THE ECONOMIC IMPACTS AND ENVIRONMENTAL, SAFETY AND INFRASTRUCTURE BENEFITS OF THE PROPOSED MONTGOMERY INLAND INTERMODAL FACILITY

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Projected Economic Impact and Environmental, Safety and Infrastructure Benefits of the Montgomery Inland Intermodal Facility

Martin Associates was retained by the Alabama State Port Authority to assess the potential Montgomery Inland Intermodal Facility. The proposed terminal would be constructed at a cost of $54 million. The inland terminal is projected to receive 105,500 forty-foot containers annually, with 105,500 forty-foot containers returned. These containers will further generate annual impacts at the beneficial cargo owners (BCOs) clustered in the following areas:

- Pelham, AL
- Leeds, AL
- Opelika, AL
- Alexander City, AL
- Auburn, AL
- Lanett, AL
- Birmingham, AL
- Tuscaloosa, AL

The boxes will move over the Port's container terminal and be drayed about 1.5 miles to the Mobile ICTF. There will be daily rail service (Monday-Friday). The Montgomery Inland Intermodal Facility will employ about 30 direct jobs on-site. The average distribution range by truck from the Inland Intermodal Facility to the key areas of BCO locations is 77 miles.

Economic Impact of the Proposed Montgomery Intermodal Facility

To estimate the potential impacts associated with the Montgomery Inland Intermodal Facility project, Martin Associates customized the Port of Mobile economic impact model developed for the Port by Martin Associates in 2016 and re-assessed in 2019. As part of the development of the baseline economic impact model developed for the Port , Martin Associates interviewed more than 400 local service providers, including tug operators, pilots, freight forwarders and customhouse brokers, agents, surveyors, chandlers, trucking firms and railroads. Based on the data gathered during those interviews, as well as an updated induced impact model and local re-spending multiplier, Martin Associates calibrated the economic impact model used to estimate the economic impacts of the proposed inland intermodal facility. The container volume that the Montgomery Inland Intermodal Facility will generate, 211,000 container moves imported and exported via the Port of Mobile Container Terminal, as well as the truck and rail distance assumptions were provided to Martin Associates by the Alabama State Port Authority.

The container throughput, vessel activity, rail and truck activity associated with the inland intermodal facility development will contribute to the local and regional economy by generating business revenue to local and national firms providing vessel and container handling services, drayage,

and rail services. These firms, in turn, provide employment and income to individuals, and pay taxes to state and local governments. A further definition of the impacts follows.

- The employment impact of the Montgomery Inland Intermodal Facility consists of three levels of job impacts:

    - ***Direct employment*** -- are jobs directly generated by the activity associated with development of the Montgomery Inland Intermodal Facility and the associated activity that is generated at the Mobile Container Terminal. The direct jobs include jobs with the inland terminal; as well as longshoremen unloading and loading the containers from and to the ship; the maritime services involved in servicing the vessels and handling the containers once in the terminal such as tug operators and pilots, freight forwarders and customhouse brokers, steamship agents, chandlers.; and trucking and rail operations moving the containers to and from Marine Container Terminal to the Mobile ICTF, then the rail move to the Montgomery Inland Intermodal Facility, and the eventual dray to the beneficial cargo owners that will be served by the Montgomery Inland Intermodal Facility. Also included are the impacts of the empty container returns to the Mobile Container Terminal.

    - ***Induced employment*** -- jobs created throughout the local economy because individuals directly employed due to the proposed inland intermodal terminal spend a portion of their wages locally on goods and services such as food, housing, health care, and apparel. These jobs are held by residents located throughout the region, since they are estimated based on local and regional purchases by the directly employed. The induced model used in this analysis is based on actual Mobile-specific economic data, including the distribution of expenditures (by type of expenditure) by consumers in the Mobile regional economy.

    - ***Indirect Employment*** -- are jobs created locally due to purchases of goods and services by firms directly providing the services to the proposed inland intermodal facility. These jobs are estimated directly from the projected local purchases generated by the firms supplying the direct services to the containers generated by the inland terminal, and include jobs with local office supply firms, maintenance and repair firms, parts and equipment suppliers, insurance brokers, etc. The indirect multipliers associated with the local purchases are derived from data provided to Martin Associates by the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System, as part of the 2016 Port of Mobile Economic Impact Study, and as re-assessed in 2019, and adjusted for the proposed Montgomery Inland Intermodal Facility.

- **Personal income impact** consists of employee wages and salaries (excluding benefits) received by individuals directly employed due to the proposed inland intermodal facility. Re-spending of these earnings throughout the regional economy for purchases of goods and services is also estimated. This, in turn, generates additional jobs -- the induced employment impact. This re-spending throughout the region is estimated using a regional personal earnings multiplier, which reflects the percentage of purchases by individuals that are made within the state of Alabama. The re-spending effect varies by region -- a larger re-spending effect occurs in regions that produce a relatively large proportion of the goods and services consumed by residents, while lower re-spending effects are associated with regions that import a relatively large share of consumer goods and services (since personal earnings "leak out" of the region

for these out-of-region purchases). The earnings multiplier used in this analysis was developed for Martin Associates by the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System. Local consumption data for the induced model was developed from the U.S. Bureau of Labor Statistics, Consumer Expenditure Survey.

- **Business revenue** consists of total business receipts by firms providing services in support of the proposed inland intermodal facility, such as the off-loading and loading of the containers and vessel activity associated with the containers generated by the inland intermodal facility at the Mobile Container Terminal, as well as the rail and truck revenue from transporting the containers to and from the Montgomery Inland Intermodal Facility. **Local purchases for goods and services** made by the directly impacted firms are also measured. These local purchases by the dependent firms create the indirect impacts.

- **State and local taxes** include taxes paid to the state and local governments by firms and by individuals whose jobs are directly dependent upon and supported (induced and indirect impacts) by the proposed inland intermodal facility.

The potential annual economic impacts of the Montgomery Inland Intermodal Facility are shown in Table 1.

Table 1
Potential Economic Impacts of the Montgomery Inland Intermodal Facility

	Inland ICTF Annual Impact
JOBS	
DIRECT	1,040
INDUCED	1,008
INDIRECT	570
TOTAL	**2,618**
PERSONAL INCOME (1,000)	
DIRECT	$51,879
RESPENDING/LOCAL CONSUMPTION	$94,621
INDIRECT	$25,364
TOTAL	**$171,865**
BUSINESS REVENUE ($1,000)	**$340,221**
STATE AND LOCAL TAXES ($1,000)	**$14,265**
LOCAL PURCHASES ($1,000)	**$44,592**

Totals may not add due to rounding

In addition to the annual economic impacts projected as the result of the container activity that is projected to be generated by the Montgomery Inland Intermodal Facility, Martin Associates developed an estimate of the economic impacts generated by the construction activity in the state of Alabama. Table 2 shows the associated on-time construction impacts that are projected to be generated by the construction of the proposed Montgomery Inland Intermodal Facility. These are one-time impacts and unlike the annual impacts associated with the Montgomery Inland Intermodal Facility, these impacts would be discontinued upon completion of the project.

Table 2
Construction Impacts of the Montgomery Inland Intermodal Facility

	Inland ICTF Construction One Time Impact
JOBS	
DIRECT	237
INDUCED	138
INDIRECT	130
TOTAL	**505**
PERSONAL INCOME (1,000)	
DIRECT	$12,118
RESPENDING/LOCAL CONSUMPTION	$10,044
INDIRECT	$5,781
TOTAL	**$27,943**
BUSINESS REVENUE ($1,000)	**$54,000**
STATE AND LOCAL TAXES ($1,000)	**$2,319**
LOCAL PURCHASES ($1,000)	**$10,164**

Totals may not add due to rounding

Environmental, Safety and Infrastructure Benefits of the Proposed Montgomery Intermodal Facility

In addition to the annual economic impact of the proposed Montgomery Inland Intermodal Facility, as measured in terms of jobs, income, economic value, and state and local taxes, the ability to move containers by rail to the proposed Montgomery Inland Intermodal Facility that would otherwise move by truck directly from the Port of Mobile to the BCO geographic clusters described above cargo will result in significant reductions of environmental emissions, reduced accidents and reduced wear and tear on the Alabama highway infrastructure. The projected environmental, safety and infrastructure benefits accruing to the state of Alabama as well as the United States that would result from the development and use of the Inland Intermodal Facility are documented in this section.

In order to estimate these environmental, safety, and external infrastructure benefits of the use of proposed Inland Intermodal Facility, the reduced truck miles traveled as the result of the use of the 180 mile rail connection between the Inland Intermodal Facility and geographic clusters of BCOs was estimated. Without the use of the Inland Intermodal Facility operations, the average mileage to serve the BCO clusters directly by truck from the Port of Mobile is 234.4 miles. With the use of the Inland Intermodal Facility, the average truck miles to serve the BCO clusters from Montgomery Inland Intermodal Facility is about 78 miles, plus an additional 1.5 truck miles for drayage between the Port's container terminal and the Mobile ICTF. Therefore, the use of the Montgomery Inland Intermodal Facility would provide a mileage savings of 155.125 truck miles. It is this reduction in truck miles that translates into the environmental, safety and infrastructure benefits. It is to be emphasized that the 180-mile rail move between the Mobile ICTF and the proposed Montgomery Inland Intermodal Facility will also create emissions and safety impacts, which must be subtracted from the truck mile savings generated benefits.

Strict guidelines for measuring the merits of transportation activity are outlined the "Benefit-Cost Analysis Guidance for Discretionary Grant Programs", U.S. Department of Transportation, January 2021. All benefit and cost metrics are expressed in 2019$ as specified in the benefit-cost guidance issued by the U.S. Department of Transportation. The benefit criteria used to measure the environmental, safety, and external and infrastructure benefits of the proposed Montgomery Inland Intermodal Facility are:

- ***Determination of Environmental Benefits*** which results from the savings in the truck travel distance and resulting vehicle miles traveled (and ton-miles) to serve the identified BCO geographic clusters via the Inland Intermodal Facility. In the absence of the use of the Montgomery Inland Intermodal Facility, truck would be used to serve these markets directly from the Port of Mobile.

- ***Determination of the Safety Benefits*** which results from the savings in the truck travel distance and resulting vehicle miles traveled (and ton-miles) to serve the identified BCO geographic clusters via the Inland Intermodal Facility. In the absence of the use of the Montgomery Inland Intermodal Facility, truck would be used to serve these markets directly from the Port of Mobile.

- ***Determination of External Trucking and National Infrastructure Benefits*** which results from the savings in the truck travel distance and resulting vehicle miles traveled (and ton-miles) to serve the identified BCO geographic clusters via the Inland Intermodal

Facility. In the absence of the use of the Montgomery Inland Intermodal Facility, truck would be used to serve these markets directly from the Port of Mobile.

To estimate the environmental, safety and external truck infrastructure impacts that would be generated by the proposed Montgomery Inland Intermodal Facility, the initial step was to estimate the volume of cargo that would use the proposed Inland Intermodal Facility, and then compute the vehicle miles saved by using the proposed Inland Intermodal Facility over the use of a direct truck movement between the Port of Mobile and the specified BCO geographic clusters. Based on analysis by the ASPA, it is estimated that 105,500 laden forty-foot containers move into the BCO geographic clusters targeted to be served by the proposed Montgomery Inland Intermodal Facility. These containers will then be retuned empty via the Inland Intermodal Facility to the Port of Mobile. Based on these assumptions and the 155.125 one-way mileage savings of using the Inland Intermodal Facility, a total of 211,000 containers would use the Inland Intermodal Facility. Assuming one container per trip, the Inland Intermodal Facility would provide a vehicle mile savings of 32,731,375 (211,000 truck trips multiplied by 155.125 miles saved per truck trip. It is further assumed that each laden container contains 22 tons of cargo. Therefore, the Inland Intermodal Facility would provide a savings of 360,045,125-ton miles moved by truck (22 tons per laden container multiplied by 105,500 laden containers multiplied by 155.125 miles saved).

In order to control for the rail emissions and safety impacts, the number of tons moved by rail over the 180 miles of rail were used to estimate rail ton miles, 417,780,000-ton miles that would be incurred with the use of the Inland Intermodal Facility (105,500 laden containers multiplied by 22 tons per laden container multiplied by 180 rail miles). The environmental and safety costs associated with the rail ton miles were subtracted from the benefits generated by the truck mileage savings of using the Inland Intermodal Facility.

The ton-miles and VMT were used to estimate the environmental, safety and infrastructure benefits of the proposed Montgomery Inland Intermodal Facility. The key conversion metrics used to compute the costs for each category are described in the following sections.

ENVIRONMENTAL COSTS

Definition: Environmental benefits are generated due to the savings in truck travel distance and resulting vehicle miles traveled to serve the identified BCO geographic clusters via the Inland Intermodal Facility.

Methodology: Emissions of air pollutants are generated per million ton-miles, and the metrics used to estimate the volume of emissions per truck million ton-miles are shown in Table 3. These emission rates are measured in terms of short tons emitted per million ton-miles.

Table 3
Short Tons of Emissions per Million Ton-Miles by Truck

Emissions	TONS EMITTED PER MILLION TON MILES
Nitrogen Oxides (NOx)	3.0193
Volatile Organic Compounds (VOC)	0.11
Fine Particule (PM)	0.1191
Sulfur Dioxide (SO2)	0.0055
Carbon Dioxide	229.8

Source: *Surface Transportation, A Comparison of the Costs of Road, Rail and Waterways Freight Shipments that are not Passed on to Consumers*, GAO, Report to the Subcommittee on Select Revenue Measures, Committee on Ways and Means House of Representatives, January 2011

The costs per metric ton of the emissions by type of emission were developed from Benefit Cost Analysis Guidance for Discretionary Grant Programs, Office of the Secretary, U.S. Department of Transportation, January 2021, Table A-6. The ton-miles saved (in terms of million-ton miles saved) were multiplied by the short tons emitted per million ton-miles, by emissions type, to estimate short tons of emissions that would be saved with the Inland Intermodal Facility. The short tons emitted were multiplied by the cost per short ton (after conversion from cost per metric ton to cost per short ton) of each emission type was then multiplied by the corresponding level of short tons emitted that would be saved with the Inland Intermodal Facility.

To control for the increased environmental costs due to the ton-miles moved by rail, the following metrics were used to estimate the increased emissions resulting from the rail linehaul operation. The increased environmental costs due to rail were subtracted from the environmental benefits from the use of the Inland Intermodal Facility and reduced truck mileage.

Table 4
Short Tons of Emissions per Million Ton-Miles by Rail

Emissions	TONS EMITTED PER MILLION TON MILES
Nitrogen Oxides (NOx)	0.6747
Volatile Organic Compounds (VOC)	0.11
Fine Particule (PM)	0.0179
Sulfur Dioxide (SO2)	NA
Carbon Dioxide	28.96

Source: *Surface Transportation, A Comparison of the Costs of Road, Rail and Waterways Freight Shipments that are not Passed on to Consumers*, GAO, Report to the Subcommittee on Select Revenue Measures, Committee on Ways and Means House of Representatives, January 2011

SAFETY COSTS

Definition: Safety benefits are defined in terms of reduced accidents and associated injuries as the result of the savings in truck travel distance and resulting vehicle miles traveled to serve the identified BCO geographic clusters via the Inland Intermodal Facility.

Methodology: Accidents per 100 million vehicle miles traveled were developed from *Surface Transportation, A Comparison of the Costs of Road, Rail and Waterways Freight Shipments that are not Passed on to Consumers*, GAO, Report to the Subcommittee on Select Revenue Measures, Committee on Ways and Means House of Representatives, January 2011. The value of an accident, a fatality, injury, or

property damage only (PDO) was collected from *BTS Motor Vehicle Safety* Data, 2015 National Transportation Statistics, 2015, and the *Benefit Cost Analysis Guidelines for Discretionary Grant Programs, January 2020, Table A-1*.

Table 5
Accidents per 100 million VMT by Truck

	Accident Probability/ 100 million VMT	Value per Accident
Fatal Accident Cost (K)	1.13369	$10,900,000
Severe Injury Accident Cost (A)	78.92426	$284,100
PDO Accident Cost (no injury)	203.40039	$3,700

Source: Traffic accident incidents per 100 million miles from BTS Motor Vehicle Safety Data, 2015, National Transportation Statistics, 2015; Benefit Cost Analysis Guidance for Discretionary Grant Programs, Office of the Secretary, U.S. Department of Transportation, January 2021, Table A-1: Value of Reduced Fatalities and Injuries

The accident rates per 100 million VMT by type of accident were multiplied by the vehicle miles traveled annually to estimate the number of accidents by type (due to the VMT). The estimated number of annual accidents by type were then multiplied by the value of accidents (by type) to estimate the total annual value of accidents that would be saved by using the Inland Intermodal Facility.

To control for the accident impact of the use of the 180-mile rail linehaul, the following safety metrics for rail were used and combined with the billion-ton miles generated by the use of the Inland Intermodal Facility. Using these rail metrics and accident probabilities for rail, the safety costs associated with the 180 mile rail linehaul were subtracted from the safety benefits of the reduced truck mileage and truck trips generated by using the Inland Intermodal Facility.

Table 6
Accidents per Billion Ton Miles by Rail

	Accident Probability/ Billion Ton Miles	Value per Accident, 2019$
Fatal Accident Cost (K)	0.39000	$10,900,000
Severe Injury Accident Cost (A)	3.32000	$284,100
PDO Accident Cost (no injury)	0.00000	NA

Source: Traffic accident incidents per 100 million miles from BTS Motor Vehicle Safety Data, 2015, National Transportation Statistics, 2015; Benefit Cost Analysis Guidance for Discretionary Grant Programs, Office of the Secretary, U.S. Department of Transportation, January 2021, Table A-1: Value of Reduced Fatalities and Injuries

INFRASTRUCTURE AND EXTERNAL TRUCK COSTS

Definition: Infrastructure and External truck costs consist of costs of highway/pavement repair, highway congestion, and noise pollution, due to the savings in truck travel distance and resulting vehicle miles traveled to serve the identified BCO geographic clusters via the Inland Intermodal Facility.

Methodology: Metrics that measure highway/pavement degradation costs per vehicle mile traveled, noise pollution costs per vehicle mile traveled and highway congestion per vehicle mile are published in the *1997 Federal Highway Cost Allocation Study*, Final Report, USDOT, Federal Highway Administration, May 2000, Table 13.

The external cost per vehicle mile traveled metrics shown in Table 7 were multiplied by the annual vehicle mile savings provided by the use of the Inland Intermodal Facility to estimate the external truck cost savings. The reduction in truck miles traveled under the use of the Inland Intermodal Facility results in a loss in federal gasoline tax revenues. Therefore, it is necessary to subtract the reduced federal fuel tax from the pavement degradation costs by using the Inland Intermodal Facility, as these tax revenues are used in interstate highway maintenance and repair. The federal fuel tax on diesel fuel, $0.244 per gallon, was used to estimate the lost federal fuel tax revenue from the vehicle miles savings. The gallons saved were estimated by dividing the vehicle miles traveled savings by 6.4 miles per gallon. The lost federal tax revenue is estimated by multiplying the gallons of diesel saved multiplied by the $0.244 federal fuel tax per gallon. This lost federal fuel tax revenue was subtracted from the pavement degradation costs to compute the benefits of the Inland Intermodal Facility on pavement damage. These cost metrics are shown in Table 7.

Table 7
External Truck Cost Metrics

Combination Truck 4 Axle	Cost/VMT 2019$
Congestion	**$0.4807**
Noise	**$0.0236**
Pavement (Urban Interstate)	**$0.2665**

Source: *1997 Federal Highway Cost Allocation Study*, Final Report, USDOT, Federal Highway Administration, May 2000,

These metrics are applied to the VMT that would be incurred should the Inland Intermodal Facility not be developed. No infrastructure costs were associated with the use of the 180-mile line haul rail move with the Inland Intermodal Facility.

Summary of Benefits Analysis

The annual benefits were projected over a 20 year time period, assuming a 2% growth rate in containerized cargo for the first 10 years and a 1% growth rate thereafter. According to the Benefit Cost guidelines outlined by the U.S. Department of Transportation, the net benefits were discounted over the 20 year period using a 3% and 7% discount rate. As stipulated by the U.S. Department of Transportation, 2019 is the base year used in discounting.

Based on this analysis, the proposed Inland Intermodal Facility is estimated to generate $1.2 billion benefits under a 3% discount rate and $812.3 million under a 7% discount rate to the State and U.S. economies due the avoidance of environmental emissions, safety, and external trucking costs that would result if the Inland Intermodal Facility were not developed.

Table 8
Environmental, Safety, and External Truck Infrastructure Benefits of the Proposed Montgomery Inland Intermodal Facility

CATEGORIES	3% DISCOUNT	7% DISCOUNT
EMISSIONS	$698,826,336	$468,365,011
SAFETY	$151,661,839	$97,308,319
INFRASTRUCTURE	$384,451,677	$246,669,478
TOTAL BENEFITS	$1,234,939,852	$812,342,808

Totals may not add due to rounding