

# BENEFIT-COST ANALYSIS REPORT

Port of Mobile Improvements  
PIDP Grant Application, 2026

Port of Mobile

JUNE 2026



EBP ©

## Contents

1. Project Overview and BCA Results .....	1
2. Build and No-Build Scenarios Description .....	2
3. General BCA Parameters and Assumptions .....	2
4. Project Costs .....	3
4.1. Capital Costs .....	3
4.2. Operations & Maintenance Costs .....	4
5. Benefits .....	4
5.1. Residual Value of Infrastructure .....	6
5.2. Drayage Efficiency .....	6
5.2.1. Summary .....	6
5.2.2. Truck VMT Noise Savings .....	6
5.2.3. Truck VMT Emissions Reductions .....	6
5.2.4. Truck VMT Safety Benefits .....	7
5.2.5. Truck VMT Vehicle Operating Cost (VOC) Savings .....	7
5.3. Rehandle Efficiency .....	7
5.3.1. Operational Savings .....	7
5.3.2. Emissions Savings .....	8
5.3.3. Fuel Savings .....	8
5.4. Vessel Efficiency .....	8
5.4.1. Fuel Savings .....	9
5.4.1. Emissions Savings .....	9
6. Results .....	10
6.2. Sensitivity Analysis of Results .....	11

## 1. Project Overview and BCA Results

**Project Overview:** The Port of Mobile is looking to expand its backland capacity adjacent to a new under-construction pier. With current yard storage, containers from the new pier would need to be drayed on average 1,600 feet, for a round trip journey of 5,300 feet for the equipment involved. The new yard, maintains the same operational profile of the current berths – roughly 3,700 feet per lift. This drayage introduces costs and delays in operations and reduces the Port’s economic competitiveness.

This proposed project would redevelop former coal terminal land into a higher-value maritime use that supports the Port’s container growth trajectory. By converting legacy bulk-terminal land into productive container backland, the project would support cargo movement, improve terminal efficiency and reliability, and help the Port make fuller use of its recent pier investments. Some yard activity would consist of existing containers shifting from a less efficient operating pattern, generating benefits from shorter truck moves, reduced idling, lower labor and equipment time, fewer rehandles, and reduced fuel use. Vessels similarly capture efficiency gains.

**BCA Framework:** A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a national perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and changes in welfare (benefits), as well as project capital costs.

The BCA framework involves defining a Base Case or “No Build” Case, which is compared to the “Build” Case, where the grant request is awarded, and the project is built as proposed. The BCA assesses the incremental difference between the Base Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project life cycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by the USDOT in the 2026 BCA Guidance for Discretionary Grant Programs.<sup>1</sup>

**BCA Results:** The Project yields a Benefit-Cost Ratio (BCR) of 2.54 and a Net Present Value (NPV) of approximately \$69.81M. The Project’s costs are detailed in Section 4 of this report. The derivations of benefits by type are presented in Section 5, and the thirty-year present value results, including the distribution of benefits by type, are found in Section 6.

---

<sup>1</sup> [U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Applications, December 2025.](#)

## 2. Build and No-Build Scenarios Description

The two alternative scenarios are:

- **No-Build Scenario:** Under the no-build scenario, the Port of Mobile would operate its new terminal without the proposed backland container yard. An under-construction pier/wharf expansion (separate from the yard project evaluated in this report) will add vessel-side capability, but the terminal would lack the adjacent yard capacity needed to fully support efficient container staging behind the wharf. Containers discharged from vessels would be moved longer distances from the ship/wharf area into the existing yard, requiring additional truck or yard tractor travel, maneuvering, and staging. Without additional yard capacity, stack heights in the existing yard would be higher, increasing the amount of rehandling involved in outbound moves from the yard. These two effects would increase operating time for reach stackers, yard tractors, trucks, and labor compared with a yard located directly behind the wharf.

In the no-build scenario, some container volumes would continue to be handled through the existing, less efficient operating pattern, while some incremental cargo may be delayed, staged elsewhere, diverted, or not accommodated depending on capacity constraints. The lack of nearby backland storage could contribute to higher truck cycle times, more idling, longer vessel dwell times, additional fuel consumption, added emissions, and greater risk of congestion around the wharf and yard interface.

- **Build Scenario:** Under the build scenario, the Port of Mobile would construct a new backland container yard directly behind the expanded wharf. The project would convert underutilized legacy bulk-terminal land into higher-value container terminal backland, including storage and staging areas for both unrefrigerated and refrigerated containers. The yard would include the supporting infrastructure needed for modern container operations, such as hardened and level pavement, lighting, power, fencing, drainage, circulation space, and reefer plugs.

With the new yard in place, containers could move more directly between the vessel/wharf area and storage, reducing the distance, time, idling, fuel use, labor, and equipment hours associated with container handling. Existing cargo could shift from a less efficient operating pattern into the new yard, generating terminal operating efficiency benefits through shorter truck or yard tractor cycles, fewer rehandles due to shorter stacks, and improved staging. By reducing yard congestion and container stack heights, vessel dwell times will be reduced for all vessel calls, allowing for more efficient vessel operations.

## 3. General BCA Parameters and Assumptions

This BCA follows the December 2025 USDOT BCA guidance for conducting benefit cost analyses for the purpose of 2026 PIDP grant applications. The BCA guidance provides both methodological

guidance and specific values for monetizing distinct types of benefits, such as emissions reductions.<sup>2</sup>

The following general parameters and assumptions were used in the BCA:

- The year 2024 was used as the base year for discounting.
- A real discount rate of 7 percent is applied to all costs and benefits.
- All costs and benefits used in the BCA are in (or have been converted to) 2024 constant dollars. Unless noted otherwise, values reflected in this BCA narrative are 2024\$.
- Bureau of Economic analysis implicit price deflator (IPD) data was used to derive multipliers for converting to 2024 dollars.
- The Project construction is expected to commence in Q2 2030 and end in Q3 2031, with operations commencing in Q4 2031.
- The analysis covers a 30-year period of operation and useful life, with residual value monetized in year 30.

## 4. Project Costs

### 4.1. Capital Costs

The capital cost of the Project is based on the Estimated Schedule of Values for Yard Development. The total estimated discounted project cost is **\$44,397,492** in 2024\$, inclusive of a 20 percent contingency. The estimate reflects the cost to develop former coal terminal land into a functional container yard capable of supporting both unrefrigerated and refrigerated container operations.

The cost estimate includes site preparation, earthwork, paving, drainage, utilities, electrical infrastructure, lighting, shore power, truck charging infrastructure, reefer infrastructure, fencing, pavement markings, and other items necessary for a complete yard installation. Major cost components include:

- RCC paving
- truck chargers
- shore power for reefer container supply
- electrical work
- soil cement
- trench drains with water quality units

---

<sup>2</sup> [U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Applications, December 2025.](#)

## 4.2. Operations & Maintenance Costs

The Phase V backlands yard will require annual resurfacing and sealcoating as well as re-striping every three years.

	Low	High	Avg	Unit
Annual Preventative Maintenance (crack sealing, pothole repair)	\$15,000	\$30,000	\$22,500	\$/yr
Re-striping	\$8,000	\$15,000	\$1,500.00	\$/3yr
Annual sealcoating	\$40,000	\$70,000	\$55,000.00	\$/yr

Source: Mott MacDonald estimates in 2026\$.

The BCA uses high-end estimates for each type of maintenance. In total, O&M's total discounted cost over the thirty-year span is **\$875,358** in 2024\$.

## 5. Benefits

The following categories of benefit have been captured and monetized.

### 1. Residual Value

The project includes substantial long-lived yard infrastructure, including paved container storage areas, drainage, utilities, electrical infrastructure, lighting, fencing, shore power, truck charging infrastructure, and reefer infrastructure. Because several of these assets are expected to retain useful life beyond the end of the BCA operating period, the remaining value of eligible capital assets is monetized as a residual value benefit. Residual value is calculated based on the portion of original capital cost remaining at the end of the analysis period, according to each asset class's assumed useful life, and is discounted to present value.

### 2. Drayage Efficiency

The Project will develop a new backland container yard directly behind the expanded wharf, reducing the need to move containers longer distances into the existing storage area. Under current operations, containers need to travel from the ship/wharf area into the existing yard, plus additional maneuvering and staging time. By locating storage closer to the wharf, the Project reduces drayage vehicle miles traveled (VMT) and cycle times per lift. These cycle time benefits are valued on a per-hour and per-VMT benefits and are monetized based on USDOT BCA Guidance as well as port worker wage data.

VMT-related savings include reduced:

- labor costs,
- noise costs,
- safety costs,
- emission costs (nitrogen oxides, sulfur oxides, and particulate matter), and

- operating cost (including fuel).

### 3. Rehandle Efficiency

In addition to reducing drayage VMT, the proposed yard will improve staging efficiency by lowering container stack heights and reducing the number of rehandles required to access containers. Under the no-build scenario, increased throughput enabled by the new under-construction berth will result in denser stacking conditions. Import container stack height (currently 3 on average) will increase proportionally with increases in volume. Increased density in the no-build scenario will lead to more unproductive equipment movements, as reach stackers more repeatedly disassemble and restack containers to retrieve target units.

Under the build scenario, the expanded yard capacity enables the port to handle increased volumes but with shorter stack configurations, thereby improving operational efficiency and reducing unnecessary container handling movements. Rehandle efficiency impacts only imported containers (exports do not require stacking and rehandling), which account for half of all containers in the Port of Mobile.

Digging for containers increases port equipment utilization times as well as wait times for customers' trucks picking up containers. Each party's labor is valued based on appropriate wage and benefit rates while idling fuel consumption and emissions are considered for both Class 8 trucks involved in the operation.

Fewer rehandles and improved efficiency result in reduced:

- labor costs (for both yard equipment operators and customer pick-up truck labor),
- fuel costs, and
- emissions (nitrogen oxides and particulate matter) from idling vehicles.

### 4. Vessel Efficiency

Improved efficiency in container drayage and rehandling also translates into operational benefits for berthed vessels. These efficiencies reduce:

- vessel labor costs,
- fuel consumption, and
- marine diesel emissions, as vessels can reallocate berth time toward transit at slower, more fuel-efficient steaming speeds.

This benefit very importantly extends to *all* vessels operating at the Port of Mobile, as new yard will reduce average stack heights (rehandles) and drayage on average across the berths.

## 5.1. Residual Value of Infrastructure

The 30-year operations period covered in the BCA infrastructure begins in Q4 2031 following construction. Infrastructure with a useful life of 50 years retains 40 percent of its original value in year 30. The undiscounted residual value of the infrastructure is \$971,305 in 2024\$.

## 5.2. Drayage Efficiency

### 5.2.1. Summary

The Phase V Backland Yard will reduce drayage VMT as well as operational and labor hours for port operators. Whereas containers in the no-build scenario are drayed 5,300 feet (on average), containers in the build scenario will be drayed 3,700 feet (on average). This reduction of VMT results in savings related to noise, safety, emissions, and operating cost (all monetized as per USDOT BCA guidance).

Reduced VMT will also result in fewer labor hours. Each movement requires 2 workers to operate equipment (e.g., Utility Tractor Rigs and Reach Stackers) at total cost of \$112 per union worker. This hourly cost reflects labor under the union contract in effect from 2024 to 2030 and excludes fuel and maintenance.

Based on average speeds and distances, drayage cycles in the no-build scenario will take approximately 10 minutes, whereas drayage cycles in the build scenario will take approximately 12.5 minutes.

The number and duration of drayage trips is derived from forecasted TEU throughput, the number of lifts required (approximately 0.57 lifts per TEU), and port operator-calculated distances.

### 5.2.2. Truck VMT Noise Savings

Drayage operations generate elevated noise levels at and near the port. The reduction in truck VMT under the build scenario reduces exposure to noise.

USDOT's December 2025 guidance for benefit-cost analysis recommends valuing noise costs per VMT for rural trucks at \$0.0039.<sup>3</sup>

### 5.2.3. Truck VMT Emissions Reductions

Drayage operations emit pollutants (e.g., NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>2.5</sub>.) that degrade air quality and harm human health. The build scenario reduces these emissions by reducing VMT.

---

<sup>3</sup> Ibid.

USDOT's December 2025 guidance for benefit-cost analysis recommends valuing emissions costs per VMT for rural trucks at \$0.038.<sup>4</sup>

#### 5.2.4. Truck VMT Safety Benefits

Reduced truck traffic lowers the risk of crashes and resulting injuries and damage.

USDOT's December 2025 guidance for benefit-cost analysis recommends valuing safety costs per VMT for rural trucks at \$0.03.<sup>5</sup>

#### 5.2.5. Truck VMT Vehicle Operating Cost (VOC) Savings

Truck operators avoid direct operating costs (including fuel and maintenance) by reducing drayage distances.

USDOT's December 2025 guidance for benefit-cost analysis recommends valuing VOCs per VMT for rural trucks at \$1.23 per VMT.<sup>6</sup>

### 5.3. Rehandle Efficiency

Inefficient container staging and drayage operations can create delays for heavy-duty trucks and terminal equipment, increasing idle time and associated operating costs for both port operators and customer pick-up truck drivers. This issue applies only for imported containers (50% of the port's volume), as exports do not require stacking and rehandling.

Although only imports are rehandled, the build scenario's improved rehandle efficiency affects *all* port containers, as the entire port will benefit from shorter stacks on average enabled by the new yard.

#### 5.3.1. Operational Savings

In the no-build scenario, the new berth would increase container lifts by 38% (120,000 new lifts) but without increased yard capacity. This would result in taller stacks, which necessitate 2.07 lifts per container. The build scenario's proposed yard would reduce stack heights and thus the average number of container rehandles from approximately 2.07 to 1.25 moves per container.

Each rehandle requires approximately 0.083 hours (5 minutes) of equipment time and two union workers, where each worker costs \$112 per hour. Similarly, time costs are incurred by truck drivers (one driver paid \$37.20 per hour, as per USDOT BCA Guidance) in the no-build scenario.

---

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

Reducing unproductive container movements lowers labor costs while improving overall terminal throughput and operational efficiency.

### 5.3.2. Emissions Savings

Heavy-duty trucks typically consume approximately 0.8 gallons of fuel per hour while idling, meaning unproductive wait times translate directly into emissions.<sup>7</sup> Lower fuel use directly reduces emissions of greenhouse gases and criteria pollutants, including NO<sub>x</sub> and PM<sub>2.5</sub>.

The burned fuel results emissions whose damaged are valued by EPA.<sup>8</sup> These emissions reductions generate environmental and public health benefits that can be monetized using EPA emissions damage cost factors:

- \$23,800 per metric ton for NO<sub>x</sub>, and
- \$1,140,500 per metric ton for PM<sub>2.5</sub>.<sup>9</sup>

### 5.3.3. Fuel Savings

Heavy-duty trucks typically consume approximately 0.8 gallons of fuel per hour while idling, meaning unproductive wait times translate directly into higher fuel costs. Lower fuel use directly reduces port operation costs. Fuel prices are estimated with US Energy Information Administration forecasts for diesel fuel (distillate fuel oil) for transportation.<sup>10</sup>

## 5.4. Vessel Efficiency

Improved container staging and reduced yard congestion can also improve vessel operations at berth. Faster container handling reduces vessel turnaround times, allowing vessels to spend less time docked and more time in transit operating at slower, more fuel-efficient steaming speeds.

For this analysis, the project is assumed to save approximately 1-2 vessel hour per call relative to the no-build scenario. In 2031, there will be an estimated 9 vessel calls per week, i.e., 468 calls a year. Time savings of an hour per vessel saves approximately 468 vessel hours annually, increasing over time with terminal throughput growth, proportional to the throughput forecasts through 2060. The BCA uses the more conservative 1 hour instead of 2 hours.

<sup>7</sup> <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100AGGF.TXT>

<sup>8</sup> EPA 2025 SmartWay Technical Documents (data year 2024):  
[https://app4.erg.com/smartwayEPA/portal/download/OLT\\_TD.pdf](https://app4.erg.com/smartwayEPA/portal/download/OLT_TD.pdf)

<sup>9</sup> EPA tables provide factors for diesel emissions denoted as PM10, with the footnote caveat that "all particulate is ≤ 1 μm in size." Because 1 μm < 2.5 μm, emissions are definitionally PM2.5. For stationary/industrial diesel engines, the analysis assumes PM2.5 emissions = PM10 emissions on this basis.

<sup>10</sup> <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=3-AEO2025&region=1-0&cases=ref2025&start=2023&end=2050&f=A&linechart=ref2025-d032025a.3-3-AEO2025.1-0~ref2025-d032025a.10-3-AEO2025.1-0~&map=ref2025-d032025a.3-3-AEO2025.1-0&ctype=linechart&chartindexed=0&sourcekey=0>

### 5.4.1. Fuel Savings

Reduced berth delays allow vessels to shift operational time toward transit, enabling slower and more fuel-efficient steaming speeds. The analysis assumes vessels can reduce propulsion load by approximately 4 percent (assuming an average baseline steaming time of 67.5 hours based on weighted average distances between Mobile and destination ports at an assumed 15 knots per hour) by reallocating an hour of berth time to longer transit durations.<sup>11</sup> The BCA calculates the change in fuel burn and emissions based on a reduction in the vessel load factor, as determined by the propeller cube law.<sup>12</sup>

Reduced fuel consumption lowers operating costs for vessel operators while improving overall maritime efficiency.

Fuel savings are estimated using average vessel engine power, fuel consumption rates, and marine fuel prices. Based on these assumptions, vessel fuel costs per metric ton are estimated at \$1,198.76 per vessel-hour. This estimate reflects a weighted average of the global vessel fleet, including representative engine types, engine power characteristics, fuel composition, and associated fuel consumption rates. The analysis incorporates average main engine power, engine-specific fuel consumption factors, and the weighted share of marine diesel oil (MDO) and bunker fuel oil (BFO) usage across the fleet.<sup>13</sup>

### 5.4.1. Emissions Savings

Lower vessel fuel consumption during cruising also reduces emissions from main propulsion engines, including nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter (PM<sub>2.5</sub>). Emissions savings are estimated using a weighted average of the global container vessel fleet, incorporating representative engine types, engine power characteristics, fuel composition, and associated emissions factors.<sup>14</sup> Most container ships (92.98%) have slow-speed diesel (SSD) engines and use BFO. The BCA conservatively estimates fuel sulfur content at 0.1%, below international limits of 0.5%.<sup>15</sup> Emissions factors reflect cruising speeds, weighted by engine type and fuel type.<sup>16</sup>

Emissions reductions are valued using USDOT and EPA emissions damage cost guidance.<sup>17</sup> These emissions reductions generate environmental and public health benefits that can be monetized using EPA emissions damage cost factors:

- \$23,800 per metric ton for NO<sub>x</sub>,

---

<sup>11</sup> Calculations made using propeller cube law. A vessel previously operating at 100% propulsion load for 20 hours could reduce to roughly 75% for a 22-hour trip; <https://www.sciencedirect.com/science/article/pii/S2772390923000203>

<sup>12</sup> <https://www.sciencedirect.com/science/article/pii/S2772390923000203>

<sup>13</sup> <https://www.dla.mil/Energy/Business/Standard-Prices/>; <https://www3.epa.gov/ttnchie1/conference/ei19/session10/trozzi.pdf>

<sup>14</sup> [https://gaftp.epa.gov/air/nei/ei\\_conference/EI19/session10/trozzi.pdf](https://gaftp.epa.gov/air/nei/ei_conference/EI19/session10/trozzi.pdf)

<sup>15</sup> <https://www.imo.org/en/mediacentre/pressbriefings/pages/02-imo-2020.aspx>

<sup>16</sup> [https://gaftp.epa.gov/air/nei/ei\\_conference/EI19/session10/trozzi.pdf](https://gaftp.epa.gov/air/nei/ei_conference/EI19/session10/trozzi.pdf)

<sup>17</sup> EPA tables provide factors for diesel emissions denoted as PM<sub>10</sub>, with the footnote caveat that “all particulate is ≤ 1 μm in size.” Because 1 μm < 2.5 μm, emissions are definitionally PM<sub>2.5</sub>. For stationary/industrial diesel engines, the analysis assumes PM<sub>2.5</sub> emissions = PM<sub>10</sub> emissions on this basis.

- \$64,500 per metric ton for SO<sub>x</sub>, and
- \$1,140,500 per metric ton for PM<sub>2.5</sub>.

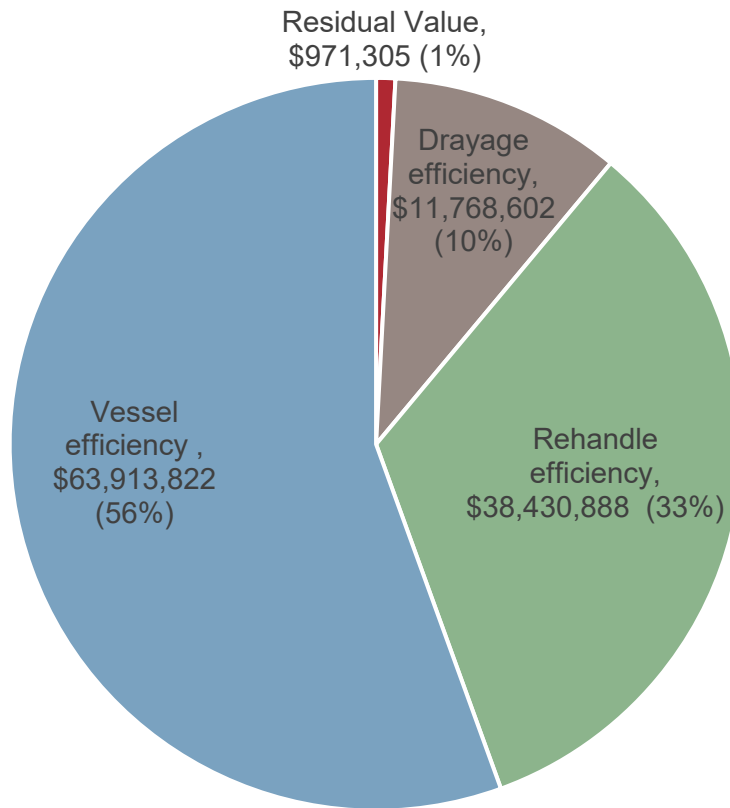
Because many of these emissions will occur on the ocean far from population, the BCA reduces emissions reductions benefits to 10% of their USDOT-calculated value.

## 6. Results

Table 1. Summary Benefit Cost Analysis Results (Discounted, 2024 Dollars)

Discounted Costs	
<b>Total Cost</b>	<b>\$45,272,849</b>
Discounted Benefits	
<b>Drayage efficiency</b>	<b>\$ 11,768,602</b>
<i>Labor</i>	\$ 10,851,249
<i>Noise</i>	\$ 2,748
<i>Safety</i>	\$ 21,139
<i>Emissions</i>	\$ 26,776
<i>Operating Costs (including fuel)</i>	\$ 866,691
<b>Rehandle efficiency</b>	<b>\$ 38,430,888</b>
<i>Yard Equipment Operator Labor</i>	\$ 32,311,531
<i>Customer Pickup Truck Labor</i>	\$ 5,366,022
<i>NOx</i>	\$ 166,026
<i>PM2.5</i>	\$ 142,116
<i>Fuel</i>	\$ 445,194
<b>Vessel efficiency</b>	<b>\$ 63,913,822</b>
<i>NOx</i>	\$ 5,416,728
<i>SOx</i>	\$ 3,157,876
<i>PM2.5</i>	\$ 24,523,596
<i>Fuel</i>	\$ 30,815,622
<b>Residual Value</b>	<b>\$971,305</b>
<b>Total Benefits</b>	<b>\$ 115,084,618</b>
Summary	
<b>Benefit Cost Ratio</b>	<b>2.54</b>
<b>Net Present Value</b>	<b>\$ 69,811,768</b>

Figure 1 Share of Discounted Benefits



## 6.2. Sensitivity Analysis of Results

Because most benefits are driven by time and labor efficiency, the BCR is particularly sensitive to:

- volume (number of lifts)
- estimated minutes of labor saved
- the value of labor during drayage and rehandles
- vessel dwell time savings (impacts fuel burn and emissions)

Saving an extra minute of labor per lift during drayage (currently a saving of 2.5 minutes) would increase the BCR dramatically. Conversely, one less minute of savings reduces the BCR dramatically. The impact on the BCR relates to the volume of containers moved every year.

The BCR is comparatively less sensitive to changes in VMT and emissions for both idling and drayage.

Vessel emissions are also very impactful due to sheer scale of emissions per vessel, but the BCA adjusts these damages to 10% of the full value of emissions based on USDOT BCA factors due to the share of these emissions that are likely to be experienced by population.