**Congestion**

Adding a second track will reduce congestion and delay for the railroads, allowing them to run trains in a more energy efficient manner. Moreover, additional capacity should shift some freight transportation from truck to rail and prevent future diversions from rail to truck. Rail is a more efficient form of transportation that produces anywhere from 30 to 8 percent of the emissions generated by trucks.

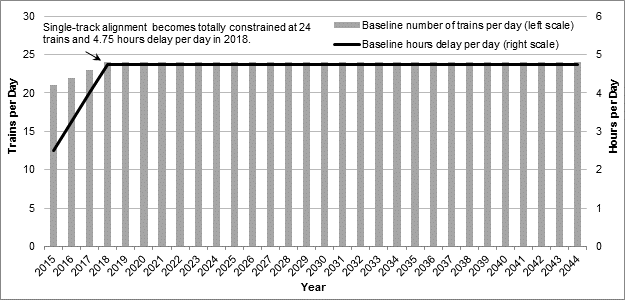
Furthermore, additional railroad capacity enabled by the second track will reduce congestion and delay on area roads for providers of truck transportation. This will allow trucks carrying freight – as well as other motorists – to operate their vehicles at a more consistent speed, one that promotes the efficient consumption of diesel fuel and gasoline. Reductions in fuel consumption by area vehicles will reduce the amount of harmful greenhouse gas emissions in the air and improve local air quality.

### Baseline

The current single-track configuration on the Broadway Street Bridge is designed to accommodate 18 trains per day with no delay. Current utilization of the single-track segment, based on data collected by PTRA, is 21 trains per day and this number is expected to grow. These trains, on average, handle over 1,000 rail cars per day. The overutilization of the track is creating congestion in the corridor, which increases the cost of transportation by introducing delay into the network and lowers the local air quality by increasing harmful emissions. This section of the report describes the baseline, or no-investment scenario, for the single-track railroad segment bridge.

Data collected by the PTRA indicates that the existing single-track configuration creates 2.5 hours of delay per day for railroads operating on the segment. As freight shipments on the alignment are forecast to grow, delays are expected to become worse in the baseline scenario if no action is taken. Figure 2 displays baseline daily train traffic and delay estimates from 2015 to 2044. Note that in 2018, the rail alignment becomes completely constrained and accommodates 24 trains with 4.75 hours delay per day. Once the alignment becomes constrained, freight moving into and out of the Port will need to move by other means, including truck and other modes of transportation.

Figure : Baseline Daily Train Traffic and Delay



Source: PTRA data and PHA estimates

According to PTRA, the average cost of delay for railroads operating on the corridor is estimated to be $1,000 per hour. This cost includes expenditures associated with fuel, crew, and maintenance. In the absence of a second track, the baseline cost of delay is expected to reach between $21.5 and $33.4 M over a 30 year period. See Table 6.

Table : Baseline Cost of Delay

|  |  |  |
| --- | --- | --- |
|  | **30 Year Present Value** | |
| **Baseline Cost of Delay** | **Discounted at 7%** | **Discounted at 3%** |
| $21.5 million | $33.4 million |

Source: PTRA data and PHA estimates

Delays created by the “bottleneck” at the single-track segment prevent freight trains from operating in an optimal manner, resulting in increased fuel consumption and increased emissions. Emissions from diesel locomotive engines include particulate matter, volatile organic compounds, nitrogen oxide, sulfur dioxide, and carbon dioxide. Table 7 presents the cost of baseline emissions over a 30 year period.

Table : Baseline Cost of Emissions from Delayed Diesel Locomotives

|  |  |  |
| --- | --- | --- |
|  | **30 Year Present Value** | |
| **Baseline Cost of Emission from Delayed Diesel Locomotives** | **Discounted at 7%** | **Discounted at 3%** |
| $0.1 million | $0.1 million |

Source: PTRA data and PHA estimates

As shown in the figures above, the “bottleneck” created by the single-track rail configuration imposes significant costs on Port of Houston stakeholders. Investment to replace the bridge and bring a second track to the alignment will yield significant benefits.

### Benefits

When compared to the status quo, replacing the Broadway Street Bridge and adding a second track will yield significant economic benefits for the railroads, the Port, and the greater Houston region. Reductions in railroad delay will lower the cost of transportation and reduce pollutants that harm local air quality. Moreover, by increasing the capacity of the rail alignment, shippers will be able to ship more freight via train, which is a cleaner form of transportation compared with trucks. Table 8 provides an overview of the benefits of the investment.

Table : Benefit Summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Benefit** | | **30-Year Present Value** | |
| **7%** | **3%** |
| 1 | Reduction in transportation costs due to reduced train delay | $20.55 million | $32.50 million |
| 2 | Reduction in diesel locomotive emissions due to reduced train delay | $0.09 million | $0.14 million |
| 3 | Reduction in truck emissions due to increased train capacity | $15.45 million | $30.34 million |
| **Total** | | **$36.09 million** | **$62.98 million** |

Source: PTRA Data and PHA estimates

#### Reduction in Train Delay

The construction of the new bridge and second track, which will accommodate up to 40 trains per day, will eliminate delay on the Broadway Street Bridge. If construction begins in 2015, then the alignment will become operational in 2016 and the cost of delay described in the baseline will be reduced to zero. This cost savings, which will provide significant value to stakeholders of the Port, is shown in Table 9.

Table : Savings from Reduction in Train Delay

|  |  |  |  |
| --- | --- | --- | --- |
|  | **30-Year Delay** | **30-Year Present Value Cost of Delay** | |
|  | **7%** | **3%** |
| **Baseline Scenario** | 50,370 Hours | $21.5 million | $33.4 million |
| **Investment Scenario** | 913 Hours | $0.9 million | $0.9 million |
| **Benefit (Savings)** | **49,458 Hours** | **$20.6 million** | **$32.5 million** |

Source: PTRA data and PHA estimates

When compared to the baseline, delays with the bridge and second track investment are reduced dramatically, reducing transportation costs for rail operators on the alignment.

#### Reduction in Diesel Locomotive Emissions

Reductions in delay on the track will lead to reductions in emissions as trains consume less fuel. As trains spend less time idling due to the addition of the second track, locomotives will emit less particulate matter, volatile organic compounds, nitrogen oxides, sulfur dioxide, and carbon dioxide. These pollutants impose a cost on society. To monetize the value of reducing these emissions, the PHA relied on research conducted by the National Highway Traffic Safety Administration (NHTSA). Table 10 compares emission on the alignment from diesel locomotives under the baseline and investment scenario.

Table : Savings from Reduction in Diesel Locomotive Emissions

|  |  |  |
| --- | --- | --- |
|  | **30-Year Present Value Cost of Emissions** | |
|  | **7%** | **3%** |
| **Baseline Scenario** | $0.1 million | $0.1 million |
| **Investment Scenario** | $0.0 million | $0.0 million |
| **Benefit (Savings)** | **$0.1 million** | **$0.1 million** |

Source: PTRA data and PHA estimates

#### Reduction in Emissions from Substitution of Train Shipments for Truck Shipments

The new double track will also allow shippers that utilize the POH to send more freight via rail. The substitution of rail transportation for truck transportation, in particular, will generate additional reductions in emissions as trains are more energy efficient than trucks on average. Based on PTRA data, the PHA estimates that 24 percent of the new freight train traffic enabled by the new alignment could have been shipped via truck without the investment. Moving that freight volume from trucks to trains will reduce emissions in the Houston area and improve local air quality.

Figure : Savings from Reduced Emissions from Substitution of Train for Truck Traffic

|  |  |  |
| --- | --- | --- |
|  | **30-Year Present Value Cost of Emissions** | |
|  | **7%** | **3%** |
| **Benefit (Savings)** | $15.5 million | $30.3 million |