

The following equation shows the computation used to calculate this benefit before adjusting for dis-benefits.

$$Carry\ Cost\ Benefit = T_{yk} * \frac{\$value}{T} * \frac{1}{hours\ per\ year} * \frac{miles}{speed} * \%rate$$

T_{yk} = Tonnage in year y for scenario k

The following table shows the values used in the computation.

Table 11: Values Used to Calculate Inventory Carrying Cost

Variable	Value	Source
Miles saved (military)	68	PB
Miles saved (agriculture)	167	PB
Miles (diverted)	570	PB
Average speed truck	53.1	US DOT
Average speed rail	20	CSX
Rate	13%	US DOT
Value per ton	$245.84	US DOT

Source: CSX[10], US DOT[11]

Reduction in Accidents

The BCA assumes constant accident rates for the "build" and "no build" scenarios. Accordingly, changes in accidents are a result of the changes in ton-miles in each of the scenarios analyzed. The calculation relies on accident rates per ton mile as shown in the table below. The resultant change in accidents is multiplied by monetized values to arrive at a total accident cost savings. The following equation shows the computation used to calculate this benefit.

[10] http://www.railroadpm.org/Home/RPM/Performance%20Reports/CSX.aspx

[11] http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/09factsfigures/table3_8.htm. The 13 percent inventory carrying cost is from the FHWA Intermodal Transportation and Inventory Cost System Model (ITIC).

$$Accident\ benefit = TM_{yk} * \frac{accidents}{TM} * \frac{\$value}{accident}$$

TM_{yk} = Ton-mileage in year y for scenario k

In calculating the results for truck freight the estimated tonnage was divided by the average tonnage per truck, as provided by the Federal Highway Administration's Freight Management and Operations branch[12]. This results in total VMT avoided by this mode. The VMTs are then multiplied by accident rate and then by the monetized values to arrive at the accident benefit from avoided truck trips.

$$Truck\ accident\ savings = \frac{TM_{yk}}{Tonnage\ per\ truck} * \frac{accidents}{VMT} * \frac{\$value}{accident}$$

TM_{yk} = Ton-mileage in year y for scenario k

Table 12: Values Used to Calculate Accident Savings

Accident Rates and Monetized Values	Accidents/TM & $Value/Accident	Source
Rail Fatal Crashes per 100 mil. ton-miles	140	FRA
Rail Injury Crashes per 100 mil. ton-miles	580	FRA
Rail Damage Crashes per 100 mil. ton-miles	1,770	FRA
Fatal Crashes per mil. Truck VMT	0.012500	FMCSA
Injury Crashes per mil. Truck VMT	0.224550	FMCSA
Damage Crashes per mil. Truck VMT	0.785910	FMCSA
Value per Fatal Crash	$9,100,000	US DOT
Value per Injury Crash	$110,011	US/NC DOT
Value per Damage Crash	$3,927	US DOT

Source: US DOT[13] & *NC DOT[14] & FMCSA[15] & FRA[16]

Reduction in Operating Expense

Operating expense savings are derived from decreases in mileage. To calculate these savings costs per ton-mile are multiplied by the total ton-miles for the respective benefit source. That is, existing freight

[12] http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/chap3.htm#32 : value of 22.7 tons per truck

[13] http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf

14 https://connect.ncdot.gov/business/DMV/.../2012%20Crash%20Facts.pdf – *weighted average product of total non-fatal, non-PDO accidents and accident monetized values.*

[15] Large Truck and Bus Crash Facts 2012. FMCSA-RRA-14-004. Analysis Division, Federal Motor Carrier Safety Administration, U.S. Department of Transportation. June 2014.

[16] One Year Accident/Incident Overview – Combined (2012). Office of Safety Analysis, Federal Railroad Administration, U.S. Department of Transportation. 2014.

movements taking the shortcut and the net difference between truck and rail for diverted freight. The following equation shows the computation of this benefit.

$$Operating\ expense\ savings\ = TM_{yk} * \frac{\$cost}{ton - mile}$$

TM_{yk} = Ton-mileage in year y for scenario k

The following table shows the values used in the computation.

Table 13: Values Used to Estimate Operating Expense Savings

Variable	Value	Source
Cost/ton-mile unit rail	$0.015	STB URCS
Cost/ton-mile diverted rail	$0.034	STB 2011 Waybill
Cost/ton-mile diverted truck	$0.09	ATRI

Source: STB & ATRI

The calculation of rail operating expense per variable ton-mile saved is detailed below. Results using the 2012 URCS were indexed to 2014 using the STB's Railroad Cost Adjustment Factor – Adjusted (RCAF-A). Because the RCAF-A declined over this time period, the inflations adjustment reflects a reduction in costs.

Table 14: Cost Savings Associated with Shorter Route between Wilson and Wilmington

(Assume 90 Car Train, 108 Tons per Car, Covered Hoppers with Grain, RR Owned Cars, 2012 CSX URCS)

Route/Difference	Ton-Miles (TM)	Var. Cost (VC)	2014 $'s Var. Cost	VC/TM	VC/TM 2014 $'s
Wilmington - Wilson by W&W	1,059,480	$33,650	$27,257	$0.032	$0.026
Wilmington - Wilson by Pembroke	1,720,440	$46,228	$37,445	$0.027	$0.022
Difference	660,960	$12,578	$10,188	$0.019	$0.015
Wilmington - Warsaw by W&W	660,960	$26,067	$21,114.18	$0.039	$0.032
Wilmington - Warsaw by Pembroke	2,206,440	$55,477	$44,936.31	$0.025	$0.020
Difference	1,545,480	$29,410	$23,822	$0.019	$0.015

Estimated diverted rail variable costs represent total variable costs for rail movements to and from the Wilmington region as reflected by the 2011 STB Waybill Sample, adjusted to 2014 levels. Truck costs represent the marginal cost per mile of trucking in the Southeast as estimated by the American Transportation Research Institute (ATRI), the research wing of the American Trucking Associations. The resulting cost per mile of $1.599[17] was divided by an assumed 22.7 tons per truck per documentation to the FHWA FAF-3. [18] FAF-3 documentation also found that total mileage including miles traveled empty is about 128 percent of loaded mileage. STB calculations of railroad variable costs include empty mileage. Therefore, to make truck and rail cost calculations comparable, the truck costs per ton-mile were multiplied by 128 percent to account for empty mileage.

Increase in System Redundancy and Resiliency Benefits

The rail line reactivation will also provide redundancy to the Wilmington area. According to a railroader familiar with rail service in the area, there have been outages during 5 of the last 15 years. On average this amounts to an outage every three years. These outages last approximately 2 days. Accordingly, the average savings per year can be summarized with the following equation.

$$Redundancy\ benefit\ =\ T_{yk} * \frac{\$value}{T} * \%rate * \frac{1}{hours\ per\ year} * \frac{2(24h)}{3\ years}$$

T_{yk} = Tonnage in year y for scenario k

This resiliency benefit applies to all existing freight to/from Wilmington.

Project Costs

The total project costs are based off of Alternative 2 from the Technical Assessment and Cost Estimation section; the option includes a total bridge replacement at the Northeast Cape Fear River crossing. The costs were estimated to be $153,165,312. Expenditures are expected to begin in 2015 and conclude by the end of 2016. Approximately 8% of the total project cost is expended in 2015 with the remainder in the following year. The 2015 expenditures represent the portion of the budget dedicated to preconstruction activities. The table below summarizes the discounted costs of the project.

Total Project Costs = $153,165,312

2015 Expenditures = $11,194,406
2016 Expenditures = $141,970,906

Discount Rate = 7%
2014 Present Value = $134,464,950

[17] American Trucking Associations, *An Analysis of the Operational Costs of Trucking: A 2013 Update,* September 2013.
[18] Oak Ridge National Laboratory, *FAF^3 Freight Traffic Analysis,* March 23, 2011, http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/faf_fta.pdf.

Residual Value Estimation

Given that the analysis only considers 30 years of operations and the useful life of much of the infrastructure exceed this time period, a residual value is estimated in order to account for the possible remaining value of assets. The estimation assumes straight line depreciation and varying useful life estimates depending on the specific assets. Asset lives are derived from CSX depreciation rate prescriptions with the STB, as well as U.S. Bureau of Economic Analysis (BEA) depreciation rates for trackwork. The specific assets considered are listed below along with corresponding lifespan, costs, and remaining value at the end of the analysis period.

Table 15: Estimation of W2CH Residual Value at 2046

Structure	Approx. Asset Life Years	Cost 2014 $	Remaining Value 2014 $
Trackwork	38	78,253,108	16,489,853
Crossings	45	791,019	261,036
Bridges	70	26,910,000	15,338,700
Crossing Protection	30	10,622,413	0
Total	**N/A**	**116,846,540**	**32,089,589**

The residual values are summed and assumed to exist at the end of the project in 2046. The residual value is then discounted from 2046 back to 2014, resulting in a discounted present value of $3,865,548. This amount is later deducted from the present value of costs as shown in Table 16 below.

Table 16: Project Costs Discounted to 2014

Costs Component	2014 $
Present value of costs	134,464,950
Residual value	-3,865,548
PV of costs net of RV	130,599,402

Benefit-Cost Analysis Results

At a 7 percent discount rate, the investments yield a net present value of **($120,566,696)** in the middle scenario, and a benefit-cost ratio of **0.08**. The results indicate that the reactivation of the rail line only generates modest benefits that are not sufficient to offset the cost of the project.

The table below presents the evaluation results for all three cases. All benefits and costs were estimated in constant 2014 dollars over an evaluation period extending 30 years beyond project completion in 2016.

Table 17: Benefit Cost Analysis Summary Results

Project	Net Present Value (2014 $ millions disc.)	Benefit Cost Ratio
Mid	($120,566,696)	0.08
High	($108,260,699	0.17
Low	($124,659,623)	0.05

Appendix D

Resolutions of Support for the Wallace to Castle Hayne Project

WILMINGTON URBAN AREA METROPOLITAN PLANNING ORGANIZATION
TRANSPORTATION ADVISORY COMMITTEE

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

NOW THEREFORE, be it resolved that the Wilmington Metropolitan Planning Organization's Transportation Advisory Committee hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED at a regular meeting of the Transportation Advisory Committee on September 28, 2011.

Jonathan Barfield Jr., Chair
Transportation Advisory Committee

Mike Kozlosky, Secretary

RESOLUTION NO. 11-1068

A Resolution Supporting the Reconstruction of the Railroad Tracks Between Castle Hayne and Wallace

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina state Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for Pender County and all of southeastern North Carolina.

NOW THEREFORE, be it resolved that the Town Council of the Town of Carolina Beach supports the efforts of the WMPO to re-establish the 27 mile rail corridor between Castle Hayne and Wallace; and further encourages the NC DOT to reconstruct the railroad line between Castle Hayne and Wallace, and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

Adopted this 13th day of December 2011.

Joel Macon, Mayor

Attest: Melinda N. Prusa, Town Clerk

TOWN OF CAROLINA BEACH SEAL NORTH CAROLINA

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for Pender County and all of southeastern North Carolina.

NOW THEREFORE, be it resolved that the Board of Commissioners of Pender County supports the efforts of the WMPO to re-establish the 27 mile rail corridor between Castle Hayne and Wallace; and further encourages the NC DOT to reconstruct the railroad line between Castle Hayne and Wallace, and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED this the 21st day of November, 2011.

George R. Brown, Chairman

Rick Benton, Clerk to the Board

Resolution

City Council
City of Wilmington
North Carolina

Introduced By: Laura W. Padgett, Councilmember **Date:** 11/1/2011

Resolution Encouraging the North Carolina Department of Transportation (NCDOT) to Reconstruct the Railroad Line between Castle Hayne and Wallace and Requesting NCDOT Consider Double Tracking this Rail Line for Future Freight and Passenger Service

LEGISLATIVE INTENT/PURPOSE:

The North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27 miles of railroad tracks between Castle Hayne and Wallace in southeastern North Carolina. This 27 mile rail corridor is state owned and links New Hanover, Pender and Duplin Counties. The re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Ports Authority, our military bases, improve access for moving products through the state's most agriculturally active region, and improve access to major population centers to the north and west. The reconstructed railroad tracks would also allow the introduction of future passenger rail between Wilmington and Raleigh via Goldsboro. These reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina

CERTIFIED TO BE A TRUE COPY
CITY CLERK

THEREFORE, BE IT RESOLVED:

THAT, the Wilmington City Council encourages the NCDOT to reconstruct the railroad line between Castle Hayne and Wallace and also requests NCDOT consider double tracking this rail line for future freight and passenger service.

Adopted at a regular meeting
on November 1, 2011.

Bill Saffo, Mayor

ATTEST:

Penelope Spicer-Sidbury, City Clerk

APPROVED AS TO FORM:

City Attorney

RESOLUTION NO. (2011) 1750

Board of Aldermen
Town of Wrightsville Beach, North Carolina
Date: November 16, 2011

A RESOLUTION OF THE BOARD OF ALDERMEN OF
THE TOWN OF WRIGHTSVILLE BEACH, NORTH CAROLINA
EXPRESSING SUPPORT FOR RECONSTRUCTION OF THE RAILROAD TRACKS
BETWEEN CASTLE HAYNE AND WALLACE IN SOUTHEASTERN NORTH CAROLINA

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington; the Towns of Belville, Carolina Beach, Kure Beach, Leland, Navassa, and Wrightsville Beach; the Counties of Brunswick, New Hanover and Pender; the Cape Fear Public Transportation Authority, and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne and Wallace in southeastern North Carolina that would link New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve access for moving products through the state's most agriculturally active region; and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro and would have significant and profound positive economic benefits for southeastern North Carolina.

NOW THEREFORE, BE IT RESOLVED that the Board of Aldermen of the Town of Wrightsville Beach, North Carolina does hereby encourage the North Carolina Department of Transportation to re-construct the railroad line between Castle Hayne and Wallace and to do everything in their power to double track this rail line for future freight and passenger service.

This Resolution duly adopted this 16th day of November, 2011.

David L. Cignotti, Mayor

ATTEST:

Sylvia Holleman, Town Clerk

TOWN OF WRIGHTSVILLE BEACH INCORPORATED 1899 STATE OF NORTH CAROLINA

County of Brunswick

Office of the County Commissioners

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for a portion of Brunswick County, City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

NOW THEREFORE, be it resolved that the Brunswick County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED at a regular meeting of the Brunswick County Board of Commissioners on February 6, 2012.

William M. Sue, Chairman
Brunswick County Commissioners

ATTEST:

Deborah S. (Debby) Gore, NCCCE
Clerk to the Board

R11-14

RESOLUTION BY THE BELVILLE BOARD OF COMMISSIONERS SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the reestablishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the reestablishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

NOW THEREFORE, be it resolved that the Belville Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED at a regular meeting of the Belville Board of Commissioners on October 24, 2011.

Jack Batson, Mayor

Attest:

Athina D. Williams, Town Clerk

TOWN OF BELVILLE CORPORATE SEAL NORTH CAROLINA

TOWN OF NAVASSA
334 Main Street
Navassa, N.C. 28451
Phone: (910) 371-2432
townofnavassa.org

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina;

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties;

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west;

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development;

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro;

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina and the Town of Navassa.

NOW THEREFORE, be it resolved that the Town of Navassa, North Carolina hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

I hereby certify that this is a true and correct copy of this resolution, duly adopted by the Town Council of Navassa on October 20, 2011 as it appears of record in its official minutes.

TOWN OF NAVASSA

By: _____
Michael Ballard, Mayor Pro-Tem

ATTEST

By: Charlena R Alston
Charlena Alston, Town Clerk

D3-02

RESOLUTION IN SUPPORT OF
THE RESTORATION OF RAIL TRACK
BETWEEN CASTLE HAYNE & WALLACE

Whereas, the Cape Fear Area Rural Transportation Advisory Committee (Cape Fear Area RTAC) is made up of elected officials from Brunswick, Columbus and Pender Counties, and

Whereas, the Cape Fear Area RTAC is, among other things, charged with the responsibility of developing, in cooperation with the North Carolina Department of Transportation, long-range local and regional multi-modal transportation plans, and

Whereas, the North Carolina Department of Transportation is examining the potential for and impacts of restoring 27 miles of train tracks from Castle Hayne to Wallace, and

Whereas, such restored rail lines would allow the movement of bulk agricultural products to the Port of Wilmington, and

Whereas, such a restored rail tracks would likely have significant positive economic benefits for the Port. of Wilmington and southeast North Carolina,

Now therefore, be it resolved that the Cape Fear Area Rural Transportation Advisory Committee does hereby encourage the North Carolina Department of Transportation to strongly consider the restoration of said rail tracks as a way to enhance economic development in southeast North Carolina.

This the 21st day of March 2003.

May Moore

May Moore, Chair
Region 0 Area RTAC

Attest:

Don Eggert, RPO Planner

County of Brunswick

Office of the County Commissioners

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for a portion of Brunswick County, City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

NOW THEREFORE, be it resolved that the Brunswick County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED at a regular meeting of the Brunswick County Board of Commissioners on February 6, 2012.

William M. Sue, Chairman
Brunswick County Commissioners

ATTEST:

Deborah S. (Debby) Gore, NCCCE
Clerk to the Board

Jacksonville Urban Area
Metropolitan Planning Organization

RESOLUTION SUPPORTING THE RECONSTRUCTION OF RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Jacksonville Urban Area Metropolitan Planning Organization recognizes the value of and seeks to promote safe, efficient and convenient rail transportation throughout Eastern North Carolina; and

WHEREAS, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad track between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

WHEREAS, re-establishment of the Castle Hayne to Wallace rail line would improve regional mobility of people and goods, while also creating opportunities for economic development.

NOW THEREFORE, be it resolved that the Jacksonville Urban Area Metropolitan Planning Organization Transportation Advisory Committee hereby encourages the NCDOT to reconstruct the rail line between Castle Hayne and Wallace and requests that the line be double-track for enhanced service.

ADOPTED this the 26th day of January, 2012

Lionell Midgett, TAC Vice Chairman

Anthony Prinz, TAC Secretary

RESOLUTION (2012-08)

RESOLUTION SUPPORTING THE RECONSTRUCTION OF RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Jacksonville City Council recognizes the value of and seeks to promote safe, efficient and convenient rail transportation throughout Eastern North Carolina; and

WHEREAS, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad track between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

WHEREAS, re-establishment of the Castle Hayne to Wallace rail line would improve regional mobility of people and goods, while also creating opportunities for economic development;

NOW, THEREFORE, BE IT RESOLVED that the Jacksonville City Council hereby encourages the NCDOT to reconstruct the rail line between Castle Hayne and Wallace and requests that the line be double-track for enhanced service.

Adopted by the Jacksonville City Council in regular session this 17th day of January, 2012.

Sammy Phillips, Mayor

ATTEST:

Carmen K. Miracle, City Clerk

STATE OF NORTH CAROLINA
COUNTY OF ONSLOW

RESOLUTION 12-007
SUPPORTING THE RECONSTRUCTION OF RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Onslow County Board of Commissioners recognizes the value of and seeks to promote safe, efficient, and convenient rail transportation throughout Eastern North Carolina; and

WHEREAS, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad tracks between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

WHEREAS, reconstruction of the railroad tracks between Castle Hayne and Wallace would improve regional mobility of people and goods, while also creating opportunities for economic development.

NOW THEREFORE, BE IT RESOLVED that the Onslow County Board of Commissioners do hereby encourage the North Carolina Department of Transportation to reconstruct the railroad tracks between Castle Hayne and Wallace and requests a double-track line be provided to enhance future service opportunities.

Adopted this the 18th day of January, 2012.

Onslow County
Board of Commissioners

BOARD OF COUNTY COMMISSIONERS ONSLOW COUNTY NC SEAL

W.C. Jarman, Chairman

ATTEST:

Julie S. Wand, Clerk to the Board

NEW HANOVER COUNTY BOARD OF COMMISSIONERS

RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN CASTLE HAYNE AND WALLACE

WHEREAS, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

WHEREAS, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

WHEREAS, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27 miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

WHEREAS, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

WHEREAS, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

WHEREAS, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

WHEREAS, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

WHEREAS, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

NOW, THEREFORE, BE IT RESOLVED, that the New Hanover County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED this the 7th day of November, 2011.

NEW HANOVER COUNTY

Jonathan Barfield, Jr., Chairman

ATTEST:

Sheila L. Schult, Clerk to the Board

Appendix E

Assessing Bulk Shipping Costs at the GTP

Assessing the Economic Feasibility of Bulk Facilities at GTP

Four types of facilities have been proposed for construction at the Global TransPark to handle dry, refrigerated bulk. The analysis presented in this appendix considers the feasibility of using the facilities on the users and does not consider the capital or operating costs. The assumptions included in the analysis are outlined in the sections below, including the scenarios tested, methodology, and the conclusions.

Baseline and Scenario Assumptions

The SB-402 Legislation specifically requires analysis of an inland terminal, transload equipment, and refrigerated and dry bulk storage. These four facilities define the three scenarios[1], which are described below in terms of the assumptions used in the calculations for the baseline and the build scenarios. All scenarios are analyzed over 30 years (2020-2049) in 2014 dollars and discounted to the present using a 7% interest rate. The baseline scenario considers trucking goods from their origin to their destination port, bypassing GTP. The improvement case considers whether there is a savings to shippers by loading goods onto rail at GTP.

The baseline assumes a volume equivalent to that of 90 rail cars per day, approximately equivalent to a unit train. These are goods that could be diverted to use the bulk facility at GTP. The scenarios assume that shippers operate year-round as a way of smoothing seasonal peaks and troughs, resulting in an annualization factor of 365 days per year. One rail car can hold the equivalent of approximately four truckloads[2], and soybeans are used as an example commodity for the analysis[3]. There are three likely destinations: the Port of Morehead City, the Port of Wilmington, and the Port of Norfolk. The distance traveled per truck is 71 miles to the Port of Morehead City[4] in Scenario 1, and 89 miles to the Port of Wilmington and 152 miles to the Port of Norfolk in Scenario 2. The numbers of trucks are expected to conservatively grow by 1% per year and carry 6.75 tons on average[5]. The per ton mile cost to ship by truck and train is shown in Exhibit E-1 below.

Exhibit E-1: Truck and Train Shipping Costs, $2014

	Cost per Ton Mile		
Destination	Truck*	Single Car Train**	Unit Train**
Morehead City (bulk)	$0.19	$0.432	$0.132
Norfolk (container)	$0.19	$0.998	
Wilmington (container)	$0.19	$1.415	

Sources: *Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf>.

**URCS Database: assumes NS is operator, 27 tons per rail car, "hopper-open top general" car type for bulk and "flat car – general service" for container, commodity types include "food & kindred products" and "lumber & wood products," shipment charge set to 0, 90 cars per unit train and 1 car per single car train, segment type parameter set to "originate and terminate"

[1] Transload and dry storage facilities serve the same products

[2] ICLEI: Local Governments for Sustainability. *Environment and Economy Working Together: Holyoke's Partnership with Freight Rail*. Rep. ICLEI: Local Governments for Sustainability, n.d. Web. Nov. 2014. <http://www.icleiusa.org/action-center/learn-from-others/Freight_Case_Study.pdf>.

[3] Informa Economics, "Heavier Semis: A Good Idea?" June 2009.

[4] Because the distance from the origin to GTP is unknown, only the distance between GTP and the Port of Morehead City is considered in the analysis. It is assumed that it is economical to truck from the origin to the Port of Morehead City.

[5] A trainload of soybeans is approximately 27 tons, and there are four trucks per railcar, resulting in 6.75 tons per truck.

The shipping costs per ton mile for rail were obtained from the 2013 Surface Transportation Board's Uniform Rail Costing System (URCS) Database found at STB's website[6]. A number of assumptions were included in the database tool in order to extract the variable costs per ton mile.

- The railroad parameter was specified as Norfolk Southern (NS) because all scenarios operate over NS for a portion of the trip. In Scenario 1, NS operates between GTP and the Port of Morehead City. In Scenarios 2B and 2C, a transfer to CSXT is needed to take the shortest route to Wilmington and Norfolk.
- The distance parameter corresponded to the distance from GTP to: the Port of Morehead City (71 miles), Norfolk (152 miles), and Wilmington (89 miles).
- The segment type parameter was set to "Originate and Terminate" for all scenarios, which indicates that the freight was picked up and delivered by the specified railroad, NS.
- The number of freight cars per train was assumed to be 90 for a unit train and 1 for a single car train.
- For Scenario 1, the freight car type was set to "Hopper- Open Top General," and for Scenario 2 it was set to "Flat Car – General Service."
- The tons per car were assumed to be 27 for all scenarios.
- The commodity type parameter is used to calculate loss and damages. The analysis assumes the products handled include "Food & Kindred Products" and "Lumber & Wood Products." These commodity types result in low loss and damages costs.
- Shipment charge, which is not a mandatory parameter to compute the variable costs, was set to 0.
- Shipment size was set to "single" for Scenarios 1B, 2B, and 2C. It was set to "unit" for Scenario 1C.

The URCS Database output resulted in a variable cost for each route and shipment type. Multiplying the miles for each route by the tonnage results in the ton-miles per route; dividing the variable cost by the ton miles results in the cost per ton mile. These costs are then converted to 2014 dollars using the GDP deflator[7] and are shown in Exhibit E-1.

The trucking costs per mile were obtained from a presentation by the US Department of Transportation on Trucks and Federal Policy[8]. As reported in the presentation, the freight revenue per ton mile by mode in 2007 was $0.1654 for truck. Converting the 2007 value to 2014 dollars using the GDP deflator[9] results in a total shipper cost of $0.19 per ton mile. This cost is used to calculate the baseline shipper costs baseline when multiplied by the distance from GTP to the applicable port.

In addition to shipping costs based on distance and tonnage, there are lift/handling fees and interchange fees that shippers incur. A lift/handling fee is charged at each end of a trip for handling the goods and is estimated at $90 per truckload[10]. While the handling process for bulk goods differs between a hopper and a container, for the purpose of this analysis it is assumed that the fees are equal. This assumption is tested in the sensitivity analysis when a much lower $10 fee is modeled to see if it changes the outcome. In the baseline, goods are handled twice: once at the origin when loading the truck, and once at the destination port when unloading the truck. In Scenarios 1B, 1C, 2B, and 2C, the goods are handled a total of four times: loading onto the truck at the origin, offloading the truck at GTP to storage, loading at GTP onto rail in either a hopper or container, and unloading at the destination port from the railcar.

Goods are transferred from trucks to rail under the scenarios, and because each rail car must connect with a Class I at the juncture of the spur, an interchange fee is incurred in addition to handling fees. Under Scenarios 1B and 1C, trains interchange once between the GTP rail spur operator and NS. Under Scenarios 2B and 2C,

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[6] The database can be downloaded from the STB website: http://www.stb.dot.gov/stb/industry/urcs.html

[7] "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019." Historical Tables. Office of Management and Budget, n.d. Web. Sept. 2014. <http://www.whitehouse.gov/omb/budget/Historicals>.

[8] Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf>.

[9] "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019." Historical Tables. Office of Management and Budget, n.d. Web. Sept. 2014. <http://www.whitehouse.gov/omb/budget/Historicals>.

[10] Some shippers will pay more, some will pay less based on contractual agreements, but $90 is an assumed average based on AECOM analysis.

trains interchange twice: between the GTP rail spur and NS, and from NS to CSXT. An interchange fee is charged by rail operators per carload for shipments transferring between rail lines and is estimated to be $228 per train car[11]. The $228 fee per rail car is found from the Surface Transportation Board's URCS Database found at STB's website[12], output line 623. Because a variety of agreements and operating arrangements could alter the interchange fee, the sensitivity analysis also considers a $0 fee.

Scenario 1: Dry Bulk/Grain Facility

Scenario 1 considers constructing a dry bulk/grain storage facility at GTP. The facility would be capable of transloading and storing goods such as wood pellets or soybeans with the goal of removing trucks from the region's roads and consolidating trips to the Port of Morehead City through rail. The facility at GTP would provide trucks with a centralized location to bring bulk shipments and they can be combined on trains for final shipment to the port. The analysis considers whether the use of the facility costs less than the baseline or existing conditions, which is trucking the goods directly to the Port of Morehead City. Scenario 1 has two alternatives that are compared to the baseline, as described below. The key difference is the cost per ton mile for shipping by single car train or by unit trains.

- 1A (Baseline) – ship product to Port by truck
- 1B (single car train) – ship product to GTP by truck, unload, store, and load onto single car hopper train to Port of Morehead City
- 1C (unit train) – ship product to GTP by truck, unload, store, and load onto unit train to Port of Morehead City.

Scenario 2: Container Facility

Scenario 2 considers constructing a facility that handles containers at GTP, much like an inland port. The goal of the facility would be to remove trucks from the region's roads, and consolidate trips to ports through rail. Another purpose of the facility would be to provide a centralized distribution center in eastern North Carolina for containerized goods, particularly for bulk products. Some soybean growers export via container to deliver a higher quality product and earn a higher rate. Also, the development of identity-preserved crops (high value, premium or niche market grains produced with a specific end use in mind) and food safety requirements are supporting a greater use of shipping agricultural products in containers, especially for the export market. The analysis considers whether shippers using a container facility at GTP would pay more or less than the baseline shipping cost, which is defined as trucking the goods directly to the Port of Wilmington or Norfolk (as Morehead City is not equipped to handle large-scale containerized operations). As a result, there are two alternatives to Scenario 2 that are compared to the baselines. The scenarios vary in the distance goods would travel to their respective ports.

- 2A (two Baselines) – ship containers to Port (Norfolk/Wilmington) by truck
- 2B (Norfolk) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Norfolk
- 2C (Wilmington) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Wilmington.

Scenario 3: Refrigerated Goods

If there were a refrigerated packing and distribution facility at GTP, the goods could be transported in and out three ways. First, they can be distributed by rail to Wilmington or Norfolk (as Morehead City does not have the capability to handle refrigerated containers). Second, they could be sent by cargo plane. And third, they could be trucked in, repackaged and consolidated, and trucked to port. The feasibility of the three scenarios is qualitatively discussed in the paragraphs below.

[11] URCS Database, output line 623 for interchange operating costs based on NS; however, the $228 fee per train car is assumed to be equal among the different rail operators: spur operator, NS, and CSXT.

[12] The database can be downloaded from the STB website: http://www.stb.dot.gov/stb/industry/urcs.html

Shipping refrigerated containers or "reefers" from GTP could be achieved by rail. In order to ship by rail, goods would need to be loaded at GTP and onto the NCDOT rail spur and transferred to NS, thereby incurring a fee for the interchange. As NS currently prices pickups at the spur very highly, this is detrimental to the shippers' bottom lines. Continuing to the Port of Norfolk or Wilmington will cost travel time and another interchange with CSX. If the CSX rail spur were constructed at GTP, and/or the Wallace to Castle Hayne segment were reconstructed, only one carrier would be needed to get to Norfolk and Wilmington in a shorter route. If a refrigerated facility were to be constructed in the region, it would not locate at GTP because of the interchange costs and inconvenience of reaching a compatible port by rail. A more feasible option would be to place a facility off of GTP property and on the CSX A-line. However, because there has not been sufficient demand for the CSX spur, Wallace to Castle Hayne, or for a refrigerated facility at GTP, transporting reefers by rail is considered infeasible at this time.

With rail an infeasible option, shipping the refrigerated goods by air is another possibility. However, the Raleigh-Durham International Airport (RDU) is a nearby competitor with existing air cargo services and is only 95 miles from GTP. Currently there is no demand for air cargo into or out of GTP, and even if there were, it would be priced at double the cost due to the lack of a backhaul opportunity. As a result, using air cargo services at RDU is a more feasible opportunity than utilizing air service at GTP.

Finally, because shipping refrigerated cargo by rail and air are infeasible, trucking is the preferable mode of transport. Trucks could move the goods more efficiently to Wilmington and Norfolk than rail or air, and at a more affordable cost in a shorter time. With no demand for refrigerated goods near GTP, there is no need for a refrigerated facility in the region.

Methodology

The following methodology was used to compare between the baseline and the two "build" scenarios in the analysis.

Costs to Shippers

There are three primary costs that shippers bear with transporting goods: shipping costs, lift/handling fees, and interchange fees. Each cost places an additional pressure on shippers' bottom lines and comes into consideration when deciding on modes for transport. The methodologies for applying the assumptions outlined previously are described in the sections below by scenario.

Shipping Costs

Shipping costs are the cost per ton mile to move the product. In the baseline, the annual number of trucks is multiplied by the tons per truck (6.75), the average cost per ton mile to transport by truck, or $0.19[13], and the distance to the Port of Morehead City (71 miles). The build compares the cost of shipping by rail to the baseline of truck.

- **Scenario 1**
  Scenario 1 considers shipping by rail from GTP to the Port of Morehead City by mixed freight trains or unit trains. In order to estimate the scenarios' shipping costs, the number of trucks was converted to rail cars[14]. The rail cars were then multiplied by the applicable cost per ton mile as shown in Exhibit E-1, the distance to the Port (71 miles), and the tons per rail car (27)[15]. The cost per ton mile for a unit train ($0.132) is lower than the cost per unit mile of a single car train ($0.432), as calculated from data obtained from the URCS Database.

[13] Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf>.

[14] One rail car can hold approximately 4 truckloads

[15] 27 tons per rail car, per the Soy Transportation Coalition and the United Soybean Board, 2009

- **Scenario 2**

  The cost of shipping in Scenario 2 was estimated in the same methodology as Scenario 1 for the number of rail cars and tons per rail car, but the destination ports were different, meaning there were two baselines. The containers would be shipped by truck in the baseline and rail in the build to the Port of Norfolk at a distance of 152 miles from GTP, or to Wilmington which is 89 miles from GTP. In the build, the routes used the per ton mile cost for a single car train for a container which varied based on the distance, at a cost of $0.998 to Norfolk and $1.415 to Wilmington.

Lift/Handling Fees

Handling fees are applied to the truck and trainloads at each transition point and therefore mean that the more handling that a product needs in transport, the more it will cost to move. The cost per lift was assumed to be $90 based on AECOM analysis. The handling in the baseline for both scenarios assumes that the trucks are loaded at the origin and unloaded at the destination, resulting in two lifts for the whole trip.

- **Scenario 1**

  The trucks arriving at GTP have already experienced one lift at the origin. Once at GTP, the goods are offloaded to a storage facility, resulting in another move. Loading onto the train for the trip to the Port of Morehead City is a third move, and unloading at the Port is the fourth and final movement of goods. Four fees are applied in Scenario 1: two to trucks and two to rail cars.
- **Scenario 2**

  Trucks bring the containers to GTP where they are unloaded, stuffed, and loaded onto trains to the Port of Norfolk or Wilmington and unloaded. Four fees are applied in Scenario 2: two to trucks and two to rail cars.

Interchange Fees

Railroads charge fees for interchanging trains between carriers for the right to travel over another railroad's track or to switch the cars to another carrier's locomotive. Because truck is the only mode used in the baseline, no interchange fees are incurred. Interchange fees are charged on a per-car basis, so the number of train cars is constant across Scenarios 1 and 2. However, the number of interchanges varies based on the existing Class I networks between GTP and the destination ports[16].

- **Scenario 1**

  In Scenario 1, the trains would interchange once between the GTP spur and NS, who operates the mainline that the spur connects to. One interchange fee of $228 is charged per rail car in Scenario 1.
- **Scenario 2**

  In Scenario 2, there are two interchanges for each of the destinations. Trains from GTP destined for the Port of Wilmington will incur two interchanges: one from the GTP spur to the NS mainline, and again from NS to southbound CSXT at Goldsboro. The containers going to the Port of Norfolk experience the same interchanges, though the trains head northbound at Goldsboro on CSXT. Each interchange incurs a $228 fee per railcar.

Results

Each of the above costs associated with the shipping scenarios results are summed by scenario (baseline, Scenario 1, and Scenario 2). Then each scenario's annual total is subtracted from the baseline's annual total, resulting in the net cost (if it is negative) or benefit (if it is positive) of the rail move compared to truck. Each annual total was discounted at 7 percent and summed over the 30-year analysis period to determine whether the movement is economical.

As seen in Exhibit E-2, none of the movements provide savings to shippers compared to shipping by truck. Even if these volumes could be attracted there, constructing a bulk/dry handling or container facility at GTP is not economical at this time. The primarily reason that none of the scenarios save shippers costs by rail is due to the distance between GTP and the destination ports. The shipping fees are based on tonnage moved

[16] No interchange fee is applied at the destination Port in either Scenario.

and distance, and have the greatest effect on the overall cost of the shipment. Handling and interchange fees are an extra burden on the shippers, who would save on half of the handling and pay no interchange fees by using trucks. It is important to note that shipping by unit train is the only option that is more cost-effective than trucking, based on the shipping costs. However, at this time there are insufficient volumes of product to attract a unit train to serve GTP; as a result, trucking will continue to be the most economical mode for shippers between GTP and the destination ports.

To test a range of feasible scenarios, sensitivity analyses were performed to determine whether key assumptions would change this result. This included reducing the handling fee from $90 to $10 per move, testing a range of truck to rail car ratios to reflect the variations across possible commodities handled, and eliminating the interchange costs. While the size of the penalty varied, the cost penalty of the shipping, additional handling, and interchanges could not be overcome given the comparatively short distance to the ports. The results of the original analysis and the sensitivities tested are presented in Exhibit E-2.

Exhibit E-2: Summary of Scenario Cost Penalty Compared to Trucking

Summary in $2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
Discounted Net Shipping + $90 Handling + Interchange Costs (original analysis)	$ (282.6)	$ (97.9)	$ (1,275.4)	$ (1,153.2)
Discounted Net Shipping + $10 Handling + Interchange	$ (231.2)	$ (46.5)	$ (1,224.0)	$ (1,101.8)
Discounted Net Shipping + $90 Handling + Interchange *(using 7 trucks per rail car)*	$ (196.7)	$ (12.0)	$ (1,091.5)	$ (1,045.5)
Discounted Net Shipping + $90 Handling + Interchange *(using 2 trucks per rail car)*	$ (339.9)	$ (155.2)	$ (1,398.0)	$ (1,225.0)
Discounted Net Shipping + $90 Handling + $0 Interchange	$ (209.1)	$ (24.5)	$ (1,128.5)	$ (1,006.3)

Note: All scenarios are compared to trucking the goods to the destination

An additional sensitivity was tested to determine the point at which public benefits might overcome the costs to the shippers. If the public benefits of removing trucks from the road are greater than the costs to private industry, there would be support for the state to invest in such a facility at GTP.

Public Benefits Analysis

By moving goods from truck to rail with the bulk/dry transload and container interchange at GTP, there are public benefits realized by other users of the state's roads. The reduction of truck traffic would result in pavement and congestion savings. From the state's perspective, these benefits could offset the costs to the private shippers, thereby making a bulk facility at GTP a feasible investment. To test this, the pavement and congestion savings that result from taking trucks off the road were estimated. The methodology of calculating these public benefits is described below.

Pavement Savings

The bulk/dry transload facility at GTP would reduce the vehicle miles traveled (VMT) on the state's roads by diverting truck shipments to rail. The VMT avoided reduces the marginal cost of maintaining the pavement. The marginal cost of pavement for truck depends on whether the Interstate routes that would have been used are urban or rural. Because the routes between GTP and the destination ports are in rural parts of the state, it was assumed that the entire route is rural. The reduced VMT was calculated annually by subtracting the truck VMT in the build, which was zero because the goods are shipped by rail, from the baseline, which was the number of trucks times the distance to the destination ports.

The FHWA Cost Allocation Study, 2000 Addendum[17] estimated the marginal pavement costs per VMT for trucks to be $0.056 ($2000) or $0.067 ($2014) for a 60kip 4-axle US truck on rural Interstates[18]. Applying these marginal pavement costs to the annual reduction in truck VMT yields the pavement savings for each scenario. The VMT avoided estimates that these benefits are based on is conservative because it assumes that the truck trips are one-way.

- **Scenario 1**
  Both of the train types (single car trains and unit trains) in Scenario 1 are going from GTP to the Port of Morehead City, which means each rail carload avoids four truck trips of 71 miles. The analysis conservatively assumes one-way truck trips are avoided. Multiplying the VMT avoided by the pavement costs per mile results in the pavement savings.
- **Scenario 2**
  Similar to Scenario 1 but with different destinations, the truck trips avoided are multiplied by the respective distances to the Port of Wilmington (89 miles) and the Port of Norfolk (152 miles). Multiplying the VMT avoided by the pavement costs per mile results in the pavement savings.

Congestion Savings

The bulk/dry transload facility also results in highway congestion savings by diverting shipments to rail. The reduction in truck VMT benefits the remaining highway drivers and reduces the marginal cost of congestion on these other vehicles. The marginal cost of truck congestion varies based on whether the Interstate routes used are urban or rural. Because the routes between GTP and the destination ports are in rural parts of the state, it was assumed that the entire route is on a rural Interstate. The reduced VMT was calculated annually by subtracting the truck VMT in the build, which was zero because the goods are shipped by rail, from the baseline, which was the number of trucks times the distance to the destination ports.

The Federal Highway Administration (FHWA) Cost Allocation Study, 2000 Addendum[19] estimated the marginal congestion costs per VMT to be $0.033 ($2000) or $0.043 ($2014) for a 60kip 4-axle U.S. truck on rural Interstates[20]. Multiplying these marginal congestion costs by the annual reduction in truck VMT yielded the congestion cost savings for each scenario. The VMT avoided estimates that these benefits are based on is conservative because it assumes that the truck trips are one-way.

- **Scenario 1**
  Both of the train types (single car trains and unit trains) in Scenario 1 are going from GTP to the Port of Morehead City, which means each carload avoids four truck trips of 71 miles. The analysis conservatively assumes one-way truck trips are avoided. Multiplying the VMT avoided by the congestion costs per mile results in the congestion savings.

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[17] "Addendum to the 1997 Federal Highway Cost Allocation Study Final Report." U.S. Department of Transportation Federal Highway Administration, May 2000. Web. Nov. 20014. <https%3A%2F%2Fwww.fhwa.dot.gov%2Fpolicy%2Fhcas%2Faddendum.htm>.

[18] $2000 were escalated to $2014 using GDP Deflators.

[19] "Addendum to the 1997 Federal Highway Cost Allocation Study Final Report." U.S. Department of Transportation Federal Highway Administration, May 2000. Web. Nov. 20014. <https%3A%2F%2Fwww.fhwa.dot.gov%2Fpolicy%2Fhcas%2Faddendum.htm>.

[20] $2000 were escalated to $2014 using GDP Deflators.

- **Scenario 2**
  Similar to Scenario 1 but with different destinations, the truck trips avoided are multiplied by the respective distances to the Port of Wilmington (89 miles) and the Port of Norfolk (152 miles). Multiplying the VMT avoided by the congestion costs per mile results in the congestion savings.

The savings associated with the shipping scenarios are summed by scenario (baseline, Scenario 1, and Scenario 2). To calculate the total benefits of the baseline and scenarios, the annual public benefits are summed (pavement and congestion savings). Then each scenario's annual total is subtracted from the baseline's annual total, resulting in the net cost (if it is negative) or benefit (if it is positive) of the rail move compared to the truck shipment. Each annual total was discounted at 7 percent and summed over the 30-year analysis period. The public benefits of pavement and congestion cost savings, as shown in Exhibit E-3, total $10.0 million in Scenario 1[21], $21.4 million in Scenario 2B, and $12.6 million in Scenario 1C in discounted 2014 dollars.

Exhibit E-3: Summary of Public Benefits

Summary in $2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
Discounted Net Pavement Savings	$6.1	$6.1	$13.0	$7.6
Discounted Net Congestion Savings	$3.9	$3.9	$8.5	$4.9
Total Net Discounted Public Benefits	**$10.0**	**$10.0**	**$21.4**	**$12.6**

Note: All scenarios are compared to trucking the goods to the destination

As shown in Exhibit E-4, totaling the discounted net benefits against the discounted net costs to shippers, a facility is still not economically viable. Even though a facility would result in pavement and congestion savings to the state and highway users, the facility would not be used by shippers because it costs them more to use rail than truck.

Exhibit E-4: Total of Shipper Costs and Public Benefits

Summary in $2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
Total Net Discounted Public Benefits	$10.0	$10.0	$21.4	$12.6
Discounted Net Shipping + $90 Handling + Interchange Costs	$ (282.6)	$ (97.9)	$ (1,275.4)	$ (1,153.2)
Total (Sum of Net Discounted Benefits and Costs)	**$ (272.6)**	**$ (87.9)**	**$ (1,254.0)**	**$ (1,140.6)**

Note: All scenarios are compared to trucking the goods to the destination

[21] Scenario 1B and 1C are equal because both scenarios have the same origin and destination.

The costs to shippers to use rail is greater than truck unless a unit train is used. As a result, only Scenario 1C could ever overcome the shipping, interchange, and handling costs when considering the public benefits. The public benefits from a bulk facility serving unit trains at GTP would only overcome the costs if it were 215 miles from the Port of Morehead City. At that point, as shown in Exhibit E-5, Scenario 1C would result in enough public benefits to overcome the cost to the shippers of using the facility by $0.1 million. Because Scenario 1B considers moving products by single car trains and the costs per ton mile are higher than trucking, the total costs in Scenario 1B continue to increase faster than the benefits accrue. However, it is important to note that the public benefits are not likely to influence the mode by which a shipper sends goods; the costs incurred by the shipper will determine whether truck or rail is the more economical choice.

Exhibit E-5: Sensitivity Analysis of Scenario 1 if Port of Morehead City were 215 Miles from GTP

Summary in $2014M	Scenario 1: Dry Grain/Dry Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail, 215 Miles	1C: Grain comes to GTP by truck, goes to MHC by unit train, 215 Miles
Total Net Discounted Public Benefits	$30.3	$30.3
Discounted Net Shipping + $90 Handling + Interchange Costs	$ (589.5)	$ (30.2)
Total (Sum of Net Discounted Benefits and Costs)	**$ (559.2)**	**$ 0.1**

Note: All scenarios are compared to trucking the goods to the destination.
Scenario 2 is not displayed because its net total costs increase as distance increases, and the distance to the Port of Morehead City is irrelevant.

The analysis shows that even if these volumes could be attracted to the GTP and the public benefits were considered, the costs to shippers are too high to transfer goods to rail at GTP for shipping to the Port of Morehead City, Norfolk, or Wilmington. The proximity of GTP to the ports, even by unit train, is a primary reason that a bulk facility there is not commercially feasible. In addition, the region already has a number of established grain handling facilities. Shipping bulk grain or refrigerated cargoes would also require investment in equipment for the Port of Morehead City.

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