

## **APPENDIX 3.0-1**

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### **EMISSIONS ERRATA**

## Explanation of Air Quality and Greenhouse Gas Emissions Errata Revisions

The Air Quality and Greenhouse Gas Emissions Errata to the Barstow International Gateway (BIG) Draft EIR (Emissions Errata) reflects minor technical refinements to the emissions modeling that were made in response to public comments and subsequent quality control review. These revisions do not change the overall analytical methodology, significance determinations, or conclusions presented in the Draft EIR, but instead clarify and correct specific modeling inputs to ensure consistency with the assumptions disclosed in the environmental document.

First, public comment O21-46 noted that the switcher locomotive fleet mix used in the emissions modeling did not explicitly reflect an all Tier 4 switcher fleet. As discussed throughout the Draft EIR and Appendix 5.3 BIG-1: Air Quality Technical Report, BIG would use Tier 4-certified switchers. However, the emissions modeling applied a standard, regulatory-accepted fleet mix rather than assuming 100 percent Tier 4 equipment, over-counting BIG's emissions. This Errata clarifies this distinction and makes minor adjustments to the modeled emissions to ensure alignment between the assumptions and the emissions calculations.

Second, a technical refinement was made to the locomotive idling emissions calculations. The original modeling inadvertently applied a load factor to a nominal 25-horsepower idling load, which resulted in duplicate accounting of engine load. This Errata corrects this issue by modeling idling emissions using the full locomotive horsepower, with an appropriate load factor applied during idling operation. This correction avoids double counting of load while maintaining a conservative and technically correct representation of idling emissions.

Finally, as noted in Attachment A, a clerical error resulted in an earlier draft version of the CEM Analysis (Appendix B to Appendix 5.3 BIG-1) being published. The corrected emissions are presented in Attachment A and the corrected emissions were used in BIG's air quality and greenhouse gas emissions analysis in the Draft EIR. Thus, there are no changes to the Draft EIR impact analyses, conclusions, or mitigation measures as a result of this update.

Collectively, this Emissions Errata revisions result in minor adjustments to calculated emissions levels but do not alter the scope of the analysis, the environmental impact conclusions, or the mitigation and compliance framework presented in the Draft EIR. The revisions constitute clarifications and technical corrections to information already disclosed and analyzed, rather than the introduction of new project components, new emissions sources, or a new analytical approach. Accordingly, this Emissions Errata does not constitute "new information" as it does not show new significant impacts, substantially increase the severity of identified impacts, or identify new feasible mitigation measures previously unavailable.

Draft EIR Appendix 5.3 BIG-1, Switcher Fleet Mix Values  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)

| Table 1: Locomotive Fleet Mix Forecast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |        |        |                                          |                  |                  |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------|--------|------------------------------------------|------------------|------------------|------------------|
| U.S. EPA Tier Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Line-Haul Locomotives <sup>1,2,3</sup> |        |        | Switcher Locomotives <sup>1,2</sup>      |                  |                  |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Without BIG and With BIG               |        |        | With BIG                                 | With BIG         |                  |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2028                                   | 2033   | 2048   | Dedicated Fleet (All Years) <sup>4</sup> | 2028             | 2033             | 2048             |
| Uncontrolled (1973-1999)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | <del>18.0%</del> | <del>18.0%</del> | <del>13.0%</del> |
| Tier 0 (2000-2001)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | <del>62.0%</del> | <del>62.0%</del> | <del>60.0%</del> |
| Tier 0+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | <del>11.0%</del> | <del>11.0%</del> | <del>8.0%</del>  |
| Tier 1 (2002-2004)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%             | 0.0%             | 0.0%             |
| Tier 1+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26.48%                                 | 22.12% | 8.62%  | 0.0%                                     | <del>3.8%</del>  | <del>3.8%</del>  | <del>7.6%</del>  |
| Tier 2 (2005-2011)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | <del>1.0%</del>  | <del>1.0%</del>  | <del>1.0%</del>  |
| Tier 2+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 37.01%                                 | 37.27% | 38.05% | 0.0%                                     | <del>4.0%</del>  | <del>4.0%</del>  | <del>10.0%</del> |
| Tier 3 (2012-2014)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27.91%                                 | 28.10% | 28.69% | 0.0%                                     | 0.0%             | 0.0%             | 0.0%             |
| Tier 4 (2015)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8.60%                                  | 12.52% | 24.64% | 100%                                     | <del>0.2%</del>  | <del>0.2%</del>  | <del>0.4%</del>  |
| Note:<br><sup>1</sup> Line-haul locomotives are 4,000 horsepower or higher; switcher locomotives are less than 2,300 horsepower.<br><sup>2</sup> Line-haul locomotive life is assumed to be 40 years; switcher locomotive life is assumed to be 70 years.<br><sup>3</sup> Based on 2023 report for the 1998 MOU and adjusted for full conversion of Tier 0 and 1 to Tier 1+ and Tier 2 to Tier 2+. Annual Tier 4 purchases with associated Tier 1 replacements based on 5-year historical average purchase rates.<br><sup>4</sup> As a part of BIG, cross-dock intermodal containers (i.e., those taken by rail from the Ports to BIG's intermodal facility) would be transported using a dedicated fleet of Tier 4 linehaul locomotives. |                                        |        |        |                                          |                  |                  |                  |
| Sources: <i>BNSF locomotive inventory data.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |        |        |                                          |                  |                  |                  |

Final Switcher Fleet Mix Values

| Table 2: Locomotive Fleet Mix Forecast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |        |        |                                          |          |      |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------|--------|------------------------------------------|----------|------|------|
| U.S. EPA Tier Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Line-Haul Locomotives <sup>1,2,3</sup> |        |        | Switcher Locomotives <sup>1,2</sup>      |          |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Without BIG and With BIG               |        |        | With BIG                                 | With BIG |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2028                                   | 2033   | 2048   | Dedicated Fleet (All Years) <sup>4</sup> | 2028     | 2033 | 2048 |
| Uncontrolled (1973-1999)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 0 (2000-2001)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 0+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 1 (2002-2004)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 1+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26.48%                                 | 22.12% | 8.62%  | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 2 (2005-2011)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                                   | 0.0%   | 0.0%   | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 2+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 37.01%                                 | 37.27% | 38.05% | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 3 (2012-2014)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27.91%                                 | 28.10% | 28.69% | 0.0%                                     | 0.0%     | 0.0% | 0.0% |
| Tier 4 (2015)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8.60%                                  | 12.52% | 24.64% | 100%                                     | 100%     | 100% | 100% |
| Note:<br><sup>1</sup> Line-haul locomotives are 4,000 horsepower or higher; switcher locomotives are less than 2,300 horsepower.<br><sup>2</sup> Line-haul locomotive life is assumed to be 40 years; switcher locomotive life is assumed to be 70 years.<br><sup>3</sup> Based on 2023 report for the 1998 MOU and adjusted for full conversion of Tier 0 and 1 to Tier 1+ and Tier 2 to Tier 2+. Annual Tier 4 purchases with associated Tier 1 replacements based on 5-year historical average purchase rates.<br><sup>4</sup> As a part of BIG, cross-dock intermodal containers (i.e., those taken by rail from the Ports to BIG's intermodal facility) would be transported using a dedicated fleet of Tier 4 linehaul locomotives. |                                        |        |        |                                          |          |      |      |
| Sources: <i>BNSF locomotive inventory data.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |        |        |                                          |          |      |      |

Draft EIR – Unmitigated Operations (pounds per day)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-23, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 32.

| Table 5.3-3: Unmitigated Operational Emissions Within MDAB (pounds per day) |                                                 |                  |                  |                 |                  |                   |
|-----------------------------------------------------------------------------|-------------------------------------------------|------------------|------------------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                  |                  |                 |                  |                   |
|                                                                             | VOC                                             | NO <sub>x</sub>  | CO               | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                             |                                                 |                  |                  |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                  |                  |                 |                  |                   |
| Mainline (Without BIG)                                                      | 52                                              | 1,518            | 383              | 1               | 32               | 31                |
| Mainline (With BIG)                                                         | 30                                              | 887              | 249              | 1               | 18               | 18                |
| Net Mainline (Through BIG)                                                  | -22                                             | -631             | -134             | -0.46           | -14              | -13               |
| BIG Lead Tracks                                                             | 9                                               | 261              | 74               | 0.26            | 5                | 5                 |
| BIG Block Swap Yard                                                         | <del>15</del>                                   | <del>338</del>   | <del>66</del>    | <del>0.23</del> | <del>9</del>     | <del>9</del>      |
| BIG Intermodal Facility                                                     | <del>0.70</del>                                 | <del>20</del>    | <del>5</del>     | <del>0.02</del> | <del>0.42</del>  | <del>0.41</del>   |
| BIG Maintenance                                                             | <del>4</del>                                    | <del>27</del>    | <del>4</del>     | <del>0.01</del> | <del>0.98</del>  | <del>0.95</del>   |
| Locomotives Within BIG Footprint Subtotal                                   | <del>6</del>                                    | <del>15</del>    | <del>15</del>    | <del>0.06</del> | <del>2</del>     | <del>2</del>      |
| Mobile Sources                                                              |                                                 |                  |                  |                 |                  |                   |
| Passenger Cars                                                              | 41                                              | 38               | 721              | 2               | 90               | 23                |
| Trucks                                                                      | 1                                               | 120              | 33               | 1               | 59               | 17                |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -                | -                | -               | 4                | 0.91              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -                | -                | -               | 7                | 2                 |
| Equipment Exhaust                                                           | 143                                             | 551              | 2,280            | 3               | 20               | 20                |
| Area Sources                                                                | 256                                             | 1                | 72               | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                               | -                | -                | -               | -                | -                 |
| BIG Footprint Emissions                                                     | <del>448</del>                                  | <del>724</del>   | <del>3,121</del> | <del>7</del>    | <del>182</del>   | <del>65</del>     |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -1                                              | -120             | -29              | -1              | -74              | -21               |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 1,915                                           | 48,806           | 12,310           | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 2,001                                           | 51,217           | 12,984           | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>               | 86                                              | 2,412            | 675              | 3               | 40               | 39                |
| 2028 Total BIG Operational Emissions                                        | <del>533</del>                                  | <del>3,016</del> | <del>3,767</del> | <del>8</del>    | <del>148</del>   | <del>83</del>     |
| Existing Barstow Yard Switcher Replacement                                  | -131                                            | -821             | -53              | -0.26           | -39              | -38               |
| Net 2028 Emissions                                                          | <del>403</del>                                  | <del>2,195</del> | <del>3,715</del> | <del>8</del>    | <del>109</del>   | <del>45</del>     |
| MDAQMD Threshold                                                            | 137                                             | 137              | 548              | 137             | 82               | 65                |
| Threshold Exceeded?                                                         | Yes                                             | Yes              | Yes              | No              | Yes              | No                |
| 2033 Operations                                                             |                                                 |                  |                  |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                  |                  |                 |                  |                   |
| Mainline (Without BIG)                                                      | 54                                              | 1,601            | 423              | 1               | 33               | 32                |
| Mainline (With BIG)                                                         | 30                                              | 899              | 271              | 0.96            | 18               | 17                |
| Net Mainline (Through BIG)                                                  | -23                                             | -702             | -152             | -0.53           | -15              | -14               |
| BIG Lead Tracks                                                             | 9                                               | 275              | 84               | 0.30            | 5                | 5                 |
| BIG Block Swap Yard                                                         | <del>16</del>                                   | <del>366</del>   | <del>73</del>    | <del>0.26</del> | <del>10</del>    | <del>10</del>     |

Final EIR – Unmitigated Operations (pounds per day)

| Table 5.3-4: Unmitigated Operational Emissions Within MDAB (pounds per day) |                                                 |                 |              |                 |                  |                   |
|-----------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |              |                 |                  |                   |
|                                                                             | VOC                                             | NO <sub>x</sub> | CO           | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                             |                                                 |                 |              |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                 |              |                 |                  |                   |
| Mainline (Without BIG)                                                      | 52                                              | 1,518           | 383          | 1               | 32               | 31                |
| Mainline (With BIG)                                                         | 30                                              | 887             | 249          | 1               | 18               | 18                |
| Net Mainline (Through BIG)                                                  | -22                                             | -631            | -134         | -0.46           | -14              | -13               |
| BIG Lead Tracks                                                             | 9                                               | 261             | 74           | 0.26            | 5                | 5                 |
| BIG Block Swap Yard                                                         | 7                                               | 213             | 58           | 0.21            | 4                | 4                 |
| BIG Intermodal Facility                                                     | 6                                               | 180             | 45           | 0.16            | 4                | 4                 |
| BIG Maintenance                                                             | 0.41                                            | 5               | 5            | 0.02            | 0.11             | 0.11              |
| Locomotives Within BIG Footprint Subtotal                                   | <b>1</b>                                        | <b>27</b>       | <b>48</b>    | <b>0.18</b>     | <b>0.06</b>      | <b>0.05</b>       |
| Mobile Sources                                                              |                                                 |                 |              |                 |                  |                   |
| Passenger Cars                                                              | 41                                              | 38              | 721          | 2               | 90               | 23                |
| Trucks                                                                      | 1                                               | 120             | 33           | 1               | 59               | 17                |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -               | -            | -               | 4                | 0.91              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -               | -            | -               | 7                | 2                 |
| Equipment Exhaust                                                           | 143                                             | 551             | 2,280        | 3               | 20               | 20                |
| Area Sources                                                                | 256                                             | 1               | 72           | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                               | -               | -            | -               | -                | -                 |
| BIG Footprint Emissions                                                     | <b>443</b>                                      | <b>736</b>      | <b>3,154</b> | <b>7</b>        | <b>180</b>       | <b>63</b>         |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -1                                              | -120            | -29          | -1              | -74              | -21               |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 1,915                                           | 48,806          | 12,310       | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 2,001                                           | 51,217          | 12,984       | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>               | 86                                              | 2,412           | 675          | 3               | 40               | 39                |
| 2028 Total BIG Operational Emissions                                        | <b>528</b>                                      | <b>3,028</b>    | <b>3,800</b> | <b>8</b>        | <b>146</b>       | <b>81</b>         |
| Existing Barstow Yard Switcher Replacement                                  | -131                                            | -821            | -53          | -0.26           | -39              | -38               |
| Net 2028 Emissions                                                          | <b>397</b>                                      | <b>2,207</b>    | <b>3,747</b> | <b>8</b>        | <b>107</b>       | <b>43</b>         |
| MDAQMD Threshold                                                            | 137                                             | 137             | 548          | 137             | 82               | 65                |
| Threshold Exceeded?                                                         | Yes                                             | Yes             | Yes          | No              | Yes              | No                |
| 2033 Operations                                                             |                                                 |                 |              |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                 |              |                 |                  |                   |
| Mainline (Without BIG)                                                      | 54                                              | 1,601           | 423          | 1               | 33               | 32                |
| Mainline (With BIG)                                                         | 30                                              | 899             | 271          | 0.96            | 18               | 17                |
| Net Mainline (Through BIG)                                                  | -23                                             | -702            | -152         | -0.53           | -15              | -14               |
| BIG Lead Tracks                                                             | 9                                               | 275             | 84           | 0.30            | 5                | 5                 |
| BIG Block Swap Yard                                                         | 7                                               | 224             | 63           | 0.22            | 4                | 4                 |

| Table 5.3-3: Unmitigated Operational Emissions Within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|-----------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                             | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                     | 0.86                                            | 26              | 7      | 0.02            | 0.52             | 0.50              |
| BIG Maintenance                                                             | 4                                               | 27              | 4      | 0.01            | 0.98             | 0.96              |
| Locomotives Within BIG Footprint Subtotal                                   | 6                                               | 7               | 15     | 0               | 2                | 2                 |
| Mobile Sources                                                              |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                              | 43                                              | 34              | 758    | 3               | 17               | 6                 |
| Trucks                                                                      | 2                                               | 128             | 33     | 1               | 14               | 6                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -               | -      | -               | 5                | 1                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -               | -      | -               | 9                | 2                 |
| Equipment Exhaust                                                           | 150                                             | 557             | 2,282  | 3               | 2                | 20                |
| Area Sources                                                                | 256                                             | 1               | 72     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                     | 456                                             | 713             | 3,160  | 7               | 48               | 37                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -1                                              | -125            | -27    | -1              | -77              | -22               |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 1,924                                           | 49,997          | 13,214 | 47              | 1,015            | 985               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 2,036                                           | 53,122          | 14,131 | 50              | 1,068            | 1,036             |
| Net Rail Corridor Emissions Change (within MDAB)                            | 112                                             | 3,125           | 917    | 4               | 53               | 51                |
| 2033 Total BIG Operational Emissions                                        | 567                                             | 3,713           | 4,051  | 9               | 24               | 67                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                     | -131                                            | -821            | -53    | 0               | -39              | -38               |
| Net 2033 Emissions                                                          | 436                                             | 2,896           | 3,994  | 9               | 81               | 13                |
| MDAQMD Threshold                                                            | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                         | Yes                                             | Yes             | Yes    | No              | No               | No                |
| 2048 Operations                                                             |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                      | 53                                              | 1,704           | 529    | 2               | 31               | 30                |
| Mainline (With BIG)                                                         | 31                                              | 1,002           | 348    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                  | 21                                              | 702             | 181    | 0.63            | 13               | 13                |
| BIG Lead Tracks                                                             | 9                                               | 295             | 104    | 0.37            | 5                | 5                 |
| BIG Block Swap Yard                                                         | 25                                              | 561             | 110    | 0.39            | 16               | 15                |
| BIG Intermodal Facility                                                     | 0.69                                            | 22              | 7      | 0.02            | 0.40             | 0.39              |
| BIG Maintenance                                                             | 5                                               | 34              | 5      | 0.02            | 1                | 1                 |
| Locomotives Within BIG Footprint Subtotal                                   | 18                                              | 211             | 45     | 0.17            | 9                | 9                 |
| Mobile Sources                                                              |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                              | 33                                              | 24              | 701    | 3               | 132              | 34                |
| Trucks                                                                      | 2                                               | 132             | 26     | 1               | 92               | 28                |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -               | -      | -               | 13               | 4                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -               | -      | -               | 15               | 4                 |
| Equipment Exhaust                                                           | 156                                             | 558             | 2,286  | 3               | 19               | 19                |

| Table 5.3-4: Unmitigated Operational Emissions Within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|-----------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                             | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                     | 8                                               | 227             | 60     | 0.21            | 5                | 4                 |
| BIG Maintenance                                                             | 0.42                                            | 6               | 5      | 0.02            | 0.12             | 0.11              |
| Locomotives Within BIG Footprint Subtotal                                   | 1                                               | 30              | 60     | 0.22            | 0.05             | 0.04              |
| Mobile Sources                                                              |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                              | 43                                              | 34              | 758    | 3               | 17               | 6                 |
| Trucks                                                                      | 2                                               | 128             | 33     | 1               | 14               | 6                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -               | -      | -               | 5                | 1                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -               | -      | -               | 9                | 2                 |
| Equipment Exhaust                                                           | 150                                             | 557             | 2,282  | 3               | 20               | 20                |
| Area Sources                                                                | 256                                             | 1               | 72     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                     | 451                                             | 750             | 3,204  | 7               | 64               | 35                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -1                                              | -125            | -27    | -1              | -77              | -22               |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 1,924                                           | 49,997          | 13,214 | 47              | 1,015            | 985               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 2,036                                           | 53,122          | 14,131 | 50              | 1,068            | 1,036             |
| Net Rail Corridor Emissions Change (within MDAB)                            | 112                                             | 3,125           | 917    | 4               | 53               | 51                |
| 2033 Total BIG Operational Emissions                                        | 562                                             | 3,750           | 4,095  | 10              | 40               | 65                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                     | -131                                            | -821            | -53    | 0               | -39              | -38               |
| Net 2033 Emissions                                                          | 431                                             | 2,929           | 4,042  | 9               | 1                | 27                |
| MDAQMD Threshold                                                            | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                         | Yes                                             | Yes             | Yes    | No              | No               | No                |
| 2048 Operations                                                             |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                      | 53                                              | 1,704           | 529    | 2               | 31               | 30                |
| Mainline (With BIG)                                                         | 31                                              | 1,002           | 348    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                  | 21                                              | 702             | 181    | 0.63            | 13               | 13                |
| BIG Lead Tracks                                                             | 9                                               | 295             | 104    | 0.37            | 5                | 5                 |
| BIG Block Swap Yard                                                         | 7                                               | 232             | 77     | 0.27            | 4                | 4                 |
| BIG Intermodal Facility                                                     | 5                                               | 174             | 54     | 0.19            | 3                | 3                 |
| BIG Maintenance                                                             | 1                                               | 7               | 6      | 0.02            | 0.13             | 0.13              |
| Locomotives Within BIG Footprint Subtotal                                   | 1                                               | 7               | 60     | 0.23            | -0.32            | -0.31             |
| Mobile Sources                                                              |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                              | 33                                              | 24              | 701    | 3               | 132              | 34                |
| Trucks                                                                      | 2                                               | 132             | 26     | 1               | 92               | 26                |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                               | -               | -      | -               | 13               | 4                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                               | -               | -      | -               | 15               | 4                 |
| Equipment Exhaust                                                           | 156                                             | 558             | 2,286  | 3               | 19               | 19                |

| Table 5.3-3: Unmitigated Operational Emissions Within MDAB (pounds per day)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                 |        |                 |                  |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 256                                             | 0.62            | 72     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 465                                             | 926             | 3,130  | 7               | 281              | 96                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -1                                              | -122            | -16    | -1              | -108             | -30               |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,919                                           | 53,861          | 16,699 | 59              | 969              | 940               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2,016                                           | 56,795          | 17,706 | 63              | 1,012            | 981               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 96                                              | 2,934           | 1,007  | 4               | 43               | 42                |
| 2048 Total BIG Operational Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 560                                             | 3,738           | 4,120  | 10              | 215              | 107               |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2048 Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 430                                             | 2,917           | 4,067  | 10              | 176              | 70                |
| MDAQMD Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                             | Yes             | Yes    | No              | Yes              | Yes               |
| <div>Notes:</div> <div><sup>1</sup> Totals may not add up due to rounding.</div> <div><sup>2</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.</div> <div><sup>3</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b></div> <div><sup>4</sup> MDAB only Corridor emissions per EnSafe, <i>BNSF Barstow International Gateway Corridor Emissions Analysis</i>, October 2025 (see <b>Appendix 5.3 BIG-1, Appendix B</b>).</div> <div>Note that operational train emissions modeling was completed for future years without BIG (2028, 2033, and 2048) to establish future baseline train emissions and analyze incremental emissions increases directly attributable to BIG.</div> |                                                 |                 |        |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |                 |        |                 |                  |                   |

| Table 5.3-4: Unmitigated Operational Emissions Within MDAB (pounds per day)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                 |        |                 |                  |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 256                                             | 0.62            | 72     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 448                                             | 721             | 3,145  | 7               | 271              | 86                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -1                                              | -122            | -16    | -1              | -108             | -30               |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,919                                           | 53,861          | 16,699 | 59              | 969              | 940               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2,016                                           | 56,795          | 17,706 | 63              | 1,012            | 981               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 96                                              | 2,934           | 1,007  | 4               | 43               | 42                |
| 2048 Total BIG Operational Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 543                                             | 3,533           | 4,135  | 10              | 205              | 98                |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2048 Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 413                                             | 2,713           | 4,082  | 10              | 166              | 60                |
| MDAQMD Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                             | Yes             | Yes    | No              | Yes              | No                |
| <div>Notes:</div> <div><sup>1</sup> Totals may not add up due to rounding.</div> <div><sup>2</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.</div> <div><sup>3</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b></div> <div><sup>4</sup> MDAB only Corridor emissions per EnSafe, <i>BNSF Barstow International Gateway Corridor Emissions Analysis</i>, October 2025 (see <b>Appendix 5.3 BIG-1, Appendix B</b>).</div> <div>Note that operational train emissions modeling was completed for future years without BIG (2028, 2033, and 2048) to establish future baseline train emissions and analyze incremental emissions increases directly attributable to BIG.</div> |                                                 |                 |        |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |                 |        |                 |                  |                   |

Draft EIR – Unmitigated Operations (tons per year)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-24, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 33.

| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year) |                                                |                 |                |                     |                  |                   |
|-----------------------------------------------------------------------------|------------------------------------------------|-----------------|----------------|---------------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |                |                     |                  |                   |
|                                                                             | VOC                                            | NO <sub>x</sub> | CO             | SO <sub>2</sub>     | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                             |                                                |                 |                |                     |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |                |                     |                  |                   |
| Mainline (Without BIG)                                                      | 8                                              | 245             | 62             | 0.22                | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 143             | 40             | 0.14                | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -3                                             | -102            | -22            | -0.07               | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 42              | 12             | 0.04                | 0.87             | 0.84              |
| BIG Block Swap Yard                                                         | <del>2</del>                                   | <del>55</del>   | <del>11</del>  | <del>0.04</del>     | 1                | 1                 |
| BIG Intermodal Facility                                                     | <del>0.11</del>                                | <del>3</del>    | <del>1</del>   | <del>&lt;0.01</del> | <del>0.07</del>  | <del>0.07</del>   |
| BIG Maintenance                                                             | <del>1</del>                                   | <del>4</del>    | 1              | <0.01               | <del>0.16</del>  | <del>0.15</del>   |
| Locomotives Within BIG Footprint Subtotal                                   | <del>1</del>                                   | <del>2</del>    | <del>3</del>   | <del>0.01</del>     | <del>0.38</del>  | <del>0.36</del>   |
| Mobile Sources                                                              |                                                |                 |                |                     |                  |                   |
| Passenger Cars                                                              | 6                                              | 5               | 96             | 0.32                | 16               | 4                 |
| Trucks                                                                      | 0.23                                           | 18              | 5              | 0.16                | 11               | 3                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -              | -                   | 0.67             | 0.17              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -              | -                   | 1                | 0.32              |
| Equipment Exhaust                                                           | 12                                             | 42              | 379            | 0.54                | 2                | 1                 |
| Area Sources                                                                | 47                                             | 0.06            | 6              | <0.01               | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                              | -               | -              | -                   | -                | -                 |
| BIG Footprint Emissions                                                     | <del>66</del>                                  | <del>68</del>   | <del>489</del> | 1                   | 30               | 9                 |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -0.20                                          | -22             | -5             | -0.21               | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 309                                            | 7,882           | 1,988          | 7                   | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 323                                            | 8,272           | 2,097          | 7                   | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>               | 14                                             | 389             | 109            | 0.44                | 6                | 6                 |
| 2028 Total BIG Operational Emissions                                        | <del>80</del>                                  | <del>435</del>  | <del>593</del> | 1                   | 23               | 12                |
| Existing Barstow Yard Switcher Replacement                                  | -24                                            | -150            | -10            | -0.05               | -7               | -7                |
| Net 2028 Emissions                                                          | <del>56</del>                                  | <del>286</del>  | <del>583</del> | 1                   | 16               | 5                 |
| MDAQMD Threshold                                                            | 25                                             | 25              | 100            | 25                  | 15               | 12                |
| Threshold Exceeded?                                                         | Yes                                            | Yes             | Yes            | No                  | Yes              | No                |
| 2033 Operations                                                             |                                                |                 |                |                     |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |                |                     |                  |                   |
| Mainline (Without BIG)                                                      | 9                                              | 259             | 68             | 0.24                | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 145             | 44             | 0.16                | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -4                                             | -113            | -25            | -0.09               | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 44              | 14             | 0.05                | 0.89             | 0.86              |

Final EIR – Unmitigated Operations (tons per year)

| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year) |                                                |                 |       |                 |                  |                   |
|-----------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                             | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                             |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                      | 8                                              | 245             | 62    | 0.22            | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 143             | 40    | 0.14            | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -3                                             | -102            | -22   | -0.07           | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 42              | 12    | 0.04            | 0.87             | 0.84              |
| BIG Block Swap Yard                                                         | 1                                              | 34              | 9     | 0.03            | 1                | 1                 |
| BIG Intermodal Facility                                                     | 0.99                                           | 29              | 7     | 0.03            | 0.60             | 0.58              |
| BIG Maintenance                                                             | 0.07                                           | 1               | 1     | <0.01           | 0.02             | 0.02              |
| Locomotives Within BIG Footprint Subtotal                                   | 0.20                                           | 4               | 8     | 0.03            | 0.01             | 0.01              |
| Mobile Sources                                                              |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                              | 6                                              | 5               | 96    | 0.32            | 16               | 4                 |
| Trucks                                                                      | 0.23                                           | 18              | 5     | 0.16            | 11               | 3                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -     | -               | 0.67             | 0.17              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -     | -               | 1                | 0.32              |
| Equipment Exhaust                                                           | 12                                             | 42              | 379   | 0.54            | 2                | 1                 |
| Area Sources                                                                | 47                                             | 0.06            | 6     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                     | 65                                             | 70              | 494   | 1               | 30               | 9                 |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -0.20                                          | -22             | -5    | -0.21           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 309                                            | 7,882           | 1,988 | 7               | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 323                                            | 8,272           | 2,097 | 7               | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>               | 14                                             | 389             | 109   | 0.44            | 6                | 6                 |
| 2028 Total BIG Operational Emissions                                        | 79                                             | 437             | 598   | 1               | 23               | 12                |
| Existing Barstow Yard Switcher Replacement                                  | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2028 Emissions                                                          | 55                                             | 288             | 589   | 1               | 16               | 5                 |
| MDAQMD Threshold                                                            | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                         | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| 2033 Operations                                                             |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                      | 9                                              | 259             | 68    | 0.24            | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 145             | 44    | 0.16            | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -4                                             | -113            | -25   | -0.09           | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 44              | 14    | 0.05            | 0.89             | 0.86              |



| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year) |                                                |                 |       |                 |                  |                   |
|-----------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                             | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Block Swap Yard                                                         | 3                                              | 59              | 12    | 0.04            | 2                | 2                 |
| BIG Intermodal Facility                                                     | 0.14                                           | 4               | 1     | <0.01           | 0.08             | 0.08              |
| BIG Maintenance                                                             | 0.59                                           | 4               | 0.67  | <0.01           | 0.16             | 0.15              |
| Locomotives Within BIG Footprint Subtotal                                   | 1                                              | 1               | 2     | 0.01            | 0.35             | 0.34              |
| Mobile Sources                                                              |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                              | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                      | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                           | 13                                             | 43              | 380   | 0.54            | 2                | 2                 |
| Area Sources                                                                | 47                                             | 0.06            | 6     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                     | 66                                             | 65              | 485   | 1               | 47               | 14                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -0.21                                          | -23             | -5    | -0.23           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 311                                            | 8,075           | 2,134 | 8               | 164              | 159               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 329                                            | 8,579           | 2,282 | 8               | 172              | 167               |
| Net Rail Corridor Emissions Change (within MDAB)                            | 18                                             | 505             | 148   | 0.59            | 9                | 8                 |
| 2033 Total BIG Operational Emissions                                        | 84                                             | 547             | 628   | 1               | 41               | 18                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                     | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2033 Emissions                                                          | 60                                             | 397             | 618   | 1               | 34               | 11                |
| MDAQMD Threshold                                                            | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                         | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| 2048 Operations                                                             |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                      | 9                                              | 275             | 85    | 0.30            | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 162             | 56    | 0.20            | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -3                                             | -113            | -29   | -0.10           | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 48              | 17    | 0.06            | 0.84             | 0.82              |
| BIG Block Swap Yard                                                         | 4                                              | 91              | 18    | 0.06            | 3                | 2                 |
| BIG Intermodal Facility                                                     | 0.13                                           | 4               | 1     | <0.01           | 0.07             | 0.07              |
| BIG Maintenance                                                             | 0.75                                           | 6               | 0.89  | <0.01           | 0.20             | 0.19              |
| Locomotives Within BIG Footprint Subtotal                                   | 3                                              | 35              | 7     | 0.03            | 2                | 1                 |
| Mobile Sources                                                              |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                              | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                      | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -     | -               | 3                | 0.69              |

| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year) |                                                |                 |       |                 |                  |                   |
|-----------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                      | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                             | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Block Swap Yard                                                         | 1                                              | 36              | 10    | 0.04            | 1                | 1                 |
| BIG Intermodal Facility                                                     | 1.22                                           | 37              | 10    | 0.03            | 0.74             | 0.72              |
| BIG Maintenance                                                             | 0.07                                           | 1               | 0.76  | <0.01           | 0.02             | 0.02              |
| Locomotives Within BIG Footprint Subtotal                                   | 0.22                                           | 5               | 10    | 0.04            | 0.01             | 0.01              |
| Mobile Sources                                                              |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                              | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                      | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                           | 13                                             | 43              | 380   | 0.54            | 2                | 2                 |
| Area Sources                                                                | 47                                             | 0.06            | 6     | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                        | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                     | 65                                             | 71              | 492   | 1               | 46               | 13                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                              | -0.21                                          | -23             | -5    | -0.23           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                              | 311                                            | 8,075           | 2,134 | 8               | 164              | 159               |
| Rail Corridor Emissions - With BIG (within MDAB)                            | 329                                            | 8,579           | 2,282 | 8               | 172              | 167               |
| Net Rail Corridor Emissions Change (within MDAB)                            | 18                                             | 505             | 148   | 0.59            | 9                | 8                 |
| 2033 Total BIG Operational Emissions                                        | 83                                             | 553             | 635   | 2               | 41               | 18                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                     | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2033 Emissions                                                          | 59                                             | 403             | 626   | 1               | 34               | 11                |
| MDAQMD Threshold                                                            | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                         | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| 2048 Operations                                                             |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                                 |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                      | 9                                              | 275             | 85    | 0.30            | 5                | 5                 |
| Mainline (With BIG)                                                         | 5                                              | 162             | 56    | 0.20            | 3                | 3                 |
| Net Mainline (Through BIG)                                                  | -3                                             | -113            | -29   | -0.10           | -2               | -2                |
| BIG Lead Tracks                                                             | 1                                              | 48              | 17    | 0.06            | 0.84             | 0.82              |
| BIG Block Swap Yard                                                         | 1                                              | 38              | 12    | 0.04            | 1                | 1                 |
| BIG Intermodal Facility                                                     | 0.98                                           | 32              | 10    | 0.04            | 0.58             | 0.56              |
| BIG Maintenance                                                             | 0.09                                           | 1               | 1     | <0.01           | 0.02             | 0.02              |
| Locomotives Within BIG Footprint Subtotal                                   | 0.26                                           | 5               | 11    | 0.04            | 0.02             | 0.02              |
| Mobile Sources                                                              |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                              | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                      | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                  | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                                | -                                              | -               | -     | -               | 3                | 0.69              |



| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |                 |            |                 |                  |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------|------------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |            |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | VOC                                            | NO <sub>x</sub> | CO         | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Equipment Exhaust                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15                                             | 44              | 376        | 0.54            | 1                | 1                 |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 47                                             | 0.06            | 6          | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -                                              | -               | -          | -               | -                | -                 |
| <b>BIG Footprint Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>70</b>                                      | <b>402</b>      | <b>486</b> | <b>1</b>        | <b>48</b>        | <b>15</b>         |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -0.21                                          | -22             | -3         | -0.24           | -20              | -5                |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 310                                            | 8,699           | 2,697      | 10              | 156              | 152               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 326                                            | 9,173           | 2,860      | 10              | 163              | 159               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 16                                             | 474             | 163        | 0.65            | 7                | 7                 |
| <b>2048 Total BIG Operational Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>86</b>                                      | <b>553</b>      | <b>646</b> | <b>2</b>        | <b>35</b>        | <b>16</b>         |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -24                                            | -150            | -10        | -0.05           | -7               | -7                |
| <b>Net 2048 Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>62</b>                                      | <b>403</b>      | <b>636</b> | <b>2</b>        | <b>28</b>        | <b>9</b>          |
| <b>MDAQMD Threshold</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>25</b>                                      | <b>25</b>       | <b>100</b> | <b>25</b>       | <b>15</b>        | <b>12</b>         |
| <b>Threshold Exceeded?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Yes</b>                                     | <b>Yes</b>      | <b>Yes</b> | <b>No</b>       | <b>Yes</b>       | <b>No</b>         |
| <div>Notes:</div> <div><sup>1</sup> Totals may not add up due to rounding.</div> <div><sup>2</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.</div> <div><sup>3</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 14,719,796 annual TMT in 2028, approximately 18,067,338 annual TMT in 2033, and approximately 21,646,477 annual TMT in 2048; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b>.</div> <div><sup>4</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 (<b>Appendix 5.3 BIG-1, Appendix B</b>).</div> <div>Note that operational train emissions modeling was completed for future years without BIG (2028, 2033, and 2048) to establish future baseline train emissions and analyze incremental emissions increases directly attributable to BIG.</div> |                                                |                 |            |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |                 |            |                 |                  |                   |

| Table 5.3-24: Unmitigated Operational Emissions within MDAB (tons per year)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |                 |            |                 |                  |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------|------------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |            |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | VOC                                            | NO <sub>x</sub> | CO         | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Equipment Exhaust                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15                                             | 44              | 376        | 0.54            | 1                | 1                 |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 47                                             | 0.06            | 6          | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -                                              | -               | -          | -               | -                | -                 |
| <b>BIG Footprint Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>68</b>                                      | <b>72</b>       | <b>489</b> | <b>1</b>        | <b>46</b>        | <b>13</b>         |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -0.21                                          | -22             | -3         | -0.24           | -20              | -5                |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 310                                            | 8,699           | 2,697      | 10              | 156              | 152               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 326                                            | 9,173           | 2,860      | 10              | 163              | 159               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 16                                             | 474             | 163        | 0.65            | 7                | 7                 |
| <b>2048 Total BIG Operational Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>83</b>                                      | <b>524</b>      | <b>649</b> | <b>2</b>        | <b>33</b>        | <b>15</b>         |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -24                                            | -150            | -10        | -0.05           | -7               | -7                |
| <b>Net 2048 Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>59</b>                                      | <b>374</b>      | <b>639</b> | <b>2</b>        | <b>26</b>        | <b>8</b>          |
| <b>MDAQMD Threshold</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>25</b>                                      | <b>25</b>       | <b>100</b> | <b>25</b>       | <b>15</b>        | <b>12</b>         |
| <b>Threshold Exceeded?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Yes</b>                                     | <b>Yes</b>      | <b>Yes</b> | <b>No</b>       | <b>Yes</b>       | <b>No</b>         |
| <div>Notes:</div> <div><sup>1</sup> Totals may not add up due to rounding.</div> <div><sup>2</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.</div> <div><sup>3</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 14,719,796 annual TMT in 2028, approximately 18,067,338 annual TMT in 2033, and approximately 21,646,477 annual TMT in 2048; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b>.</div> <div><sup>4</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 (<b>Appendix 5.3 BIG-1, Appendix B</b>).</div> <div>Note that operational train emissions modeling was completed for future years without BIG (2028, 2033, and 2048) to establish future baseline train emissions and analyze incremental emissions increases directly attributable to BIG.</div> |                                                |                 |            |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                |                 |            |                 |                  |                   |

Draft EIR – Mitigated Operations (pounds per day)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-26, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 35.

| Table 5.3-5: Mitigated Operational Emissions within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|---------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                    | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                           | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 52                                              | 1,518           | 383    | 1               | 32               | 31                |
| Mainline (With BIG)                                                       | 30                                              | 887             | 249    | 1               | 18               | 18                |
| Net Mainline (Through BIG)                                                | -22                                             | -631            | -134   | -0.46           | -14              | -13               |
| BIG Lead Tracks                                                           | 9                                               | 261             | 74     | 0.26            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 15                                              | 338             | 66     | 0.23            | 9                | 9                 |
| BIG Intermodal Facility                                                   | 0.69                                            | 20              | 5      | 0.02            | 0.42             | 0.41              |
| BIG Maintenance                                                           | 4                                               | 27              | 4      | 0.01            | 0.98             | 0.95              |
| Locomotives Within BIG Footprint Subtotal                                 | 6                                               | 15              | 15     | 0.06            | 2                | 2                 |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 41                                              | 38              | 721    | 2               | 90               | 23                |
| Trucks                                                                    | 1                                               | 120             | 33     | 1               | 59               | 17                |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 4                | 0.91              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 7                | 1.91              |
| Equipment Exhaust                                                         | 37                                              | 75              | 244    | 0.48            | 2                | 2                 |
| Area Sources                                                              | 207                                             | <0.01           | <0.01  | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                      | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                   | 294                                             | 247             | 1,013  | 4               | 165              | 48                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                            | -1.10                                           | -120            | -29    | -1              | -74              | -21               |
| Rail Corridor Emissions – No BIG (within MDAB)                            | 1,915                                           | 48,806          | 12,310 | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                          | 2,001                                           | 51,217          | 12,984 | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>             | 86                                              | 2,412           | 675    | 3               | 40               | 39                |
| 2028 Total BIG Operational Emissions                                      | 379                                             | 2,539           | 1,659  | 5               | 131              | 66                |
| Existing Barstow Yard Switcher Replacement                                | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2028 Emissions                                                        | 248                                             | 1,719           | 1,606  | 5               | 92               | 28                |
| MDAQMD Threshold                                                          | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                       | Yes                                             | Yes             | Yes    | No              | Yes              | No                |
| 2033 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 54                                              | 1,601           | 423    | 1               | 33               | 32                |
| Mainline (With BIG)                                                       | 30                                              | 899             | 271    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                | -23                                             | 703             | -152   | -0.53           | -15              | -14               |
| BIG Lead Tracks                                                           | 9                                               | 275             | 84     | 0.30            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 16                                              | 366             | 73     | 0.26            | 10               | 10                |

Final EIR – Mitigated Operations (pounds per day)

| Table 5.3-6: Mitigated Operational Emissions within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|---------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                    | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                           | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 52                                              | 1,518           | 383    | 1               | 32               | 31                |
| Mainline (With BIG)                                                       | 30                                              | 887             | 249    | 1               | 18               | 18                |
| Net Mainline (Through BIG)                                                | -22                                             | -631            | -134   | -0.46           | -14              | -13               |
| BIG Lead Tracks                                                           | 9                                               | 261             | 74     | 0.26            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 7                                               | 213             | 58     | 0.21            | 4                | 4                 |
| BIG Intermodal Facility                                                   | 6                                               | 180             | 45     | 0.16            | 4                | 4                 |
| BIG Maintenance                                                           | 0.41                                            | 5               | 5      | 0.02            | 0.11             | 0.11              |
| Locomotives Within BIG Footprint Subtotal                                 | 1                                               | 27              | 48     | 0.18            | 0.06             | 0.05              |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 41                                              | 38              | 721    | 2               | 90               | 23                |
| Trucks                                                                    | 1                                               | 120             | 33     | 1               | 59               | 17                |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 4                | 0.91              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 7                | 1.91              |
| Equipment Exhaust                                                         | 37                                              | 75              | 244    | 0.48            | 2                | 2                 |
| Area Sources                                                              | 207                                             | <0.01           | <0.01  | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                      | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                   | 289                                             | 259             | 1,046  | 4               | 162              | 45                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                            | -1.10                                           | -120            | -29    | -1              | -74              | -21               |
| Rail Corridor Emissions – No BIG (within MDAB)                            | 1,915                                           | 48,806          | 12,310 | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                          | 2,001                                           | 51,217          | 12,984 | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>             | 86                                              | 2,412           | 675    | 3               | 40               | 39                |
| 2028 Total BIG Operational Emissions                                      | 373                                             | 2,551           | 1,692  | 5               | 128              | 64                |
| Existing Barstow Yard Switcher Replacement                                | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2028 Emissions                                                        | 243                                             | 1,731           | 1,639  | 5               | 89               | 26                |
| MDAQMD Threshold                                                          | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                       | Yes                                             | Yes             | Yes    | No              | Yes              | No                |
| 2033 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 54                                              | 1,601           | 423    | 1               | 33               | 32                |
| Mainline (With BIG)                                                       | 30                                              | 899             | 271    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                | -23                                             | 702             | -152   | -0.53           | -15              | -14               |
| BIG Lead Tracks                                                           | 9                                               | 275             | 84     | 0.30            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 7                                               | 224             | 63     | 0.22            | 4                | 4                 |

| Table 5.3-5: Mitigated Operational Emissions within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|---------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                    | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                           | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                   | 0.86                                            | 26              | 7      | 0.02            | 0.52             | 0.50              |
| BIG Maintenance                                                           | 4                                               | 27              | 4      | 0.01            | 0.98             | 0.96              |
| Locomotives Within BIG Footprint Subtotal                                 | 6                                               | 7               | 15     | 0.07            | 2                | 2                 |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 43                                              | 34              | 758    | 3               | 17               | 6                 |
| Trucks                                                                    | 2                                               | 128             | 33     | 1               | 14               | 6                 |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 5                | 1                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 9                | 2                 |
| Equipment Exhaust                                                         | 37                                              | 75              | 244    | 0.48            | 2                | 2                 |
| Area Sources                                                              | 207                                             | <0.01           | <0.01  | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                      | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                   | 295                                             | 230             | 1,051  | 4               | 49               | 20                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                            | -1                                              | -125            | -27    | -1              | -77              | -22               |
| Rail Corridor Emissions – No BIG (within MDAB)                            | 1,915                                           | 48,806          | 12,310 | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                          | 2,001                                           | 51,217          | 12,984 | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB)                          | 86                                              | 2,412           | 675    | 3               | 40               | 39                |
| 2033 Total BIG Operational Emissions                                      | 380                                             | 2,517           | 1,698  | 6               | 12               | 37                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                   | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2033 Emissions                                                        | 249                                             | 1,696           | 1,645  | 5               | 27               | 1                 |
| MDAQMD Threshold                                                          | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                       | Yes                                             | Yes             | Yes    | No              | No               | No                |
| 2048 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 53                                              | 1,704           | 529    | 2               | 31               | 30                |
| Mainline (With BIG)                                                       | 31                                              | 1,002           | 348    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                | -21                                             | -702            | -181   | -0.63           | -13              | -13               |
| BIG Lead Tracks                                                           | 9                                               | 295             | 104    | 0.37            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 25                                              | 561             | 110    | 0.39            | 16               | 15                |
| BIG Intermodal Facility                                                   | 0.69                                            | 22              | 7      | 0.02            | 0                | 0                 |
| BIG Maintenance                                                           | 5                                               | 34              | 5      | 0.02            | 1                | 1                 |
| Locomotives Within BIG Footprint Subtotal                                 | 18                                              | 211             | 45     | 0.17            | 9                | 9                 |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 33                                              | 24              | 701    | 3               | 132              | 34                |
| Trucks                                                                    | 2                                               | 132             | 26     | 1               | 92               | 26                |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 13               | 4                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 15               | 4                 |
| Equipment Exhaust                                                         | 50                                              | 82              | 249    | 0.49            | 2                | 2                 |

| Table 5.3-6: Mitigated Operational Emissions within MDAB (pounds per day) |                                                 |                 |        |                 |                  |                   |
|---------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------|-----------------|------------------|-------------------|
| Source                                                                    | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |        |                 |                  |                   |
|                                                                           | VOC                                             | NO <sub>x</sub> | CO     | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                   | 8                                               | 227             | 60     | 0.21            | 5                | 4                 |
| BIG Maintenance                                                           | 0.42                                            | 6               | 5      | 0.02            | 0.12             | 0.11              |
| Locomotives Within BIG Footprint Subtotal                                 | 1                                               | 30              | 60     | 0.22            | 0.05             | 0.04              |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 43                                              | 34              | 758    | 3               | 115              | 30                |
| Trucks                                                                    | 2                                               | 128             | 33     | 1               | 74               | 21                |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 5                | 1                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 9                | 2                 |
| Equipment Exhaust                                                         | 37                                              | 75              | 244    | 0.48            | 2                | 2                 |
| Area Sources                                                              | 207                                             | <0.01           | <0.01  | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                      | -                                               | -               | -      | -               | -                | -                 |
| BIG Footprint Emissions                                                   | 290                                             | 267             | 1,095  | 4               | 47               | 18                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                            | -1                                              | -125            | -27    | -1              | -77              | -22               |
| Rail Corridor Emissions – No BIG (within MDAB)                            | 1,915                                           | 48,806          | 12,310 | 43              | 1,020            | 990               |
| Rail Corridor Emissions - With BIG (within MDAB)                          | 2,001                                           | 51,217          | 12,984 | 46              | 1,061            | 1,029             |
| Net Rail Corridor Emissions Change (within MDAB)                          | 86                                              | 2,412           | 675    | 3               | 40               | 39                |
| 2033 Total BIG Operational Emissions                                      | 375                                             | 2,554           | 1,742  | 6               | 169              | 74                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                   | -131                                            | -821            | -53    | -0.26           | -39              | -38               |
| Net 2033 Emissions                                                        | 245                                             | 1,733           | 1,690  | 6               | 29               | 3                 |
| MDAQMD Threshold                                                          | 137                                             | 137             | 548    | 137             | 82               | 65                |
| Threshold Exceeded?                                                       | Yes                                             | Yes             | Yes    | No              | No               | No                |
| 2048 Operations                                                           |                                                 |                 |        |                 |                  |                   |
| Locomotives (BIG Footprint)                                               |                                                 |                 |        |                 |                  |                   |
| Mainline (Without BIG)                                                    | 53                                              | 1,704           | 529    | 2               | 31               | 30                |
| Mainline (With BIG)                                                       | 31                                              | 1,002           | 348    | 1               | 18               | 17                |
| Net Mainline (Through BIG)                                                | -21                                             | -702            | -181   | -0.63           | -13              | -13               |
| BIG Lead Tracks                                                           | 9                                               | 295             | 104    | 0.37            | 5                | 5                 |
| BIG Block Swap Yard                                                       | 7                                               | 232             | 77     | 0.27            | 4                | 4                 |
| BIG Intermodal Facility                                                   | 5                                               | 174             | 54     | 0.19            | 3                | 3                 |
| BIG Maintenance                                                           | 1                                               | 7               | 6      | 0.02            | 0.13             | 0.13              |
| Locomotives Within BIG Footprint Subtotal                                 | 1                                               | 7               | 60     | 0.23            | -0.31            | -0.31             |
| Mobile Sources                                                            |                                                 |                 |        |                 |                  |                   |
| Passenger Cars                                                            | 33                                              | 24              | 701    | 3               | 132              | 34                |
| Trucks                                                                    | 2                                               | 132             | 26     | 1               | 92               | 26                |
| On-site Dust – Passenger Cars <sup>2</sup>                                | -                                               | -               | -      | -               | 13               | 4                 |
| On-site Dust – Trucks/Equipment <sup>2</sup>                              | -                                               | -               | -      | -               | 15               | 4                 |
| Equipment Exhaust                                                         | 50                                              | 82              | 249    | 0.49            | 2                | 2                 |

| Table 5.3-5: Mitigated Operational Emissions within MDAB (pounds per day)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                 |                 |              |                 |                  |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |              |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VOC                                             | NO <sub>x</sub> | CO           | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 207                                             | <0.01           | <0.01        | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -                                               | -               | -            | -               | -                | -                 |
| <b>BIG Footprint Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>311</b>                                      | <b>449</b>      | <b>1,021</b> | <b>5</b>        | <b>264</b>       | <b>78</b>         |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -1                                              | -122            | -16          | -1              | -108             | -30               |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1,919                                           | 53,861          | 16,699       | 59              | 969              | 940               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2,016                                           | 56,795          | 17,706       | 63              | 1,012            | 981               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 96                                              | 2,934           | 1,007        | 4               | 43               | 42                |
| <b>2048 Total BIG Operational Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>406</b>                                      | <b>3,261</b>    | <b>2,012</b> | <b>7</b>        | <b>198</b>       | <b>90</b>         |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -131                                            | -821            | -53          | -0.26           | -39              | -38               |
| <b>Net 2048 Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>275</b>                                      | <b>2,441</b>    | <b>1,959</b> | <b>7</b>        | <b>159</b>       | <b>52</b>         |
| <b>MDAQMD Threshold</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>137</b>                                      | <b>137</b>      | <b>548</b>   | <b>137</b>      | <b>82</b>        | <b>65</b>         |
| <b>Threshold Exceeded?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Yes</b>                                      | <b>Yes</b>      | <b>Yes</b>   | <b>No</b>       | <b>Yes</b>       | <b>No</b>         |
| <sup>1</sup> Totals may not add up due to rounding.<br><sup>2</sup> Mitigation measures include <b>MM BIG AQ-7</b> ( <del>sweeping paved areas</del> ), <b>MM BIG AQ-8</b> ( <del>Tier 4 Switchers</del> ), <b>MM BIG AQ-9</b> ( <del>Replace Tier 1+ locomotives</del> ), and <b>MM BIG AQ-10</b> ( <del>renewable diesel RTG cranes</del> ).<br><sup>3</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.<br><sup>4</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048 from regional roadways; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b> .<br><sup>5</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 ( <b>Appendix 5.3 BIG-1, Appendix B</b> ). |                                                 |                 |              |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 |                 |              |                 |                  |                   |

| Table 5.3-6: Mitigated Operational Emissions within MDAB (pounds per day)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |                 |              |                 |                  |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Pollutant (Maximum Pounds per Day) <sup>1</sup> |                 |              |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | VOC                                             | NO <sub>x</sub> | CO           | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 207                                             | <0.01           | <0.01        | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                                               | -               | -            | -               | -                | -                 |
| <b>BIG Footprint Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>293</b>                                      | <b>245</b>      | <b>1,036</b> | <b>5</b>        | <b>254</b>       | <b>69</b>         |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -1                                              | -122            | -16          | -1              | -108             | -30               |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,919                                           | 53,861          | 16,699       | 59              | 969              | 940               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2,016                                           | 56,795          | 17,706       | 63              | 1,012            | 981               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 96                                              | 2,934           | 1,007        | 4               | 43               | 42                |
| <b>2048 Total BIG Operational Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>389</b>                                      | <b>3,057</b>    | <b>2,027</b> | <b>7</b>        | <b>188</b>       | <b>81</b>         |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -131                                            | -821            | -53          | -0.26           | -39              | -38               |
| <b>Net 2048 Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>258</b>                                      | <b>2,236</b>    | <b>1,974</b> | <b>7</b>        | <b>149</b>       | <b>43</b>         |
| <b>MDAQMD Threshold</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>137</b>                                      | <b>137</b>      | <b>548</b>   | <b>137</b>      | <b>82</b>        | <b>65</b>         |
| <b>Threshold Exceeded?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Yes</b>                                      | <b>Yes</b>      | <b>Yes</b>   | <b>No</b>       | <b>Yes</b>       | <b>No</b>         |
| <sup>1</sup> Totals may not add up due to rounding.<br><sup>2</sup> Mitigation measures include <b>MM BIG AQ-7</b> , <b>MM BIG AQ-8</b> , <b>MM BIG AQ-9</b> , and <b>MM BIG AQ-10</b> .<br><sup>3</sup> Includes fugitive dust, break wear, and tire wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.<br><sup>4</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048 from regional roadways; See <b>Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis</b> .<br><sup>5</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 ( <b>Appendix 5.3 BIG-1, Appendix B</b> ). |                                                 |                 |              |                 |                  |                   |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |                 |              |                 |                  |                   |

Draft EIR – Mitigated Operations (tons per year)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-27, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 36.

| Table 5.3-7: Mitigated Operational Emissions Within MDAB (tons per year) |                                                |                 |                 |                     |                  |                   |
|--------------------------------------------------------------------------|------------------------------------------------|-----------------|-----------------|---------------------|------------------|-------------------|
| Source                                                                   | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |                 |                     |                  |                   |
|                                                                          | VOC                                            | NO <sub>x</sub> | CO              | SO <sub>2</sub>     | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                          |                                                |                 |                 |                     |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |                 |                     |                  |                   |
| Mainline (Without BIG)                                                   | 8                                              | 245             | 62              | 0.22                | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 143             | 40              | 0.14                | 3                | 3                 |
| <b>Net Mainline (Through BIG)</b>                                        | -3                                             | -102            | -22             | -0.07               | -2               | -2                |
| BIG Lead Tracks                                                          | 1                                              | 42              | 12              | 0.04                | 0.87             | 0.84              |
| BIG Block Swap Yard                                                      | <del>2</del>                                   | <del>55</del>   | <del>11</del>   | <del>0.04</del>     | <del>1.47</del>  | <del>1.42</del>   |
| BIG Intermodal Facility                                                  | <del>0.11</del>                                | <del>3</del>    | <del>0.83</del> | <del>&lt;0.01</del> | <del>0.07</del>  | <del>0.07</del>   |
| BIG Maintenance                                                          | <del>0.59</del>                                | <del>4</del>    | <del>0.66</del> | <0.01               | <del>0.16</del>  | <del>0.15</del>   |
| <b>Locomotives Within BIG Footprint Subtotal</b>                         | <del>1</del>                                   | <del>2</del>    | <del>3</del>    | <del>0.01</del>     | <del>0.38</del>  | <del>0.36</del>   |
| Mobile Sources                                                           |                                                |                 |                 |                     |                  |                   |
| Passenger Cars                                                           | 6                                              | 5               | 96              | 0.32                | 16               | 4                 |
| Trucks                                                                   | 0.23                                           | 18              | 5               | 0.16                | 11               | 3                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -               | -                   | 0.67             | 0.17              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -               | -                   | 1                | 0.32              |
| Equipment Exhaust                                                        | 4.82                                           | 7               | 8               | 0.02                | 0.17             | 0.16              |
| Area Sources                                                             | 38                                             | <0.01           | <0.01           | <0.01               | <0.01            | <0.01             |
| Energy (Natural Gas)                                                     | -                                              | -               | -               | -                   | -                | -                 |
| <b>BIG Footprint Emissions</b>                                           | <del>50</del>                                  | <del>33</del>   | <del>112</del>  | <del>0.52</del>     | <del>29</del>    | <del>8</del>      |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                           | -0.20                                          | -22             | -5              | -0.21               | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                           | 309                                            | 7,882           | 1,988           | 7                   | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                         | 323                                            | 8,272           | 2,097           | 7                   | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>            | 14                                             | 389             | 109             | 0                   | 6                | 6                 |
| <b>2028 Total BIG Operational Emissions</b>                              | <del>64</del>                                  | <del>400</del>  | <del>215</del>  | <del>0.75</del>     | <del>22</del>    | <del>11</del>     |
| Existing Barstow Yard Switcher Replacement                               | -24                                            | -150            | -10             | -0.05               | -7               | -7                |
| <b>Net 2028 Emissions</b>                                                | <del>40</del>                                  | <del>250</del>  | <del>206</del>  | <del>0.70</del>     | <del>15</del>    | <del>4</del>      |
| <b>MDAQMD Threshold</b>                                                  | <b>25</b>                                      | <b>25</b>       | <b>100</b>      | <b>25</b>           | <b>15</b>        | <b>12</b>         |
| <b>Threshold Exceeded?</b>                                               | <b>Yes</b>                                     | <b>Yes</b>      | <b>Yes</b>      | <b>No</b>           | <b>Yes</b>       | <b>No</b>         |
| 2033 Operations                                                          |                                                |                 |                 |                     |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |                 |                     |                  |                   |
| Mainline (Without BIG)                                                   | 9                                              | 259             | 68              | 0.24                | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 145             | 44              | 0.16                | 3                | 3                 |
| <b>Net Mainline (Through BIG)</b>                                        | -4                                             | -113            | -25             | -0.09               | -2               | -2                |
| BIG Lead Tracks                                                          | 1                                              | 44              | 14              | 0.05                | 0.89             | 0.86              |
| BIG Block Swap Yard                                                      | <del>3</del>                                   | <del>59</del>   | <del>12</del>   | 0.04                | <del>2</del>     | <del>2</del>      |

Final EIR – Mitigated Operations (tons per year)

| Table 5.3-8: Mitigated Operational Emissions Within MDAB (tons per year) |                                                |                 |            |                 |                  |                   |
|--------------------------------------------------------------------------|------------------------------------------------|-----------------|------------|-----------------|------------------|-------------------|
| Source                                                                   | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |            |                 |                  |                   |
|                                                                          | VOC                                            | NO <sub>x</sub> | CO         | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| 2028 Operations                                                          |                                                |                 |            |                 |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |            |                 |                  |                   |
| Mainline (Without BIG)                                                   | 8                                              | 245             | 62         | 0.22            | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 143             | 40         | 0.14            | 3                | 3                 |
| <b>Net Mainline (Through BIG)</b>                                        | -3                                             | -102            | -22        | -0.07           | -2               | -2                |
| BIG Lead Tracks                                                          | 1                                              | 42              | 12         | 0.04            | 0.87             | 0.84              |
| BIG Block Swap Yard                                                      | 1                                              | 34              | 9          | 0.03            | 0.71             | 0.69              |
| BIG Intermodal Facility                                                  | 0.99                                           | 29              | 7          | 0.03            | 0.60             | 0.58              |
| BIG Maintenance                                                          | 0.07                                           | 1               | 0.75       | <0.01           | 0.02             | 0.02              |
| <b>Locomotives Within BIG Footprint Subtotal</b>                         | <b>0.20</b>                                    | <b>4</b>        | <b>8</b>   | <b>0.03</b>     | <b>0.01</b>      | <b>0.01</b>       |
| Mobile Sources                                                           |                                                |                 |            |                 |                  |                   |
| Passenger Cars                                                           | 6                                              | 5               | 96         | 0.32            | 16               | 4                 |
| Trucks                                                                   | 0.23                                           | 18              | 5          | 0.16            | 11               | 3                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -          | -               | 0.67             | 0.17              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -          | -               | 1                | 0.32              |
| Equipment Exhaust                                                        | 4.82                                           | 7               | 8          | 0.02            | 0.17             | 0.16              |
| Area Sources                                                             | 38                                             | <0.01           | <0.01      | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                     | -                                              | -               | -          | -               | -                | -                 |
| <b>BIG Footprint Emissions</b>                                           | <b>49</b>                                      | <b>35</b>       | <b>117</b> | <b>0.54</b>     | <b>29</b>        | <b>8</b>          |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                           | -0.20                                          | -22             | -5         | -0.21           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                           | 309                                            | 7,882           | 1,988      | 7               | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                         | 323                                            | 8,272           | 2,097      | 7               | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>            | 14                                             | 389             | 109        | 0               | 6                | 6                 |
| <b>2028 Total BIG Operational Emissions</b>                              | <b>63</b>                                      | <b>402</b>      | <b>221</b> | <b>0.76</b>     | <b>22</b>        | <b>10</b>         |
| Existing Barstow Yard Switcher Replacement                               | -24                                            | -150            | -10        | -0.05           | -7               | -7                |
| <b>Net 2028 Emissions</b>                                                | <b>39</b>                                      | <b>252</b>      | <b>211</b> | <b>0.72</b>     | <b>15</b>        | <b>3</b>          |
| <b>MDAQMD Threshold</b>                                                  | <b>25</b>                                      | <b>25</b>       | <b>100</b> | <b>25</b>       | <b>15</b>        | <b>12</b>         |
| <b>Threshold Exceeded?</b>                                               | <b>Yes</b>                                     | <b>Yes</b>      | <b>Yes</b> | <b>No</b>       | <b>Yes</b>       | <b>No</b>         |
| 2033 Operations                                                          |                                                |                 |            |                 |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |            |                 |                  |                   |
| Mainline (Without BIG)                                                   | 9                                              | 259             | 68         | 0.24            | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 145             | 44         | 0.16            | 3                | 3                 |
| <b>Net Mainline (Through BIG)</b>                                        | -4                                             | -113            | -25        | -0.09           | -2               | -2                |
| BIG Lead Tracks                                                          | 1                                              | 44              | 14         | 0.05            | 0.89             | 0.86              |
| BIG Block Swap Yard                                                      | 1                                              | 36              | 10         | 0.04            | 1                | 1                 |

| Table 5.3-7: Mitigated Operational Emissions Within MDAB (tons per year) |                                                |                 |       |                 |                  |                   |
|--------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                   | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                          | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                  | 0.14                                           | 4               | 1     | <0.01           | 0.08             | 0.08              |
| BIG Maintenance                                                          | 0.59                                           | 4               | 0.67  | <0.01           | 0.16             | 0.15              |
| Locomotives Within BIG Footprint Subtotal                                | 1                                              | 1               | 2     | 0.01            | 0.35             | 0.34              |
| Mobile Sources                                                           |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                           | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                   | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                        | 4.82                                           | 7               | 8     | 0.02            | 0.17             | 0.16              |
| Area Sources                                                             | 38                                             | <0.01           | <0.01 | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                     | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                  | 49                                             | 29              | 107   | 0.62            | 45               | 12                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                           | -0.21                                          | -23             | -5    | -0.23           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                           | 309                                            | 7,882           | 1,988 | 7               | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                         | 323                                            | 8,272           | 2,097 | 7               | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB)                         | 14                                             | 389             | 109   | 0.44            | 6                | 6                 |
| 2033 Total BIG Operational Emissions                                     | 63                                             | 396             | 211   | 1               | 38               | 15                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                  | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2033 Emissions                                                       | 39                                             | 246             | 201   | 0.79            | 31               | 8                 |
| MDAQMD Threshold                                                         | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                      | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| 2048 Operations                                                          |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                   | 9                                              | 275             | 85    | 0.30            | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 162             | 56    | 0.20            | 3                | 3                 |
| Net Mainline (Through BIG)                                               | -3                                             | -113            | -29   | -0.10           | -2.09            | -2                |
| BIG Lead Tracks                                                          | 1                                              | 48              | 17    | 0.06            | 0.84             | 0.82              |
| BIG Block Swap Yard                                                      | 4                                              | 91              | 18    | 0.06            | 3                | 2                 |
| BIG Intermodal Facility                                                  | 0.13                                           | 4               | 1     | <0.01           | 0.07             | 0.07              |
| BIG Maintenance                                                          | 0.75                                           | 6               | 1     | <0.01           | 0.20             | 0.19              |
| Locomotives Within BIG Footprint Subtotal                                | 3                                              | 35              | 7     | 0.03            | 2                | 1                 |
| Mobile Sources                                                           |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                           | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                   | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                        | 7.12                                           | 8               | 9     | 0.02            | 0.11             | 0.11              |

| Table 5.3-8: Mitigated Operational Emissions Within MDAB (tons per year) |                                                |                 |       |                 |                  |                   |
|--------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                   | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                          | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| BIG Intermodal Facility                                                  | 1.22                                           | 37              | 10    | 0.03            | 0.74             | 0.72              |
| BIG Maintenance                                                          | 0.07                                           | 1               | 0.76  | <0.01           | 0.02             | 0.02              |
| Locomotives Within BIG Footprint Subtotal                                | 0.22                                           | 5               | 10    | 0.04            | 0.01             | 0.01              |
| Mobile Sources                                                           |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                           | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                   | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                        | 4.82                                           | 7               | 8     | 0.02            | 0.17             | 0.16              |
| Area Sources                                                             | 38                                             | <0.01           | <0.01 | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                     | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                  | 48                                             | 35              | 114   | 0.65            | 45               | 12                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                           | -0.21                                          | -23             | -5    | -0.23           | -14              | -4                |
| Rail Corridor Emissions – No BIG (within MDAB)                           | 309                                            | 7,882           | 1,988 | 7               | 165              | 160               |
| Rail Corridor Emissions - With BIG (within MDAB)                         | 323                                            | 8,272           | 2,097 | 7               | 171              | 166               |
| Net Rail Corridor Emissions Change (within MDAB)                         | 14                                             | 389             | 109   | 0.44            | 6                | 6                 |
| 2033 Total BIG Operational Emissions                                     | 62                                             | 402             | 218   | 1               | 37               | 14                |
| Existing Barstow Yard Switcher Replacement <sup>5</sup>                  | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2033 Emissions                                                       | 38                                             | 252             | 209   | 0.81            | 30               | 7                 |
| MDAQMD Threshold                                                         | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                      | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| 2048 Operations                                                          |                                                |                 |       |                 |                  |                   |
| Locomotives (BIG Footprint)                                              |                                                |                 |       |                 |                  |                   |
| Mainline (Without BIG)                                                   | 9                                              | 275             | 85    | 0.30            | 5                | 5                 |
| Mainline (With BIG)                                                      | 5                                              | 162             | 56    | 0.20            | 3                | 3                 |
| Net Mainline (Through BIG)                                               | -3                                             | -113            | -29   | -0.10           | -2.09            | -2                |
| BIG Lead Tracks                                                          | 1                                              | 48              | 17    | 0.06            | 0.84             | 0.82              |
| BIG Block Swap Yard                                                      | 1                                              | 38              | 12    | 0.04            | 1                | 1                 |
| BIG Intermodal Facility                                                  | 0.98                                           | 32              | 10    | 0.04            | 0.58             | 0.56              |
| BIG Maintenance                                                          | 0.09                                           | 1               | 1     | <0.01           | 0.02             | 0.02              |
| Locomotives Within BIG Footprint Subtotal                                | 0.26                                           | 5               | 11    | 0.04            | 0.02             | 0.02              |
| Mobile Sources                                                           |                                                |                 |       |                 |                  |                   |
| Passenger Cars                                                           | 5                                              | 3               | 92    | 0.40            | 24               | 6                 |
| Trucks                                                                   | 0.28                                           | 20              | 4     | 0.20            | 16               | 5                 |
| On-site Dust – Passenger Cars <sup>2</sup>                               | -                                              | -               | -     | -               | 2                | 0.62              |
| On-site Dust – Trucks/Equipment <sup>2</sup>                             | -                                              | -               | -     | -               | 3                | 0.69              |
| Equipment Exhaust                                                        | 7.12                                           | 8               | 9     | 0.02            | 0.11             | 0.11              |



| Table 5.3-7: Mitigated Operational Emissions Within MDAB (tons per year)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                |                 |       |                 |                  |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 35.74                                          | <0.01           | <0.01 | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 51                                             | 66              | 113   | 0.64            | 46               | 13                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -0.21                                          | -22             | -3    | -0.24           | -20              | -5                |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 310                                            | 8,699           | 2,697 | 10              | 156              | 152               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 326                                            | 9,173           | 2,860 | 10              | 163              | 159               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 16                                             | 474             | 163   | 1               | 7                | 7                 |
| 2048 Total BIG Operational Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 67                                             | 518             | 273   | 1               | 34               | 15                |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2048 Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 43                                             | 368             | 263   | 1               | 26               | 8                 |
| MDAQMD Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| <sup>1</sup> Totals may not add up due to rounding.<br><sup>2</sup> Mitigation measures include MM BIG AQ-7 (sweeping paved areas), MM BIG AQ-8 (Tier 4 Switchers), MM BIG AQ-9 (Replace Tier 1+ locomotives), and MM BIG AQ-10 (renewable diesel RTG cranes).<br><sup>3</sup> Includes fugitive dust, break wear, and tier wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.<br><sup>4</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048; See Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis.<br><sup>5</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 (Appendix 5.3 BIG-1, Appendix B). |                                                |                 |       |                 |                  |                   |
| Source: Refer to Appendix 5.3 BIG-1: Air Quality Technical Report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |                 |       |                 |                  |                   |

| Table 5.3-8: Mitigated Operational Emissions Within MDAB (tons per year)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                |                 |       |                 |                  |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------|-------|-----------------|------------------|-------------------|
| Source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Pollutant (Maximum Tons per Year) <sup>1</sup> |                 |       |                 |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | VOC                                            | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Area Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 35.74                                          | <0.01           | <0.01 | <0.01           | <0.01            | <0.01             |
| Energy (Natural Gas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -                                              | -               | -     | -               | -                | -                 |
| BIG Footprint Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 49                                             | 36              | 116   | 0.66            | 45               | 12                |
| Reduced TMT Emissions (MDAB Only) <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -0.21                                          | -22             | -3    | -0.24           | -20              | -5                |
| Rail Corridor Emissions – No BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 310                                            | 8,699           | 2,697 | 10              | 156              | 152               |
| Rail Corridor Emissions - With BIG (within MDAB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 326                                            | 9,173           | 2,860 | 10              | 163              | 159               |
| Net Rail Corridor Emissions Change (within MDAB) <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16                                             | 474             | 163   | 1               | 7                | 7                 |
| 2048 Total BIG Operational Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 64                                             | 488             | 276   | 1               | 32               | 13                |
| Existing Barstow Yard Switcher Replacement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -24                                            | -150            | -10   | -0.05           | -7               | -7                |
| Net 2048 Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40                                             | 338             | 266   | 1               | 25               | 6                 |
| MDAQMD Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25                                             | 25              | 100   | 25              | 15               | 12                |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                            | Yes             | Yes   | No              | Yes              | No                |
| <sup>1</sup> Totals may not add up due to rounding.<br><sup>2</sup> Mitigation measures include MM BIG AQ-7, MM BIG AQ-8, MM BIG AQ-9, and MM BIG AQ-10.<br><sup>3</sup> Includes fugitive dust, break wear, and tier wear from fleet vehicles, on-site passenger cars, heavy-duty trucks, and cargo-handling equipment.<br><sup>4</sup> BIG would improve goods movement and supply chain efficiency by transporting more containers with trains to reduce approximately 40,328 TMT per day in 2028, approximately 49,500 TMT per day in 2033, and approximately 59,305 TMT per day in 2048; See Appendix 5.15 BIG-1: Barstow International Gateway CEQA Assessment – Transportation Analysis.<br><sup>5</sup> MDAB only Corridor emissions per EnSafe, BNSF Barstow International Gateway Corridor Emissions Analysis, October 2025 (Appendix 5.3 BIG-1, Appendix B). |                                                |                 |       |                 |                  |                   |
| Source: Refer to Appendix 5.3 BIG-1: Air Quality Technical Report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                |                 |       |                 |                  |                   |

Draft EIR – Unmitigated Concentrations (Operations)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-30, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 39.

| Table 5.3-9: Maximum Off-Site Concentration from Operations (Unmitigated) |                        |                                                    |                                               |                                          |                                |                                  |
|---------------------------------------------------------------------------|------------------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                 | Averaging Time         | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
| 2028 Operations                                                           |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                              | 1-hour                 | 97.82                                              | 117.42                                        | 215.24                                   | 339 (State)                    | No                               |
|                                                                           | 1-hour <sup>4, 5</sup> | 60.74                                              | 102.24                                        | 162.98                                   | 188 (federal)                  | No                               |
|                                                                           | Annual                 | 2.91                                               | 26.35                                         | 29.25                                    | 57 (State)                     | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                        | 1-hour                 | 509                                                | 6,256                                         | 6,765                                    | 23,000 (State)                 | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                           | 8-hour                 | 204                                                | 5,631                                         | 5,835                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                             | 24-hour                | 1.03                                               | --                                            | 1.03                                     | 5 (federal)                    | No                               |
|                                                                           | Annual                 | 0.32                                               | --                                            | 0.32                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                            | 24-hour                | 0.49                                               | --                                            | 0.49                                     | 1.2 (federal)                  | No                               |
|                                                                           | Annual                 | 0.18                                               | --                                            | 0.18                                     | 0.3 (federal)                  | No                               |
| 2033 Operations                                                           |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                              | 1-hour                 | 102.09                                             | 117.42                                        | 219.52                                   | 339 (State)                    | No                               |
|                                                                           | 1-hour <sup>4, 5</sup> | 72.03                                              | 102.87                                        | 174.27                                   | 188 (federal)                  | No                               |
|                                                                           | Annual                 | 3.26                                               | 26.35                                         | 29.60                                    | 57 (State)                     | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                        | 1-hour                 | 510                                                | 6,256                                         | 6,766                                    | 23,000 (State)                 | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                           | 8-hour                 | 205                                                | 5,631                                         | 5,835                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                             | 24-hour                | 1.21                                               | --                                            | 1.21                                     | 5 (federal)                    | No                               |
|                                                                           | Annual                 | 0.38                                               | --                                            | 0.38                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                            | 24-hour                | 0.53                                               | --                                            | 0.53                                     | 1.2 (federal)                  | No                               |
|                                                                           | Annual                 | 0.19                                               | --                                            | 0.19                                     | 0.3 (federal)                  | No                               |
| 2048 Operations                                                           |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                              | 1-hour                 | 123.57                                             | 117.42                                        | 241.00                                   | 339 (State)                    | No                               |
|                                                                           | 1-hour <sup>4, 5</sup> | 88.70                                              | 102.24                                        | 190.95                                   | 188 (federal)                  | Yes                              |
|                                                                           | Annual                 | 4.16                                               | 26.35                                         | 30.51                                    | 57 (State)                     | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                        | 1-hour                 | 509                                                | 6,256                                         | 6,765                                    | 23,000 (State)                 | No                               |
|                                                                           |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                           | 8-hour                 | 203                                                | 5,631                                         | 5,834                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                             | 24-hour                | 1.89                                               | --                                            | 1.89                                     | 5 (federal)                    | No                               |
|                                                                           | Annual                 | 0.61                                               | --                                            | 0.61                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                            | 24-hour                | 0.80                                               | --                                            | 0.80                                     | 1.2 (federal)                  | No                               |

Final EIR – Unmitigated Concentrations (Operations)

| Table 5.3-10: Maximum Off-Site Concentration from Operations (Unmitigated) |                        |                                                    |                                               |                                          |                                |                                  |
|----------------------------------------------------------------------------|------------------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                  | Averaging Time         | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
| 2028 Operations                                                            |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                               | 1-hour                 | 98.35                                              | 117.42                                        | 215.78                                   | 339 (State)                    | No                               |
|                                                                            | 1-hour <sup>4, 5</sup> | 59.38                                              | 102.24                                        | 161.63                                   | 188 (federal)                  | No                               |
|                                                                            | Annual                 | 2.67                                               | 26.35                                         | 29.02                                    | 57 (State)                     | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                         | 1-hour                 | 512                                                | 6,256                                         | 6,768                                    | 23,000 (State)                 | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                            | 8-hour                 | 205                                                | 5,631                                         | 5,835                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                              | 24-hour                | 0.71                                               | --                                            | 0.71                                     | 5 (federal)                    | No                               |
|                                                                            | Annual                 | 0.17                                               | --                                            | 0.17                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                             | 24-hour                | 0.31                                               | --                                            | 0.31                                     | 1.2 (federal)                  | No                               |
|                                                                            | Annual                 | 0.09                                               | --                                            | 0.09                                     | 0.3 (federal)                  | No                               |
| 2033 Operations                                                            |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                               | 1-hour                 | 104.36                                             | 117.42                                        | 221.79                                   | 339 (State)                    | No                               |
|                                                                            | 1-hour <sup>4, 5</sup> | 71.59                                              | 102.87                                        | 173.84                                   | 188 (federal)                  | No                               |
|                                                                            | Annual                 | 3.06                                               | 26.35                                         | 29.41                                    | 57 (State)                     | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                         | 1-hour                 | 514                                                | 6,256                                         | 6,770                                    | 23,000 (State)                 | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                            | 8-hour                 | 205                                                | 5,631                                         | 5,836                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                              | 24-hour                | 0.83                                               | --                                            | 0.83                                     | 5 (federal)                    | No                               |
|                                                                            | Annual                 | 0.20                                               | --                                            | 0.20                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                             | 24-hour                | 0.36                                               | --                                            | 0.36                                     | 1.2 (federal)                  | No                               |
|                                                                            | Annual                 | 0.11                                               | --                                            | 0.11                                     | 0.3 (federal)                  | No                               |
| 2048 Operations                                                            |                        |                                                    |                                               |                                          |                                |                                  |
| NO <sub>2</sub> <sup>4</sup>                                               | 1-hour                 | 108.25                                             | 117.42                                        | 225.68                                   | 339 (State)                    | No                               |
|                                                                            | 1-hour <sup>4, 5</sup> | 74.32                                              | 102.24                                        | 176.56                                   | 188 (federal)                  | No                               |
|                                                                            | Annual                 | 3.06                                               | 26.35                                         | 29.41                                    | 57 (State)                     | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 100 (federal)                  | No                               |
| CO                                                                         | 1-hour                 | 510                                                | 6,256                                         | 6,766                                    | 23,000 (State)                 | No                               |
|                                                                            |                        |                                                    |                                               |                                          | 40,000 (federal)               | No                               |
|                                                                            | 8-hour                 | 203                                                | 5,631                                         | 5,834                                    | 10,000 (State/fed)             | No                               |
| PM <sub>10</sub> <sup>6</sup>                                              | 24-hour                | 1.07                                               | --                                            | 1.07                                     | 5 (federal)                    | No                               |
|                                                                            | Annual                 | 0.29                                               | --                                            | 0.29                                     | 1 (federal)                    | No                               |
| PM <sub>2.5</sub> <sup>6</sup>                                             | 24-hour                | 0.38                                               | --                                            | 0.38                                     | 1.2 (federal)                  | No                               |



| Table 5.3-9: Maximum Off-Site Concentration from Operations (Unmitigated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |                                                    |                                               |                                          |                                |                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Averaging Time | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Annual         | 0.29                                               | --                                            | 0.29                                     | 0.3 (federal)                  | No                               |
| <div>Notes:</div> <div><sup>1</sup> Background concentrations are from the Barstow Monitoring Station (2022 – 2024). Note that CO is no longer monitored and the above data is the latest available (2019 – 2021).</div> <div><sup>2</sup> Ambient air quality thresholds are the NAAQS and CAAQS provided in Error! Reference source not found.. All thresholds are shown in micrograms per cubic meter (µg/m³) for comparison to modeled concentrations.</div> <div><sup>3</sup> Exceedances of the NAAQS and CAAQS are indicated in <b>bold</b>.</div> <div><sup>4</sup> NO<sub>2</sub> concentrations were calculated per Tier 2 ARM2 ratios in U.S. EPA’s 40 CFR Part 51 Appendix W, § 4.2.3.4. Conversion of NO<sub>x</sub> to NO<sub>2</sub> use U.S. EPA minimum and maximum default values NO<sub>2</sub>/NO<sub>x</sub> of 0.5 and 0.9, respectively.</div> <div><sup>5</sup> This comparison is to the federal NAAQS, which is a 98<sup>th</sup> percentile threshold. The background concentration is the 3-year average of the 8<sup>th</sup> highest daily maximum 1-hour concentration, over the years 2022, 2023, and 2024.</div> <div><sup>6</sup> The thresholds for PM<sub>10</sub> and PM<sub>2.5</sub> are incremental thresholds; therefore, the incremental concentration without background is compared to the threshold.</div> <div><sup>7</sup> The Barstow Yard switcher replacement was conservatively not considered in the NAAQS and CAAQS modeling for the unmitigated project. Unlike the HRA, the NAAQS and CAAQS modeling is the max concentration at the fenceline and the switcher replacement would not substantially change the BIG concentrations.</div> |                |                                                    |                                               |                                          |                                |                                  |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                                                    |                                               |                                          |                                |                                  |

| Table 5.3-10: Maximum Off-Site Concentration from Operations (Unmitigated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                                                    |                                               |                                          |                                |                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Averaging Time | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Annual         | 0.12                                               | --                                            | 0.12                                     | 0.3 (federal)                  | No                               |
| <div>Notes:</div> <div><sup>1</sup> Background concentrations are from the Barstow Monitoring Station (2022 – 2024). Note that CO is no longer monitored and the above data is the latest available (2019 – 2021).</div> <div><sup>2</sup> Ambient air quality thresholds are the NAAQS and CAAQS provided in Error! Reference source not found.. All thresholds are shown in micrograms per cubic meter (µg/m³) for comparison to modeled concentrations.</div> <div><sup>3</sup> Exceedances of the NAAQS and CAAQS are indicated in <b>bold</b>.</div> <div><sup>4</sup> NO<sub>2</sub> concentrations were calculated per Tier 2 ARM2 ratios in U.S. EPA’s 40 CFR Part 51 Appendix W, § 4.2.3.4. Conversion of NO<sub>x</sub> to NO<sub>2</sub> use U.S. EPA minimum and maximum default values NO<sub>2</sub>/NO<sub>x</sub> of 0.5 and 0.9, respectively.</div> <div><sup>5</sup> This comparison is to the federal NAAQS, which is a 98<sup>th</sup> percentile threshold. The background concentration is the 3-year average of the 8<sup>th</sup> highest daily maximum 1-hour concentration, over the years 2022, 2023, and 2024.</div> <div><sup>6</sup> The thresholds for PM<sub>10</sub> and PM<sub>2.5</sub> are incremental thresholds; therefore, the incremental concentration without background is compared to the threshold.</div> <div><sup>7</sup> The Barstow Yard switcher replacement was conservatively not considered in the NAAQS and CAAQS modeling for the unmitigated project. Unlike the HRA, the NAAQS and CAAQS modeling is the max concentration at the fenceline and the switcher replacement would not substantially change the BIG concentrations.</div> |                |                                                    |                                               |                                          |                                |                                  |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                                                    |                                               |                                          |                                |                                  |

Draft EIR – Mitigated Concentrations (Operations)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-31, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 40.

| Table 5.3-11: Maximum Off-Site Concentration from Operations (Mitigated) |                |                                         |                                   |                                          |                    |                      |
|--------------------------------------------------------------------------|----------------|-----------------------------------------|-----------------------------------|------------------------------------------|--------------------|----------------------|
| Pollutant                                                                | Averaging Time | Maximum Modeled Concentration (µg/m³) 7 | Background Concentration (µg/m³)1 | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³)2 | Threshold Exceeded?3 |
| 2028 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | <del>78.12</del>                        | 117.42                            | <del>195.54</del>                        | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | <del>48.72</del>                        | 102.24                            | <del>150.96</del>                        | 188 (federal)      | No                   |
|                                                                          | Annual         | <del>2.18</del>                         | 26.35                             | <del>28.53</del>                         | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | <del>67</del>                           | 6,256                             | <del>6,324</del>                         | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | <del>13</del>                           | 5,631                             | <del>5,644</del>                         | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | <del>0.58</del>                         | --                                | <del>0.58</del>                          | 5 (federal)        | No                   |
|                                                                          | Annual         | <del>0.29</del>                         | --                                | <del>0.29</del>                          | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | <del>0.45</del>                         | --                                | <del>0.45</del>                          | 1.2 (federal)      | No                   |
|                                                                          | Annual         | <del>0.16</del>                         | --                                | <del>0.16</del>                          | 0.3 (federal)      | No                   |
| 2033 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | <del>81.94</del>                        | 117.42                            | <del>199.39</del>                        | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | <del>59.73</del>                        | 102.24                            | <del>161.97</del>                        | 188 (federal)      | No                   |
|                                                                          | Annual         | <del>2.40</del>                         | 26.35                             | <del>28.74</del>                         | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | <del>73</del>                           | 6,256                             | <del>6,329</del>                         | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | <del>22</del>                           | 5,631                             | <del>5,653</del>                         | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | <del>1.10</del>                         | --                                | <del>1.10</del>                          | 5 (federal)        | No                   |
|                                                                          | Annual         | <del>0.35</del>                         | --                                | <del>0.35</del>                          | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | <del>0.49</del>                         | --                                | <del>0.49</del>                          | 1.2 (federal)      | No                   |
|                                                                          | Annual         | <del>0.18</del>                         | --                                | <del>0.18</del>                          | 0.3 (federal)      | No                   |
| 2048 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | <del>102.79</del>                       | 117.42                            | <del>220.22</del>                        | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | <del>75.96</del>                        | 102.24                            | <del>178.20</del>                        | 188 (federal)      | No                   |
|                                                                          | Annual         | <del>4.16</del>                         | 26.35                             | <del>30.50</del>                         | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | <del>94</del>                           | 6,256                             | <del>6,350</del>                         | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | <del>28</del>                           | 5,631                             | <del>5,659</del>                         | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | <del>1.82</del>                         | --                                | <del>1.82</del>                          | 5 (federal)        | No                   |
|                                                                          | Annual         | <del>0.59</del>                         | --                                | <del>0.59</del>                          | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | <del>0.77</del>                         | --                                | <del>0.77</del>                          | 1.2 (federal)      | No                   |
|                                                                          | Annual         | <del>0.28</del>                         | --                                | <del>0.28</del>                          | 0.3 (federal)      | No                   |

Final EIR – Mitigated Concentrations (Operations)

| Table 5.3-12: Maximum Off-Site Concentration from Operations (Mitigated) |                |                                         |                                   |                                          |                    |                      |
|--------------------------------------------------------------------------|----------------|-----------------------------------------|-----------------------------------|------------------------------------------|--------------------|----------------------|
| Pollutant                                                                | Averaging Time | Maximum Modeled Concentration (µg/m³) 7 | Background Concentration (µg/m³)1 | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³)2 | Threshold Exceeded?3 |
| 2028 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | 80.19                                   | 117.42                            | 197.61                                   | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | 48.31                                   | 102.24                            | 150.55                                   | 188 (federal)      | No                   |
|                                                                          | Annual         | 2.45                                    | 26.35                             | 28.79                                    | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | 77                                      | 6,256                             | 6,333                                    | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | 28                                      | 5,631                             | 5,659                                    | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | 0.16                                    | --                                | 0.16                                     | 5 (federal)        | No                   |
|                                                                          | Annual         | 0.16                                    | --                                | 0.16                                     | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | 0.28                                    | --                                | 0.28                                     | 1.2 (federal)      | No                   |
|                                                                          | Annual         | 0.08                                    | --                                | 0.08                                     | 0.3 (federal)      | No                   |
| 2033 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | 86.16                                   | 117.42                            | 203.58                                   | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | 60.49                                   | 102.24                            | 162.73                                   | 188 (federal)      | No                   |
|                                                                          | Annual         | 2.84                                    | 26.35                             | 29.18                                    | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | 94                                      | 6,256                             | 6,350                                    | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | 36                                      | 5,631                             | 5,666                                    | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | 0.79                                    | --                                | 0.79                                     | 5 (federal)        | No                   |
|                                                                          | Annual         | 0.19                                    | --                                | 0.19                                     | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | 0.33                                    | --                                | 0.33                                     | 1.2 (federal)      | No                   |
|                                                                          | Annual         | 0.09                                    | --                                | 0.09                                     | 0.3 (federal)      | No                   |
| 2048 Operations                                                          |                |                                         |                                   |                                          |                    |                      |
| NO2 4                                                                    | 1-hour         | 89.97                                   | 117.42                            | 207.40                                   | 339 (State)        | No                   |
|                                                                          | 1-hour 4, 5    | 63.13                                   | 102.24                            | 165.38                                   | 188 (federal)      | No                   |
|                                                                          | Annual         | 3.06                                    | 26.35                             | 29.41                                    | 57 (State)         | No                   |
|                                                                          |                |                                         |                                   |                                          | 100 (federal)      | No                   |
| CO                                                                       | 1-hour         | 104                                     | 6,256                             | 6,360                                    | 23,000 (State)     | No                   |
|                                                                          |                |                                         |                                   |                                          | 40,000 (federal)   | No                   |
|                                                                          | 8-hour         | 39                                      | 5,631                             | 5,669                                    | 10,000 (State/fed) | No                   |
| PM10 6                                                                   | 24-hour        | 1.04                                    | --                                | 1.04                                     | 5 (federal)        | No                   |
|                                                                          | Annual         | 0.28                                    | --                                | 0.28                                     | 1 (federal)        | No                   |
| PM2.5 6                                                                  | 24-hour        | 0.35                                    | --                                | 0.35                                     | 1.2 (federal)      | No                   |
|                                                                          | Annual         | 0.11                                    | --                                | 0.11                                     | 0.3 (federal)      | No                   |

| Table 5.3-11: Maximum Off-Site Concentration from Operations (Mitigated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                                                    |                                               |                                          |                                |                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Averaging Time | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
| <div>Note:</div> <div><sup>1</sup> Background concentrations are from the Barstow Monitoring Station (2022 – 2024). Note that CO is no longer monitored and the above data is the latest available (2019 – 2021).</div> <div><sup>2</sup> Ambient air quality thresholds are the NAAQS and CAAQS provided in Error! Reference source not found.. All thresholds are shown in micrograms per cubic meter (µg/m³) for comparison to modeled concentrations.</div> <div><sup>3</sup> Exceedances of the NAAQS and CAAQS are indicated in bold.</div> <div><sup>4</sup> NO<sub>2</sub> concentrations were calculated per Tier 2 ARM2 ratios in U.S. EPA’s 40 CFR Part 51 Appendix W, § 4.2.3.4. Conversion of NO<sub>x</sub> to NO<sub>2</sub> use U.S. EPA minimum and maximum default values NO<sub>2</sub>/NO<sub>x</sub> of 0.5 and 0.9, respectively.</div> <div><sup>5</sup> This comparison is to the federal NAAQS, which is a 98<sup>th</sup> percentile threshold. The background concentration is the 3-year average of the 8<sup>th</sup> highest daily maximum 1-hour concentration, over the years 2022, 2023, and 2024.</div> <div><sup>6</sup> The thresholds for PM<sub>10</sub> and PM<sub>2.5</sub> are incremental thresholds; therefore, the incremental concentration without background is compared to the threshold.</div> <div><sup>7</sup> The Barstow Yard switcher replacement was conservatively not considered in the NAAQS and CAAQS modeling for the unmitigated project. Unlike the HRA, the NAAQS and CAAQS modeling is the max concentration at the fenceline and the switcher replacement would not substantially change the BIG concentrations.</div> |                |                                                    |                                               |                                          |                                |                                  |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                                                    |                                               |                                          |                                |                                  |

| Table 5.3-12: Maximum Off-Site Concentration from Operations (Mitigated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                                                    |                                               |                                          |                                |                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------|-----------------------------------------------|------------------------------------------|--------------------------------|----------------------------------|
| Pollutant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Averaging Time | Maximum Modeled Concentration (µg/m³) <sup>7</sup> | Background Concentration (µg/m³) <sup>1</sup> | Total Ground Level Concentration (µg/m³) | Threshold (µg/m³) <sup>2</sup> | Threshold Exceeded? <sup>3</sup> |
| <div>Note:</div> <div><sup>1</sup> Background concentrations are from the Barstow Monitoring Station (2022 – 2024). Note that CO is no longer monitored and the above data is the latest available (2019 – 2021).</div> <div><sup>2</sup> Ambient air quality thresholds are the NAAQS and CAAQS provided in Error! Reference source not found.. All thresholds are shown in micrograms per cubic meter (µg/m³) for comparison to modeled concentrations.</div> <div><sup>3</sup> Exceedances of the NAAQS and CAAQS are indicated in bold.</div> <div><sup>4</sup> NO<sub>2</sub> concentrations were calculated per Tier 2 ARM2 ratios in U.S. EPA’s 40 CFR Part 51 Appendix W, § 4.2.3.4. Conversion of NO<sub>x</sub> to NO<sub>2</sub> use U.S. EPA minimum and maximum default values NO<sub>2</sub>/NO<sub>x</sub> of 0.5 and 0.9, respectively.</div> <div><sup>5</sup> This comparison is to the federal NAAQS, which is a 98<sup>th</sup> percentile threshold. The background concentration is the 3-year average of the 8<sup>th</sup> highest daily maximum 1-hour concentration, over the years 2022, 2023, and 2024.</div> <div><sup>6</sup> The thresholds for PM<sub>10</sub> and PM<sub>2.5</sub> are incremental thresholds; therefore, the incremental concentration without background is compared to the threshold.</div> <div><sup>7</sup> The Barstow Yard switcher replacement was conservatively not considered in the NAAQS and CAAQS modeling for the unmitigated project. Unlike the HRA, the NAAQS and CAAQS modeling is the max concentration at the fenceline and the switcher replacement would not substantially change the BIG concentrations.</div> |                |                                                    |                                               |                                          |                                |                                  |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                                                    |                                               |                                          |                                |                                  |

Draft EIR – Health Risk (Operations)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-36, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 45

| Table 5.3-13: Carcinogenic Risk Assessment (Operations Only)                                                                                                                                                                                         |                                      |                                   |                       |                        |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------|-----------------------|------------------------|---------------------|
| Receptor Location <sup>1,2,3</sup>                                                                                                                                                                                                                   | Risk per Million                     |                                   |                       |                        | Threshold Exceeded? |
|                                                                                                                                                                                                                                                      | Unmitigated Cancer Risk              |                                   | Mitigated Cancer Risk | Significance Threshold |                     |
|                                                                                                                                                                                                                                                      | Without Barstow Switcher Replacement | With Barstow Switcher Replacement |                       |                        |                     |
| Maximally Exposed Individual Resident (MEIR)                                                                                                                                                                                                         | 42.63                                | 40.17                             | 39.97                 | 10                     | Yes                 |
| Maximally Exposed Individual Worker (MEIW)                                                                                                                                                                                                           | 5.33                                 | 5.09                              | 4.04                  | 10                     | No                  |
| Maximally Exposed Student Receptor                                                                                                                                                                                                                   | 6.38                                 | 6.26                              | 3.90                  | 10                     | No                  |
| Maximally Exposed Park Receptor                                                                                                                                                                                                                      | 5.88                                 | 5.69                              | 3.68                  | 10                     | No                  |
| Notes:<br><sup>1</sup> Receptors described here reflect the receptor shown in Error! Reference source not found. with the highest carcinogenic risk.<br><sup>2</sup> Sensitive receptor locations can be seen in Error! Reference source not found.. |                                      |                                   |                       |                        |                     |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report.</b>                                                                                                                                                                            |                                      |                                   |                       |                        |                     |

Draft EIR – Health Risk (Combined Construction and Operations)  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-37, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 46.

| Table 5.3-15: Carcinogenic Risk Assessment (Construction and Operations)                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                   |                       |                        |                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------|-----------------------|------------------------|---------------------|
| Receptor Location <sup>1,2,3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                | Risk per Million                     |                                   |                       |                        | Threshold Exceeded? |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Unmitigated Cancer Risk              |                                   | Mitigated Cancer Risk | Significance Threshold |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Without Barstow Switcher Replacement | With Barstow Switcher Replacement |                       |                        |                     |
| Maximally Exposed Individual Resident (MEIR)                                                                                                                                                                                                                                                                                                                                                                                                      | 64.58                                | 64.04                             | 40.03                 | 10                     | Yes                 |
| Maximally Exposed Individual Worker (MEIW)                                                                                                                                                                                                                                                                                                                                                                                                        | 26.47                                | 26.28                             | 16.36                 | 10                     | Yes                 |
| Maximally Exposed Student Receptor                                                                                                                                                                                                                                                                                                                                                                                                                | 15.20                                | 15.09                             | 8.50                  | 10                     | No                  |
| Maximally Exposed Park Receptor                                                                                                                                                                                                                                                                                                                                                                                                                   | 6.46                                 | 6.27                              | 3.96                  | 10                     | No                  |
| Notes:<br><sup>1</sup> The combined construction and operational risk is not the sum of the individual risk for each because the combined scenario assumes continuous exposure with different start ages, exposure durations, breathing rates, and age sensitivity factors. For example, the operations only scenario assumes 30 years of operational exposure whereas the combined risk is 2.8 years of construction + 27.2 years of operations. |                                      |                                   |                       |                        |                     |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report.</b>                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                   |                       |                        |                     |

Final EIR – Health Risk (Operations)

| Table 5.3-14: Carcinogenic Risk Assessment (Operations Only)                                                                                                                                                                                         |                                      |                                   |                       |                        |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------|-----------------------|------------------------|---------------------|
| Receptor Location <sup>1,2, 3</sup>                                                                                                                                                                                                                  | Risk per Million                     |                                   |                       |                        | Threshold Exceeded? |
|                                                                                                                                                                                                                                                      | Unmitigated Cancer Risk              |                                   | Mitigated Cancer Risk | Significance Threshold |                     |
|                                                                                                                                                                                                                                                      | Without Barstow Switcher Replacement | With Barstow Switcher Replacement |                       |                        |                     |
| Maximally Exposed Individual Resident (MEIR)                                                                                                                                                                                                         | 45.16                                | 44.62                             | 42.00                 | 10                     | Yes                 |
| Maximally Exposed Individual Worker (MEIW)                                                                                                                                                                                                           | 5.26                                 | 5.02                              | 3.98                  | 10                     | No                  |
| Maximally Exposed Student Receptor                                                                                                                                                                                                                   | 6.17                                 | 6.05                              | 3.71                  | 10                     | No                  |
| Maximally Exposed Park Receptor                                                                                                                                                                                                                      | 5.77                                 | 5.58                              | 3.58                  | 10                     | No                  |
| Notes:<br><sup>1</sup> Receptors described here reflect the receptor shown in Error! Reference source not found. with the highest carcinogenic risk.<br><sup>2</sup> Sensitive receptor locations can be seen in Error! Reference source not found.. |                                      |                                   |                       |                        |                     |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report.</b>                                                                                                                                                                            |                                      |                                   |                       |                        |                     |

Final EIR – Health Risk (Combined Construction and Operations)

| Table 5.3-16: Carcinogenic Risk Assessment (Construction and Operations)                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                   |                       |                        |                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------|-----------------------|------------------------|---------------------|
| Receptor Location <sup>1,2, 3</sup>                                                                                                                                                                                                                                                                                                                                                                                                               | Risk per Million                     |                                   |                       |                        | Threshold Exceeded? |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Unmitigated Cancer Risk              |                                   | Mitigated Cancer Risk | Significance Threshold |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Without Barstow Switcher Replacement | With Barstow Switcher Replacement |                       |                        |                     |
| Maximally Exposed Individual Resident (MEIR)                                                                                                                                                                                                                                                                                                                                                                                                      | 67.96                                | 67.42                             | 44.59                 | 10                     | Yes                 |
| Maximally Exposed Individual Worker (MEIW)                                                                                                                                                                                                                                                                                                                                                                                                        | 26.40                                | 26.21                             | 16.30                 | 10                     | Yes                 |
| Maximally Exposed Student Receptor                                                                                                                                                                                                                                                                                                                                                                                                                | 15.06                                | 14.95                             | 8.38                  | 10                     | No                  |
| Maximally Exposed Park Receptor                                                                                                                                                                                                                                                                                                                                                                                                                   | 6.39                                 | 6.19                              | 3.89                  | 10                     | No                  |
| Notes:<br><sup>1</sup> The combined construction and operational risk is not the sum of the individual risk for each because the combined scenario assumes continuous exposure with different start ages, exposure durations, breathing rates, and age sensitivity factors. For example, the operations only scenario assumes 30 years of operational exposure whereas the combined risk is 2.8 years of construction + 27.2 years of operations. |                                      |                                   |                       |                        |                     |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report.</b>                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                   |                       |                        |                     |

Draft EIR – Cancer Burden  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-38, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 47.

| Table 5.3-17: Population Cancer Burden at 70-Year Exposure                                                                                        |                 |                                  |                    |                                |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|--------------------|--------------------------------|------------------|
| Census Tract ID                                                                                                                                   | 2048 Population | Unmitigated Risk at the Centroid | Unmitigated Burden | Mitigated Risk at the Centroid | Mitigated Burden |
| 11801                                                                                                                                             | 4,787           | <del>1.16E-05</del>              | <del>0.06</del>    | <del>7.54E-06</del>            | <del>0.04</del>  |
| 11802                                                                                                                                             | 3,875           | <del>2.27E-05</del>              | <del>0.09</del>    | <del>1.54E-05</del>            | <del>0.06</del>  |
| 11602                                                                                                                                             | 1,862           | <del>4.22E-07</del>              | 0.00               | <del>2.48E-07</del>            | 0.00             |
| 11900                                                                                                                                             | 3,078           | <del>1.39E-06</del>              | 0.00               | <del>8.03E-07</del>            | 0.00             |
| 9400                                                                                                                                              | 4,657           | <del>6.66E-06</del>              | 0.03               | <del>3.64E-06</del>            | 0.02             |
| 11700                                                                                                                                             | 1,693           | <del>3.66E-07</del>              | 0.00               | <del>1.97E-07</del>            | 0.00             |
| 9300                                                                                                                                              | 1,411           | <del>4.01E-06</del>              | 0.01               | <del>2.18E-06</del>            | 0.00             |
| Total Cancer Burden                                                                                                                               |                 | -                                | <del>0.19</del>    | -                              | <del>0.12</del>  |
| Significance Threshold                                                                                                                            |                 | -                                | 0.5                | -                              | 0.5              |
| Threshold Exceeded?                                                                                                                               |                 | -                                | No                 | -                              | No               |
| Sources:<br>Census data from the 2020 Decennial Census official population.<br>Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> . |                 |                                  |                    |                                |                  |

Draft EIR – Chronic Hazard  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.3-39, below, would also be adopted for Draft EIR Appendix 5.3 BIG-1, Table 48.

| Table 5.3-19: Chronic Hazard Assessment Results at Peak Receptor                                                                                                                                                                                                                                                                                                                                                                                                                               |                                    |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------|
| Emissions Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Concentration (µg/m³) <sup>1</sup> | Chronic Hazard  |
| 2028 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <del>0.38</del>                    | <del>0.08</del> |
| 2028 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <del>0.29</del>                    | <del>0.06</del> |
| 2033 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <del>0.20</del>                    | <del>0.04</del> |
| 2033 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <del>0.19</del>                    | <del>0.04</del> |
| 2048 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.63                               | 0.13            |
| 2048 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.63                               | 0.13            |
| Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N/A                                | 1               |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                | No              |
| Notes:<br><sup>1</sup> The reported pollutant concentration (annual period) is at the closest receptor (maximally exposed individual receptor).<br><sup>2</sup> Impacts would not exceed applicable thresholds and mitigation is not required. However, mitigation is required to reduce criteria pollutant emissions impacts and mitigated results are included for disclosure purposes. The mitigated exposure scenario shows the risk with <b>MM BIG AQ-1</b> through <b>MM BIG AQ-10</b> . |                                    |                 |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                 |

Final EIR – Cancer Burden

| Table 5.3-18: Population Cancer Burden at 70-Year Exposure                                                                                        |                 |                                  |                    |                                |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------|--------------------|--------------------------------|------------------|
| Census Tract ID                                                                                                                                   | 2048 Population | Unmitigated Risk at the Centroid | Unmitigated Burden | Mitigated Risk at the Centroid | Mitigated Burden |
| 11801                                                                                                                                             | 4,787           | 1.08E-05                         | 0.05               | 6.86E-06                       | 0.03             |
| 11802                                                                                                                                             | 3,875           | 2.10E-05                         | 0.08               | 1.39E-05                       | 0.05             |
| 11602                                                                                                                                             | 1,862           | 3.95E-07                         | 0.00               | 2.24E-07                       | 0.00             |
| 11900                                                                                                                                             | 3,078           | 1.30E-06                         | 0.00               | 7.30E-07                       | 0.00             |
| 9400                                                                                                                                              | 4,657           | 6.35E-06                         | 0.03               | 3.37E-06                       | 0.02             |
| 11700                                                                                                                                             | 1,693           | 3.57E-07                         | 0.00               | 1.89E-07                       | 0.00             |
| 9300                                                                                                                                              | 1,411           | 3.78E-06                         | 0.01               | 1.99E-06                       | 0.00             |
| Total Cancer Burden                                                                                                                               |                 | -                                | <b>0.17</b>        | -                              | <b>0.11</b>      |
| Significance Threshold                                                                                                                            |                 | -                                | 0.5                | -                              | 0.5              |
| Threshold Exceeded?                                                                                                                               |                 | -                                |                    | -                              |                  |
| Sources:<br>Census data from the 2020 Decennial Census official population.<br>Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> . |                 |                                  |                    |                                |                  |

Final EIR – Chronic Hazard

| Table 5.3-20: Chronic Hazard Assessment Results at Peak Receptor                                                                                                                                                                                                                                                                                                                                                                                                                               |                                    |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------|
| Emissions Sources                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Concentration (µg/m³) <sup>1</sup> | Chronic Hazard |
| 2028 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.56                               | 0.11           |
| 2028 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.47                               | 0.09           |
| 2033 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.45                               | 0.09           |
| 2033 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.44                               | 0.09           |
| 2048 Unmitigated                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.63                               | 0.13           |
| 2048 Mitigated <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.63                               | 0.13           |
| Threshold                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N/A                                | 1              |
| Threshold Exceeded?                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                | No             |
| Notes:<br><sup>1</sup> The reported pollutant concentration (annual period) is at the closest receptor (maximally exposed individual receptor).<br><sup>2</sup> Impacts would not exceed applicable thresholds and mitigation is not required. However, mitigation is required to reduce criteria pollutant emissions impacts and mitigated results are included for disclosure purposes. The mitigated exposure scenario shows the risk with <b>MM BIG AQ-1</b> through <b>MM BIG AQ-10</b> . |                                    |                |
| Source: Refer to <b>Appendix 5.3 BIG-1: Air Quality Technical Report</b> .                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                |

Draft EIR – BIG GHG Emissions  
(Numbers in RED STRIKETHROUGH indicate values that are different in the Final EIR)  
Changes to Table 5.8-12, below, would also be adopted for Draft EIR Appendix 5.8 BIG-1, Table 20.

| Table Error! No text of specified style in document.-21: BIG GHG Emissions        |                                       |                                       |                                       |
|-----------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Emissions Source                                                                  | 2028 MTCO <sub>2</sub> e <sup>7</sup> | 2033 MTCO <sub>2</sub> e <sup>7</sup> | 2048 MTCO <sub>2</sub> e <sup>7</sup> |
| Unmitigated Construction Amortized over 30 Years                                  | 8,385                                 | 8,385                                 | 8,385                                 |
| Locomotives (within BIG Site Boundary)                                            |                                       |                                       |                                       |
| Mainline (Without BIG) <sup>1</sup>                                               | 21,719                                | 24,010                                | 29,979                                |
| Mainline (With BIG) <sup>2, 3</sup>                                               | 13,817                                | 15,035                                | 19,267                                |
| Net Mainline (Through BIG)                                                        | -7,902                                | -8,973                                | -10,712                               |
| BIG Lead Tracks                                                                   | 4,110                                 | 4,642                                 | 4,847                                 |
| BIG Block Swap Yard                                                               | 3,671                                 | 4,062                                 | 6,171                                 |
| BIG Intermodal Facility                                                           | 294                                   | 389                                   | 444                                   |
| BIG Maintenance                                                                   | 222                                   | 227                                   | 299                                   |
| Locomotives Within BIG Site Boundary Subtotal                                     | 395                                   | 346                                   | 1,049                                 |
| On-Road Mobile Sources                                                            |                                       |                                       |                                       |
| Passenger Cars                                                                    | 29,909                                | 35,272                                | 36,880                                |
| Trucks                                                                            | 17,048                                | 19,008                                | 20,030                                |
| On-Road Mobile Source Subtotal                                                    | 46,957                                | 54,280                                | 56,911                                |
| Equipment, Area, and Energy Sources                                               |                                       |                                       |                                       |
| Equipment (including generators)                                                  | 52,097                                | 52,323                                | 52,670                                |
| Area and Energy Sources                                                           | 70,675                                | 64,605                                | 42,829                                |
| Solar Farm                                                                        | -9,423                                | -7,369                                | 0                                     |
| Rooftop Solar – Code Compliance                                                   | -2,237                                | -1,749                                | 0                                     |
| Equipment, Area, and Energy Source Subtotal                                       | 111,111                               | 107,810                               | 95,499                                |
| Rail Corridor Emissions                                                           |                                       |                                       |                                       |
| California Rail Corridor Emissions - Without BIG                                  | 853,389                               | 916,397                               | 1,158,807                             |
| California Rail Corridor Emissions - With BIG                                     | 890,796                               | 971,385                               | 1,217,579                             |
| Net Corridor Emissions in California <sup>4</sup>                                 | 37,408                                | 54,987                                | 58,772                                |
| Corridor Emissions Outside California <sup>5</sup>                                | 115,529                               | 157,860                               | 179,451                               |
| Net National Network TMT Reduction <sup>6</sup>                                   | -325,664                              | -376,761                              | -372,415                              |
| Total BIG Unmitigated Operational Emissions                                       | -14,265                               | -1,477                                | 19,267                                |
| Total Unmitigated Construction and Operational Emissions (BIG and Corridor)       | -5,880                                | 6,907                                 | 27,652                                |
| Existing Barstow Yard Switcher Replacement                                        | -522                                  | -522                                  | -522                                  |
| Net Unmitigated BIG GHG Emissions with Existing Barstow Yard Switcher Replacement | -6,403                                | 6,385                                 | 27,130                                |
| Exceed Zero Net Increase Threshold Without Mitigation                             | No                                    | Yes                                   | Yes                                   |

Final EIR – BIG GHG Emissions

| Table Error! No text of specified style in document.-22: BIG GHG Emissions        |                                       |                                       |                                       |
|-----------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Emissions Source                                                                  | 2028 MTCO <sub>2</sub> e <sup>7</sup> | 2033 MTCO <sub>2</sub> e <sup>7</sup> | 2048 MTCO <sub>2</sub> e <sup>7</sup> |
| Unmitigated Construction Amortized over 30 Years                                  | 8,385                                 | 8,385                                 | 8,385                                 |
| Locomotives (within BIG Site Boundary)                                            |                                       |                                       |                                       |
| Mainline (Without BIG) <sup>1</sup>                                               | 21,719                                | 24,008                                | 29,979                                |
| Mainline (With BIG) <sup>2, 3</sup>                                               | 13,817                                | 15,035                                | 19,267                                |
| Net Mainline (Through BIG)                                                        | -7,902                                | -8,973                                | -10,712                               |
| BIG Lead Tracks                                                                   | 4,110                                 | 4,642                                 | 4,847                                 |
| BIG Block Swap Yard                                                               | 3,212                                 | 3,508                                 | 4,292                                 |
| BIG Intermodal Facility                                                           | 2,588                                 | 3,423                                 | 3,487                                 |
| BIG Maintenance                                                                   | 251                                   | 257                                   | 338                                   |
| Locomotives Within BIG Site Boundary Subtotal                                     | 2,260                                 | 2,857                                 | 2,252                                 |
| On-Road Mobile Sources                                                            |                                       |                                       |                                       |
| Passenger Cars                                                                    | 29,909                                | 35,272                                | 36,880                                |
| Trucks                                                                            | 17,048                                | 19,008                                | 20,030                                |
| On-Road Mobile Source Subtotal                                                    | 46,957                                | 54,280                                | 56,911                                |
| Equipment, Area, and Energy Sources                                               |                                       |                                       |                                       |
| Equipment (including generators)                                                  | 52,097                                | 52,323                                | 52,670                                |
| Area and Energy Sources                                                           | 70,675                                | 64,605                                | 42,829                                |
| Solar Farm                                                                        | -9,423                                | -7,369                                | 0                                     |
| Rooftop Solar – Code Compliance                                                   | -2,237                                | -1,749                                | 0                                     |
| Equipment, Area, and Energy Source Subtotal                                       | 111,111                               | 107,810                               | 95,499                                |
| Rail Corridor Emissions                                                           |                                       |                                       |                                       |
| California Rail Corridor Emissions - Without BIG                                  | 853,389                               | 916,397                               | 1,158,807                             |
| California Rail Corridor Emissions - With BIG                                     | 890,796                               | 971,385                               | 1,217,579                             |
| Net Corridor Emissions in California <sup>4</sup>                                 | 37,408                                | 54,987                                | 58,772                                |
| Corridor Emissions Outside California <sup>5</sup>                                | 115,529                               | 157,860                               | 179,451                               |
| Net National Network TMT Reduction <sup>6</sup>                                   | -325,665                              | -376,762                              | -372,416                              |
| Total BIG Unmitigated Operational Emissions                                       | -12,401                               | 1,033                                 | 20,469                                |
| Total Unmitigated Construction and Operational Emissions (BIG and Corridor)       | -4,017                                | 9,417                                 | 28,854                                |
| Existing Barstow Yard Switcher Replacement                                        | -522                                  | -522                                  | -522                                  |
| Net Unmitigated BIG GHG Emissions with Existing Barstow Yard Switcher Replacement | -4,539                                | 8,895                                 | 28,332                                |
| Exceed Zero Net Increase Threshold Without Mitigation                             | No                                    | Yes                                   | Yes                                   |



| Table Error! No text of specified style in document.-21: BIG GHG Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |         |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|
| Reductions from Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |         |         |
| Air Quality Construction Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -3,244  | -3,244  | -3,244  |
| Air Quality Operational Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -49,986 | -50,213 | -50,041 |
| Energy Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -5,942  | -4,647  | 0       |
| Net Mitigated BIG GHG Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -65,575 | -51,719 | -26,155 |
| Exceed Zero Net Increase Threshold With Mitigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No      | No      | No      |
| MTCO <sub>2</sub> e = metric tons of carbon dioxide equivalents, BIG = Barstow International Gateway; TMT = truck miles traveled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |         |         |
| <p>Note:</p> <p><sup>1</sup> Mainline (Without BIG) locomotive emissions represent the trains that travel on the existing mainlines today within the future BIG footprint.</p> <p><sup>2</sup> Mainline (With BIG) locomotive emissions represent the trains that pass through BIG’s footprint without stopping at the Block Swap or Intermodal Facility.</p> <p><sup>3</sup> Mainline (with BIG) includes BIG Dedicated Fleet, which represents locomotive emissions from dedicated fleet of Tier 4 locomotives traveling on the west leads to the Intermodal Facility.</p> <p><sup>4</sup> EnSafe, 2025 (see <b>Appendix 5.3 BIG-1 [Appendix B]</b>). Net corridor emissions on the mainline from the Ports to the west leads, and from the east leads to the California Border (does not include the BIG footprint).</p> <p><sup>5</sup> Net corridor emissions on the mainline (i.e., train emissions from additional containers moved by train instead of truck) from the California border to eastern destinations (See <b>Appendix 5.3 BIG-1</b>).</p> <p><sup>6</sup> See <b>Appendix 5.3 BIG-1</b>.</p> <p><sup>7</sup> Totals may not add up due to rounding.</p> |         |         |         |
| Source: Kimley-Horn, 2025.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |         |         |

| Table Error! No text of specified style in document.-22: BIG GHG Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |         |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|
| Reductions from Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |         |         |
| Air Quality Construction Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -3,244  | -3,244  | -3,244  |
| Air Quality Operational Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -49,986 | -50,213 | -50,041 |
| Energy Mitigation Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -5,942  | -4,647  | 0       |
| Net Mitigated BIG GHG Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -63,712 | -49,209 | -24,953 |
| Exceed Zero Net Increase Threshold With Mitigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No      | No      | No      |
| MTCO <sub>2</sub> e = metric tons of carbon dioxide equivalents, BIG = Barstow International Gateway; TMT = truck miles traveled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |         |         |
| <p>Note:</p> <p><sup>1</sup> Mainline (Without BIG) locomotive emissions represent the trains that travel on the existing mainlines today within the future BIG footprint.</p> <p><sup>2</sup> Mainline (With BIG) locomotive emissions represent the trains that pass through BIG’s footprint without stopping at the Block Swap or Intermodal Facility.</p> <p><sup>3</sup> Mainline (with BIG) includes BIG Dedicated Fleet, which represents locomotive emissions from dedicated fleet of Tier 4 locomotives traveling on the west leads to the Intermodal Facility.</p> <p><sup>4</sup> EnSafe, 2025 (see <b>Appendix 5.3 BIG-1 [Appendix B]</b>). Net corridor emissions on the mainline from the Ports to the west leads, and from the east leads to the California Border (does not include the BIG footprint).</p> <p><sup>5</sup> Net corridor emissions on the mainline (i.e., train emissions from additional containers moved by train instead of truck) from the California border to eastern destinations (See <b>Appendix 5.3 BIG-1</b>).</p> <p><sup>6</sup> See <b>Appendix 5.3 BIG-1</b>.</p> <p><sup>7</sup> Totals may not add up due to rounding.</p> |         |         |         |
| Source: Kimley-Horn, 2025.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |         |         |



## **ATTACHMENT A: CORRIDOR EMISSIONS MODEL**

## **BNSF Barstow International Gateway Corridor Emissions Model Analysis Errata**

The BNSF Barstow International Gateway Corridor Emissions Model (CEM) Analysis, is attached as Appendix B to Appendix 5.3 BIG-1: Air Quality Technical Report, to the November 10, 2025, City of Barstow General Plan and Barstow International Gateway Project Draft Environmental Impact Report (DEIR) (State Clearinghouse No. 2024020501). The CEM Analysis provides the methodology and assumptions for calculating line-haul rail air emissions on the rail corridor between the San Pedro Bay Ports and the California/Nevada border near Needles, California.

Due to a clerical error, an earlier draft version of the CEM Analysis (Draft CEM) was inadvertently published in the DEIR as Appendix B to Appendix 5.3 BIG-1: Air Quality Technical Report. Although the underlying methodology and assumptions for the modeled emissions are presented correctly in the Draft CEM, as published, the Draft CEM Tables 9 through 20 and 24 through 29 did not present the finalized emissions calculations that were used in the analysis and conclusions for Section 5.3 Air Quality and 5.7 Greenhouse Emissions of the DEIR. A comparison of the Draft CEM Tables 9 through 20 and 24 through 29 and the Final CEM emissions calculations, aggregated in the same format as the Draft CEM Emissions Tables, is presented below. Any differences in the Draft CEM Emissions Tables, Final CEM Emissions Values Table below, and Final CEM Analysis calculations in Appendix A of this errata are due to:

- (1) Changes in presentation. Namely, the Draft CEM presented all rail corridor emissions west of BIG (i.e., emissions west of BIG within both the South Coast Air Basin (SCAB) and the Mojave Desert Air Basin (MDAB)) as part of the “West of BIG” category; whereas, the final CEM Analysis (Final CEM) presented only emissions in the MDAB in the “West of BIG” category.
- (2) Rounding errors that arise from the change in formatting and aggregation of “West of BIG” as described above. That is to say, the tables below highlight the differences between the Draft CEM Tables and the Final CEM calculations in the same format as the Draft CEM tables, and any differences between the Final CEM Emission Values table below and the Final CEM Analysis in Appendix A of this errata are due to rounding.
- (3) Minor arithmetic refinements to the model that were made between the Draft CEM and the Final CEM.

**Importantly, the final and corrected emissions calculations as shown in the Final CEM are presented fully and accurately in Section 5.3 Air Quality and 5.7 Greenhouse Emissions of the DEIR and the related technical reports, as published in the DEIR; therefore, there are no changes to the DEIR impact analyses, conclusions or mitigation measures.**

BIG's environmental analysis utilized the Final CEM values. However, the proposed General Plan environmental analysis utilized the Draft CEM calculations. The corrected proposed General Plan emissions are shown in **Section 3.0: Errata** of the Final EIR.

This errata updates the administrative record for the City of Barstow General Plan and Barstow International Gateway Project by (1) presenting the Draft CEM and Final CEM Emissions Tables below and (2) attaching as Attachment A hereto the Final CEM Analysis, with all exhibits. All of the substantive information in Attachment A to this errata was included in the DEIR, as published, or previously submitted to the City for inclusion in the administrative record.

**Draft CEM Emissions Tables (as Published in DEIR)**  
 [Numbers in RED STRIKETHROUGH indicate values that are different  
 in the Final CEM Emissions Tables]

| Table 9<br>Project 2028: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day)  |                    |                    |                    |                     |                     |                 |
|----------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|-----------------|
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | 227.7              | <del>220.9</del>   | <del>435.8</del>   | <del>11,119.6</del> | <del>3,081.5</del>  | 11.0            |
| MDAQMD                                                                                       | <del>1,060.4</del> | <del>1,028.6</del> | <del>2,000.7</del> | <del>51,204.3</del> | <del>12,981.6</del> | 46.2            |
| West of BIG                                                                                  | <del>337.6</del>   | 327.4              | <del>644.1</del>   | <del>16,418.9</del> | <del>4,506.3</del>  | <del>16.1</del> |
| East of BIG                                                                                  | <del>950.5</del>   | <del>922.0</del>   | <del>1,792.4</del> | <del>45,905.0</del> | <del>11,556.8</del> | 41.1            |
| Total                                                                                        | <del>1,288.1</del> | <del>1,249.4</del> | <del>2,436.5</del> | <del>62,323.9</del> | <del>16,063.1</del> | 57.2            |
| Table 10<br>Project 2028: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |                    |                    |                    |                     |                     |                 |
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | 36.8               | 35.7               | 70.4               | <del>1,795.9</del>  | <del>497.7</del>    | 1.8             |
| MDAQMD                                                                                       | 171.3              | <del>166.1</del>   | <del>323.1</del>   | <del>8,269.7</del>  | <del>2,096.6</del>  | 7.5             |
| West of BIG                                                                                  | 54.5               | 52.9               | 104.0              | <del>2,651.7</del>  | <del>727.8</del>    | 2.6             |
| East of BIG                                                                                  | <del>153.5</del>   | <del>148.9</del>   | <del>289.5</del>   | <del>7,413.9</del>  | <del>1,866.5</del>  | 6.6             |
| Total                                                                                        | <del>208.0</del>   | 201.8              | <del>393.5</del>   | <del>10,065.6</del> | <del>2,594.3</del>  | 9.2             |
| Table 11<br>Project 2033: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |                    |                    |                    |                     |                     |                 |
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | 227.5              | 220.7              | <del>441.6</del>   | <del>11,462.0</del> | <del>3,392.8</del>  | 12.1            |
| MDAQMD                                                                                       | <del>1,067.6</del> | <del>1,035.6</del> | <del>2,035.5</del> | <del>53,105.9</del> | <del>14,127.1</del> | 50.3            |
| West of BIG                                                                                  | 336.9              | <del>326.8</del>   | <del>651.6</del>   | <del>16,898.8</del> | <del>4,945.1</del>  | 17.6            |
| East of BIG                                                                                  | <del>958.3</del>   | <del>929.5</del>   | <del>1,825.5</del> | <del>47,669.0</del> | <del>12,574.7</del> | 44.8            |
| Total                                                                                        | <del>1,295.1</del> | <del>1,256.3</del> | <del>2,477.1</del> | <del>64,567.9</del> | <del>17,519.9</del> | 62.4            |

**Final CEM Emissions Values Tables**  
 (Values from Attachment A to Errata)  
 [Formatted for consistency with the Draft CEM Emissions Tables]

| Table 9<br>Project 2028: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day)  |         |         |         |          |          |      |
|----------------------------------------------------------------------------------------------|---------|---------|---------|----------|----------|------|
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 227.7   | 220.8   | 435.7   | 11,118.2 | 3,079.7  | 11.0 |
| MDAQMD                                                                                       | 1,060.7 | 1,028.9 | 2,001.2 | 51,217.2 | 12,984.4 | 46.2 |
| West of BIG                                                                                  | 337.5   | 327.4   | 644.0   | 16,417.1 | 4,504.0  | 16.0 |
| East of BIG                                                                                  | 950.8   | 922.3   | 1,792.9 | 45,918.3 | 11,560.1 | 41.1 |
| Total                                                                                        | 1,288.3 | 1,249.7 | 2,436.9 | 62,335.4 | 16,064.1 | 57.2 |
| Table 10<br>Project 2028: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |         |         |         |          |          |      |
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 36.8    | 35.7    | 70.4    | 1,795.6  | 497.4    | 1.8  |
| MDAQMD                                                                                       | 171.3   | 166.2   | 323.2   | 8,271.8  | 2,097.0  | 7.5  |
| West of BIG                                                                                  | 54.5    | 52.9    | 104.0   | 2,651.4  | 727.4    | 2.6  |
| East of BIG                                                                                  | 153.6   | 149.0   | 289.6   | 7,416.0  | 1,867.0  | 6.6  |
| Total                                                                                        | 208.1   | 201.8   | 393.6   | 10,067.4 | 2,594.4  | 9.2  |
| Table 11<br>Project 2033: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |         |         |         |          |          |      |
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 227.5   | 220.7   | 441.5   | 11,460.2 | 3,390.4  | 12.1 |
| MDAQMD                                                                                       | 1,067.9 | 1,035.9 | 2,036.1 | 53,122.1 | 14,130.8 | 50.3 |
| West of BIG                                                                                  | 336.9   | 326.7   | 651.5   | 16,896.4 | 4,942.1  | 17.6 |
| East of BIG                                                                                  | 958.6   | 929.8   | 1,826.1 | 47,685.9 | 12,579.2 | 44.8 |
| Total                                                                                        | 1,295.4 | 1,256.6 | 2,477.6 | 64,582.3 | 17,521.2 | 62.4 |

**Draft CEM Emissions Tables (as Published in DEIR)**  
 [Numbers in RED STRIKETHROUGH indicate values that are different  
 in the Final CEM Emissions Tables]

| Table 12<br>Project 2033: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |                    |                    |                    |                     |                     |                 |
|----------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|-----------------|
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | 36.7               | 35.6               | 71.3               | <del>1,851.2</del>  | <del>547.9</del>    | 2.0             |
| MDAQMD                                                                                       | <del>172.4</del>   | <del>167.2</del>   | <del>328.7</del>   | <del>8,576.8</del>  | <del>2,281.6</del>  | 8.1             |
| West of BIG                                                                                  | 54.4               | 52.8               | 105.2              | <del>2,729.2</del>  | <del>798.7</del>    | 2.8             |
| East of BIG                                                                                  | 154.8              | <del>150.1</del>   | <del>294.8</del>   | <del>7,698.8</del>  | <del>2,030.9</del>  | 7.2             |
| Total                                                                                        | 209.2              | 202.9              | 400.1              | <del>10,428.0</del> | <del>2,829.5</del>  | 10.1            |
| Table 13<br>Project 2048: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |                    |                    |                    |                     |                     |                 |
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | <del>219.7</del>   | <del>213.1</del>   | <del>446.1</del>   | <del>12,457.8</del> | <del>4,267.0</del>  | 15.2            |
| MDAQMD                                                                                       | <del>1,011.5</del> | <del>981.2</del>   | <del>2,015.2</del> | <del>56,780.0</del> | <del>17,703.5</del> | 63.0            |
| West of BIG                                                                                  | <del>323.6</del>   | <del>313.8</del>   | <del>654.7</del>   | <del>18,274.1</del> | <del>6,199.2</del>  | <del>22.1</del> |
| East of BIG                                                                                  | <del>907.7</del>   | <del>880.5</del>   | <del>1,806.6</del> | <del>50,963.8</del> | <del>15,771.3</del> | <del>56.1</del> |
| Total                                                                                        | <del>1,231.3</del> | <del>1,194.3</del> | <del>2,461.3</del> | <del>69,237.8</del> | <del>21,970.5</del> | 78.2            |
| Table 14<br>Project 2048: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |                    |                    |                    |                     |                     |                 |
| Region                                                                                       | PM10               | PM2.5              | VOC                | NOx                 | CO                  | SOx             |
| SCAQMD                                                                                       | 35.5               | 34.4               | <del>72.1</del>    | <del>2,012.0</del>  | <del>689.1</del>    | 2.5             |
| MDAQMD                                                                                       | 163.4              | 158.5              | 325.5              | <del>9,170.2</del>  | <del>2,859.2</del>  | 10.2            |
| West of BIG                                                                                  | <del>52.3</del>    | 50.7               | 105.7              | <del>2,951.3</del>  | <del>1,001.2</del>  | 3.6             |
| East of BIG                                                                                  | 146.6              | 142.2              | <del>291.8</del>   | <del>8,230.9</del>  | <del>2,547.1</del>  | 9.1             |
| Total                                                                                        | 198.9              | 192.9              | 397.5              | <del>11,182.2</del> | <del>3,548.3</del>  | 12.6            |

**Final CEM Emissions Values Tables**  
 (Values from Attachment A to Errata)  
 [Formatted for consistency with the Draft CEM Emissions Tables]

| Table 12<br>Project 2033: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |         |         |         |          |          |      |
|----------------------------------------------------------------------------------------------|---------|---------|---------|----------|----------|------|
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 36.7    | 35.6    | 71.3    | 1,850.9  | 547.6    | 2.0  |
| MDAQMD                                                                                       | 172.5   | 167.3   | 328.8   | 8,579.5  | 2,282.2  | 8.1  |
| West of BIG                                                                                  | 54.4    | 52.8    | 105.2   | 2,728.8  | 798.2    | 2.8  |
| East of BIG                                                                                  | 154.8   | 150.2   | 294.9   | 7,701.5  | 2,031.6  | 7.2  |
| Total                                                                                        | 209.2   | 202.9   | 400.1   | 10,430.3 | 2,829.8  | 10.1 |
| Table 13<br>Project 2048: Total Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |         |         |         |          |          |      |
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 219.6   | 213.0   | 445.8   | 12,451.5 | 4,258.9  | 15.2 |
| MDAQMD                                                                                       | 1,011.8 | 981.4   | 2,015.7 | 56,794.6 | 17,706.0 | 63.0 |
| West of BIG                                                                                  | 323.4   | 313.7   | 654.3   | 18,265.6 | 6,188.4  | 22.0 |
| East of BIG                                                                                  | 908.0   | 880.8   | 1,807.2 | 50,980.4 | 15,776.5 | 56.2 |
| Total                                                                                        | 1,231.4 | 1,194.5 | 2,461.5 | 69,246.1 | 21,964.9 | 78.2 |
| Table 14<br>Project 2048: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)          |         |         |         |          |          |      |
| Region                                                                                       | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD                                                                                       | 35.5    | 34.4    | 72.0    | 2,011.0  | 687.8    | 2.5  |
| MDAQMD                                                                                       | 163.4   | 158.5   | 325.5   | 9,172.6  | 2,859.6  | 10.2 |
| West of BIG                                                                                  | 52.2    | 50.7    | 105.7   | 2,950.0  | 999.5    | 3.6  |
| East of BIG                                                                                  | 146.6   | 142.2   | 291.9   | 8,233.6  | 2,548.0  | 9.1  |
| Total                                                                                        | 198.9   | 192.9   | 397.5   | 11,183.5 | 3,547.4  | 12.6 |

**Draft CEM Emissions Tables (as Published in DEIR)**  
**[Numbers in RED STRIKETHROUGH indicate values that are different in the Final CEM Emissions Tables]**

| Table 15<br>Project Incremental 2028: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |                 |                 |                  |                    |                    |                |
|----------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------|--------------------|--------------------|----------------|
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | -2.4            | -2.3            | <del>3.9</del>   | <del>111.4</del>   | <del>305.2</del>   | 1.2            |
| MDAQMD                                                                                             | <del>40.0</del> | <del>38.8</del> | <del>85.5</del>  | <del>2,398.6</del> | <del>671.8</del>   | 2.7            |
| West of BIG                                                                                        | <del>-3.0</del> | <del>-2.9</del> | <del>4.8</del>   | <del>126.7</del>   | <del>397.2</del>   | 1.5            |
| East of BIG                                                                                        | <del>40.6</del> | <del>39.4</del> | <del>84.5</del>  | <del>2,383.3</del> | <del>579.9</del>   | 2.4            |
| Total                                                                                              | <del>37.6</del> | <del>36.4</del> | <del>89.4</del>  | <del>2,510.0</del> | <del>977.1</del>   | 3.9            |
| Table 16<br>Project Incremental 2028: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |                 |                 |                  |                    |                    |                |
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | -0.4            | -0.4            | 0.6              | <del>18.0</del>    | <del>49.3</del>    | 0.2            |
| MDAQMD                                                                                             | 6.5             | 6.3             | <del>13.8</del>  | <del>387.4</del>   | <del>108.5</del>   | 0.4            |
| West of BIG                                                                                        | -0.5            | -0.5            | 0.8              | <del>20.5</del>    | <del>64.1</del>    | 0.2            |
| East of BIG                                                                                        | 6.6             | 6.4             | 13.7             | <del>384.9</del>   | <del>93.7</del>    | 0.4            |
| Total                                                                                              | 6.1             | 5.9             | <del>14.4</del>  | <del>405.4</del>   | <del>157.8</del>   | 0.6            |
| Table 17<br>Project Incremental 2033: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |                 |                 |                  |                    |                    |                |
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | -1.8            | <del>-1.7</del> | <del>6.7</del>   | <del>160.1</del>   | <del>406.1</del>   | 1.6            |
| MDAQMD                                                                                             | <del>52.6</del> | <del>51.1</del> | <del>111.1</del> | <del>3,108.4</del> | <del>913.6</del>   | 3.6            |
| West of BIG                                                                                        | -2.1            | <del>-2.0</del> | <del>8.8</del>   | <del>198.3</del>   | <del>531.6</del>   | 2.0            |
| East of BIG                                                                                        | <del>53.0</del> | <del>51.4</del> | <del>108.9</del> | <del>3,070.2</del> | <del>788.1</del>   | <del>3.1</del> |
| Total                                                                                              | <del>50.9</del> | <del>49.3</del> | <del>117.8</del> | <del>3,268.5</del> | <del>1,319.7</del> | 5.2            |

**Final CEM Emissions Values Tables**  
**(Values from Attachment A to Errata)**  
**[Formatted for consistency with the Draft CEM Emissions Tables]**

| Table 15<br>Project Incremental 2028: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |      |       |       |         |         |     |
|----------------------------------------------------------------------------------------------------|------|-------|-------|---------|---------|-----|
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | -2.4 | -2.3  | 3.8   | 110.0   | 303.5   | 1.2 |
| MDAQMD                                                                                             | 40.2 | 39.0  | 86.0  | 2,411.5 | 674.6   | 2.7 |
| West of BIG                                                                                        | -3.1 | -3.0  | 4.7   | 124.8   | 394.9   | 1.5 |
| East of BIG                                                                                        | 40.9 | 39.7  | 85.1  | 2,396.7 | 583.2   | 2.4 |
| Total                                                                                              | 37.8 | 36.7  | 89.8  | 2,521.5 | 978.1   | 3.9 |
| Table 16<br>Project Incremental 2028: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |      |       |       |         |         |     |
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | -0.4 | -0.4  | 0.6   | 17.8    | 49.0    | 0.2 |
| MDAQMD                                                                                             | 6.5  | 6.3   | 13.9  | 389.5   | 109.0   | 0.4 |
| West of BIG                                                                                        | -0.5 | -0.5  | 0.8   | 20.2    | 63.8    | 0.2 |
| East of BIG                                                                                        | 6.6  | 6.4   | 13.7  | 387.1   | 94.2    | 0.4 |
| Total                                                                                              | 6.1  | 5.9   | 14.5  | 407.2   | 158.0   | 0.6 |
| Table 17<br>Project Incremental 2033: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |      |       |       |         |         |     |
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | -1.8 | -1.8  | 6.6   | 158.2   | 403.8   | 1.6 |
| MDAQMD                                                                                             | 53.0 | 51.4  | 111.7 | 3,124.7 | 917.3   | 3.6 |
| West of BIG                                                                                        | -2.1 | -2.1  | 8.7   | 195.9   | 528.5   | 2.0 |
| East of BIG                                                                                        | 53.3 | 51.7  | 109.6 | 3,087.0 | 792.5   | 3.2 |
| Total                                                                                              | 51.2 | 49.6  | 118.3 | 3,282.9 | 1,321.0 | 5.2 |

**Draft CEM Emissions Tables (as Published in DEIR)**  
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in the Final CEM Emissions Tables]

| Table 18<br>Project Incremental 2033: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |                 |                 |                  |                    |                    |                |
|----------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------|--------------------|--------------------|----------------|
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | -0.3            | -0.3            | 1.1              | <del>25.9</del>    | <del>65.6</del>    | 0.3            |
| MDAQMD                                                                                             | <del>8.5</del>  | <del>8.2</del>  | <del>17.9</del>  | <del>502.0</del>   | <del>147.5</del>   | 0.6            |
| West of BIG                                                                                        | -0.3            | -0.3            | 1.4              | <del>32.0</del>    | <del>85.9</del>    | 0.3            |
| East of BIG                                                                                        | 8.6             | 8.3             | <del>17.6</del>  | <del>495.9</del>   | <del>127.3</del>   | 0.5            |
| Total                                                                                              | <del>8.2</del>  | 8.0             | <del>19.0</del>  | <del>527.9</del>   | <del>213.1</del>   | 0.8            |
| Table 19<br>Project Incremental 2048: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |                 |                 |                  |                    |                    |                |
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | <del>0.1</del>  | <del>0.1</del>  | <del>11.0</del>  | <del>242.2</del>   | <del>479.9</del>   | <del>1.9</del> |
| MDAQMD                                                                                             | <del>42.6</del> | <del>41.3</del> | <del>96.0</del>  | <del>2,919.5</del> | <del>1,004.0</del> | 4.0            |
| West of BIG                                                                                        | -0.5            | -0.5            | 12.8             | 257.7              | 613.4              | 2.4            |
| East of BIG                                                                                        | <del>43.2</del> | <del>41.9</del> | <del>94.2</del>  | <del>2,903.9</del> | <del>870.5</del>   | <del>3.5</del> |
| Total                                                                                              | <del>42.7</del> | <del>41.4</del> | <del>106.9</del> | <del>3,161.7</del> | <del>1,483.9</del> | 5.9            |
| Table 20<br>Project Incremental 2048: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |                 |                 |                  |                    |                    |                |
| Region                                                                                             | PM10            | PM2.5           | VOC              | NOx                | CO                 | SOx            |
| SCAQMD                                                                                             | 0.0             | 0.0             | <del>1.8</del>   | <del>39.1</del>    | <del>77.5</del>    | 0.3            |
| MDAQMD                                                                                             | 6.9             | 6.7             | <del>15.5</del>  | <del>471.5</del>   | <del>162.1</del>   | 0.7            |
| West of BIG                                                                                        | -0.1            | -0.1            | <del>2.1</del>   | <del>41.6</del>    | <del>99.1</del>    | 0.4            |
| East of BIG                                                                                        | 7.0             | 6.8             | <del>15.2</del>  | <del>469.0</del>   | <del>140.6</del>   | 0.6            |
| Total                                                                                              | 6.9             | 6.7             | 17.3             | <del>510.6</del>   | <del>239.7</del>   | 1.0            |

**Final CEM Emissions Values Tables**  
(Values from Attachment A to Errata)  
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| Table 18<br>Project Incremental 2033: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |      |       |       |         |         |     |
|----------------------------------------------------------------------------------------------------|------|-------|-------|---------|---------|-----|
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | -0.3 | -0.3  | 1.1   | 25.6    | 65.2    | 0.3 |
| MDAQMD                                                                                             | 8.6  | 8.3   | 18.0  | 504.7   | 148.1   | 0.6 |
| West of BIG                                                                                        | -0.3 | -0.3  | 1.4   | 31.6    | 85.4    | 0.3 |
| East of BIG                                                                                        | 8.6  | 8.3   | 17.7  | 498.6   | 128.0   | 0.5 |
| Total                                                                                              | 8.3  | 8.0   | 19.1  | 530.2   | 213.4   | 0.8 |
| Table 19<br>Project Incremental 2048: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |      |       |       |         |         |     |
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | 0.0  | 0.0   | 10.7  | 235.8   | 471.8   | 1.8 |
| MDAQMD                                                                                             | 42.9 | 41.6  | 96.4  | 2,934.1 | 1,006.5 | 4.0 |
| West of BIG                                                                                        | -0.5 | -0.5  | 12.8  | 257.7   | 613.4   | 2.4 |
| East of BIG                                                                                        | 43.5 | 42.2  | 94.8  | 2,920.6 | 875.7   | 3.6 |
| Total                                                                                              | 42.9 | 41.6  | 107.1 | 3,169.9 | 1,478.3 | 5.9 |
| Table 20<br>Project Incremental 2048: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr)    |      |       |       |         |         |     |
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD                                                                                             | 0.0  | 0.0   | 1.7   | 38.1    | 76.2    | 0.3 |
| MDAQMD                                                                                             | 6.9  | 6.7   | 15.6  | 473.9   | 162.6   | 0.7 |
| West of BIG                                                                                        | -0.1 | -0.1  | 2.0   | 40.3    | 97.3    | 0.4 |
| East of BIG                                                                                        | 7.0  | 6.8   | 15.3  | 471.7   | 141.4   | 0.6 |
| Total                                                                                              | 6.9  | 6.7   | 17.3  | 512.0   | 238.8   | 1.0 |



**Draft CEM Emissions Tables (as Published in DEIR)**  
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| Table 24<br>Project 2028: Annual Corridor GHG Emissions<br>(metric tons/yr) |                        |                |                 |                        |
|-----------------------------------------------------------------------------|------------------------|----------------|-----------------|------------------------|
| Region                                                                      | CO2                    | N2O            | CH4             | CO2e2                  |
| SCAQMD                                                                      | <del>171,450.5</del>   | 4.4            | 13.4            | <del>173,087.4</del>   |
| MDAQMD                                                                      | <del>710,864.7</del>   | 18.1           | 55.7            | <del>717,651.7</del>   |
| West of BIG                                                                 | <del>250,546.2</del>   | 6.4            | 19.6            | <del>252,938.3</del>   |
| East of BIG                                                                 | <del>631,769.0</del>   | 16.1           | 49.5            | <del>637,800.8</del>   |
| Total                                                                       | <del>882,315.2</del>   | 22.5           | 69.1            | <del>890,739.1</del>   |
| Table 25<br>Project 2033: Annual Corridor GHG Emissions<br>(metric tons/yr) |                        |                |                 |                        |
| Region                                                                      | CO2                    | N2O            | CH4             | CO2e2                  |
| SCAQMD                                                                      | <del>188,700.0</del>   | 4.8            | 14.8            | <del>190,501.6</del>   |
| MDAQMD                                                                      | <del>773,423.2</del>   | 19.7           | 60.6            | <del>780,807.5</del>   |
| West of BIG                                                                 | <del>274,865.4</del>   | 7.0            | 21.5            | <del>277,489.7</del>   |
| East of BIG                                                                 | <del>687,257.9</del>   | 17.5           | <del>53.8</del> | <del>693,819.5</del>   |
| Total                                                                       | <del>962,123.2</del>   | 24.5           | 75.4            | <del>971,309.1</del>   |
| Table 26<br>Project 2048: Annual Corridor GHG Emissions<br>(metric tons/yr) |                        |                |                 |                        |
| Region                                                                      | CO2                    | N2O            | CH4             | CO2e2                  |
| SCAQMD                                                                      | <del>237,679.4</del>   | <del>6.1</del> | 18.6            | <del>239,948.7</del>   |
| MDAQMD                                                                      | <del>968,689.0</del>   | 24.7           | 75.9            | <del>977,937.5</del>   |
| West of BIG                                                                 | <del>344,881.2</del>   | 8.8            | 27.0            | <del>348,174.0</del>   |
| East of BIG                                                                 | <del>861,487.2</del>   | 21.9           | 67.5            | <del>869,712.2</del>   |
| Total                                                                       | <del>1,206,368.4</del> | 30.7           | 94.5            | <del>1,217,886.2</del> |

**Final CEM Emissions Values Tables**  
(Values from Attachment A to Errata)  
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| Table 24<br>Project 2028: Annual Corridor GHG Emissions<br>(metric tons/yr) |             |      |      |             |
|-----------------------------------------------------------------------------|-------------|------|------|-------------|
| Region                                                                      | CO2         | N2O  | CH4  | CO2e2       |
| SCAQMD                                                                      | 171,354.7   | 4.4  | 13.4 | 172,990.7   |
| MDAQMD                                                                      | 711,017.1   | 18.1 | 55.7 | 717,805.5   |
| West of BIG                                                                 | 250,419.6   | 6.4  | 19.6 | 252,810.5   |
| East of BIG                                                                 | 631,952.2   | 16.1 | 49.5 | 637,985.7   |
| Total                                                                       | 882,371.8   | 22.5 | 69.1 | 890,796.2   |
| Table 25<br>Project 2033: Annual Corridor GHG Emissions<br>(metric tons/yr) |             |      |      |             |
| Region                                                                      | CO2         | N2O  | CH4  | CO2e2       |
| SCAQMD                                                                      | 188,573.4   | 4.8  | 14.8 | 190,373.8   |
| MDAQMD                                                                      | 773,624.7   | 19.7 | 60.6 | 781,010.9   |
| West of BIG                                                                 | 274,698.0   | 7.0  | 21.5 | 277,320.7   |
| East of BIG                                                                 | 687,500.1   | 17.5 | 53.9 | 694,064.0   |
| Total                                                                       | 962,198.1   | 24.5 | 75.4 | 971,384.6   |
| Table 26<br>Project 2048: Annual Corridor GHG Emissions<br>(metric tons/yr) |             |      |      |             |
| Region                                                                      | CO2         | N2O  | CH4  | CO2e2       |
| SCAQMD                                                                      | 237,239.5   | 6.0  | 18.6 | 239,504.6   |
| MDAQMD                                                                      | 968,825.1   | 24.7 | 75.9 | 978,074.9   |
| West of BIG                                                                 | 344,295.8   | 8.8  | 27.0 | 347,583.0   |
| East of BIG                                                                 | 861,768.8   | 21.9 | 67.5 | 869,996.5   |
| Total                                                                       | 1,206,064.6 | 30.7 | 94.5 | 1,217,579.5 |

**Draft CEM Emissions Tables (as Published in DEIR)**  
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| Table 27<br>Incremental Project 2028: Annual Corridor GHG Emissions<br>(metric tons/yr) |                     |                |                |                     |
|-----------------------------------------------------------------------------------------|---------------------|----------------|----------------|---------------------|
| Region                                                                                  | CO2                 | N2O            | CH4            | CO2e2               |
| SCAQMD                                                                                  | <del>16,040.1</del> | 0.4            | <del>1.3</del> | <del>16,193.3</del> |
| MDAQMD                                                                                  | <del>20,957.1</del> | 0.5            | <del>1.6</del> | <del>21,157.2</del> |
| West of BIG                                                                             | <del>20,335.7</del> | 0.5            | 1.6            | <del>20,529.9</del> |
| East of BIG                                                                             | <del>16,661.5</del> | 0.4            | 1.3            | <del>16,820.6</del> |
| Total                                                                                   | <del>36,997.2</del> | 0.9            | 2.9            | <del>37,350.4</del> |
| Table 28<br>Incremental Project 2033: Annual Corridor GHG Emissions<br>(metric tons/yr) |                     |                |                |                     |
| Region                                                                                  | CO2                 | N2O            | CH4            | CO2e2               |
| SCAQMD                                                                                  | <del>21,513.7</del> | 0.5            | 1.7            | <del>21,719.1</del> |
| MDAQMD                                                                                  | <del>32,878.7</del> | 0.8            | 2.6            | <del>33,192.7</del> |
| West of BIG                                                                             | <del>27,602.0</del> | 0.7            | <del>2.2</del> | <del>27,865.5</del> |
| East of BIG                                                                             | <del>26,790.5</del> | 0.7            | 2.1            | <del>27,046.3</del> |
| Total                                                                                   | <del>54,392.5</del> | 1.4            | 4.3            | <del>54,911.8</del> |
| Table 29<br>Incremental Project 2048: Annual Corridor GHG Emissions<br>(metric tons/yr) |                     |                |                |                     |
| Region                                                                                  | CO2                 | N2O            | CH4            | CO2e2               |
| SCAQMD                                                                                  | <del>25,690.6</del> | <del>0.7</del> | 2.0            | <del>25,935.9</del> |
| MDAQMD                                                                                  | <del>32,829.7</del> | 0.8            | 2.6            | <del>33,143.1</del> |
| West of BIG                                                                             | <del>31,956.1</del> | 0.8            | 2.5            | <del>32,261.2</del> |
| East of BIG                                                                             | <del>26,564.2</del> | 0.7            | 2.1            | <del>26,817.8</del> |
| Total                                                                                   | <del>58,520.3</del> | 1.5            | 4.6            | <del>59,079.0</del> |

**Final CEM Emissions Values Tables**  
**(Values from Attachment A to Errata)**  
**[Formatted for consistency with the Draft CEM Emissions Tables]**

| Table 27<br>Incremental Project 2028: Annual Corridor GHG Emissions<br>(metric tons/yr) |          |     |     |          |
|-----------------------------------------------------------------------------------------|----------|-----|-----|----------|
| Region                                                                                  | CO2      | N2O | CH4 | CO2e2    |
| SCAQMD                                                                                  | 15,944.3 | 0.4 | 1.2 | 16,096.6 |
| MDAQMD                                                                                  | 21,109.5 | 0.5 | 1.7 | 21,311.0 |
| West of BIG                                                                             | 20,209.1 | 0.5 | 1.6 | 20,402.1 |
| East of BIG                                                                             | 16,844.7 | 0.4 | 1.3 | 17,005.5 |
| Total                                                                                   | 37,053.8 | 0.9 | 2.9 | 37,407.6 |
| Table 28<br>Incremental Project 2033: Annual Corridor GHG Emissions<br>(metric tons/yr) |          |     |     |          |
| Region                                                                                  | CO2      | N2O | CH4 | CO2e2    |
| SCAQMD                                                                                  | 21,387.1 | 0.5 | 1.7 | 21,591.2 |
| MDAQMD                                                                                  | 33,080.2 | 0.8 | 2.6 | 33,396.1 |
| West of BIG                                                                             | 27,434.6 | 0.7 | 2.1 | 27,696.5 |
| East of BIG                                                                             | 27,032.7 | 0.7 | 2.1 | 27,290.8 |
| Total                                                                                   | 54,467.3 | 1.4 | 4.3 | 54,987.3 |
| Table 29<br>Incremental Project 2048: Annual Corridor GHG Emissions<br>(metric tons/yr) |          |     |     |          |
| Region                                                                                  | CO2      | N2O | CH4 | CO2e2    |
| SCAQMD                                                                                  | 25,250.7 | 0.6 | 2.0 | 25,491.8 |
| MDAQMD                                                                                  | 32,965.8 | 0.8 | 2.6 | 33,280.5 |
| West of BIG                                                                             | 31,370.7 | 0.8 | 2.5 | 31,670.2 |
| East of BIG                                                                             | 26,845.8 | 0.7 | 2.1 | 27,102.1 |
| Total                                                                                   | 58,216.5 | 1.5 | 4.6 | 58,772.3 |

# **Attachment A**

Final BNSF Barstow International Gateway Corridor Emissions Model (CEM) Analysis

6393229.6

# **BNSF BARSTOW INTERNATIONAL GATEWAY CORRIDOR EMISSIONS ANALYSIS**

BNSF RAILWAY COMPANY  
2500 LOU MENK DRIVE  
FORT WORTH, TEXAS 76131

EnSafe Project Number  
0888840509

Prepared for:



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October 2025

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## **1.0 INTRODUCTION**

BNSF Railway Company's (BNSF) has proposed its Barstow International Gateway (BIG) Project (Proposed Project), which is located in Barstow, CA and unincorporated San Bernardino County. BIG has two primary components when evaluating the effects on air quality under the California Environmental Quality Act (CEQA): first, the facility itself, including the lead tracks; second, the rail corridor between the joint Ports of Long Beach and Los Angeles (San Pedro Ports) in Los Angeles metropolitan area and the California and Arizona border (Corridor) near the BNSF substation of Needles, which will see increased locomotive activity associated with BIG. This analysis concerns the Corridor component.

The purpose of this analysis is to present the terminology, assumptions, methodologies, and results from the Corridor Emissions Model (CEM) for the modeling of air emissions associated with the BNSF locomotives operating on the Corridor. The western portion of the Corridor is located within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), and the eastern portion is within the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The BNSF rail station of Summit delineates the boundary between the SCAQMD and MDAQMD along the Corridor. The CEM specifically evaluates air emissions from rail movements along the entirety of the Corridor under both a "Proposed Project" condition (i.e., BIG obtains all necessary approvals and is built) and a "No Project" condition (i.e., BIG is not built). (See Figure 1). While the emissions associated with rail movements along the Corridor were evaluated under the CEM, the emissions in and around the BIG facility were evaluated separately by Kimley-Horn, BNSF's CEQA consultant. A glossary of terms is provided at the end of this memorandum and the results of the CEM are presented in a separate report. The description of the BIG Project as it affects the CEM was provided by BNSF.

### **1.1 Objective**

The objective of this analysis is to provide BNSF with an assessment of the air emissions associated with BNSF's activities on the Corridor under both the Project and No Project conditions in the three years analyzed in the EIR – 2028 (opening year), 2033 (interim operational year), and 2048 (full operational capacity) for both the Proposed Project and No Project scenarios. This analysis has a number of important technical functions. First, the analysis provides for the disclosure of mass emissions of criteria pollutants and GHG emissions on the Corridor in both the SCAQMD and MDAQMD for both the No Project and the Proposed Project scenarios. Additionally, this analysis provides a direct comparison of No Project and Proposed Project emissions on the Corridor.

## **2.0 BIG RAIL YARD DESCRIPTION**

The BIG rail yard would consist of an intermodal facility (i.e., where cross-dock intermodal operations and other intermodal facility operations would occur and where support intermodal facility uses would be located), a block swap yard, and ancillary rail areas (i.e., container yard, chassis storage, and ancillary rail storage area). BIG's proposed rail yard would operate 24 hours per day, 365 days per year.

### **2.1 Intermodal Facility (IMF) and Cross-dock Intermodal Operations**

BIG's intermodal facility (IMF) operations would consist of two types: cross-dock intermodal and "other" operations. Under existing conditions, international goods arrive at the San Pedro Ports on ships from overseas in 20-foot and 40-foot intermodal containers (international containers). Some of these international containers are unloaded from ships onto heavy-duty trucks, hauled to local warehouses in the Los Angeles Basin, Orange County, and Inland Empire and transloaded into 53-foot intermodal containers (domestic containers), while some international containers are unloaded from ships and travel even further east before being transloaded. Similarly, goods from inland origins destined for the San Pedro Ports would travel west via rail or heavy-duty truck to local warehouses in the Los Angeles Basin, Orange County, and Inland Empire and be transloaded from domestic containers into international containers and then continue by heavy-duty truck to the Port. With BIG, a significant portion of these containers would instead be taken directly by train from the Ports to BIG utilizing a dedicated fleet of Tier 4 linehaul locomotives (Dedicated Fleet), where they would be transloaded at on-site warehouses as part of BIG's cross-dock intermodal operations. The cross-dock intermodal operation is a container-movement operation unique to BIG in which containers would be processed as follows: international containers loaded onto trains on-dock at the Ports; transported by train via a Dedicated Fleet of Tier 4 linehaul locomotives to the proposed BIG intermodal facility; taken by electric hostlers to the proposed on-site transload warehouse center; transloaded into domestic containers; taken by electric hostlers back to BIG intermodal facility; and loaded onto outbound trains at the intermodal facility for movement further east to inland destinations. BIG IMF would also accommodate a small percentage of other intermodal operations to reduce the travel distance/travel time due to traffic conditions that the container would otherwise travel coming to/from other local destinations near BIG.

### **2.2 Block Swap Yard**

The Proposed Project block swap yard would allow inbound trains to be split for the transfer of multiple railcars, or "blocks" of intermodal rail cars (both international and domestic) between trains. A block is defined as rail cars of a similar type moving to a similar destination that are



already connected and can be combined with other blocks intended for similar destinations to produce more efficient train movements. The entire block of rail cars would remain coupled together and be moved en-masse, permitting the synchronizing of blocks to their destinations, so that each train would be compiled of rail car blocks traveling to a similar destination. Blocks could be assembled from inbound trains and/or railcars processed at the IMF carrying containers processed at the transload warehouse center. Certain train blocks may stage at the block swap yard until another train arrives with similar destination. The block swap yard would facilitate switching and transfer of lengthy rail car blocks between tracks for assembling departing trains. Thus, by synchronizing trains to their destinations, the block swap yard would improve train efficiency Eastbound and Westbound. The rail car blocks within the block swap yard would include containers from BIG's IMF and containers processed at the transload warehouse center, combining as needed based on their destination.

### **2.3 Ancillary Rail Area**

The ancillary rail storage area is an approximately 400-acre area north of the existing mainline and would be graded and covered with aggregate to be used for numerous purposes, including a container yard, truck chassis storage, and storage of maintenance equipment. A container yard would support the storage of empty containers awaiting loading while chassis storage would be used to provide parking for empty chassis awaiting use for loading, unloading, or drying of containers. The ancillary rail storage area would also be used for storage of spare parts and equipment for track maintenance, including rail, ties, turnouts, and other track material. Operational emissions from the ancillary rail area are not included in this analysis.

### **3.0 CEM COMPONENTS OVERVIEW**

The BIG CEM calculates air emissions for the Proposed Project and No Project scenarios using actual train movement data between the last three quarters of calendar year 2022 through the first quarter of calendar year 2023 to model future scenario emissions along the Corridor as described herein.

The CEM is composed of six major components in both the Proposed Project and No Project scenarios and in all modeled operational analysis years: "Train Profiles," "Train Trips," "Fleet Mix," "Fuel Blend," and "Fuel Efficiency."

- "Train Profiles" are the physical characteristics of a train such as the number of locomotives, locomotive weight, freight weight, direction of travel, and distance traveled for an average train type along the Corridor. Actual train compositions vary daily; therefore, an annual average was used to generate representative train profiles for each train type.
- "Train Trips" refers to the number of trips for each train type. Actual train trips vary daily; therefore, an annual average was used to generate representative train trip rate for each train type.
- "Fleet Mix" represents the blend of locomotive types used for each scenario and modeled for each operational analysis year; locomotive types are classified by the engine tier, ranging from Tier 1 to Tier 4 in this model.
- "Fuel Blend" refers to the mix of conventional and renewable fuels used for each scenario and modeled for each operational analysis year. Starting in BIG opening year 2028, as part of the Proposed Project, BNSF has committed to increase the renewable diesel fueling of our linehaul locomotives within southern California from 1 percent to 10 percent, a 9-percentage point increase in renewable diesel for Eastbound movements. This is a region-wide average and not indicative of an increase at any specific site within southern California. The renewable diesel fuel blend will remain at 1 percent for No Project.
- "Fuel Emission Factors" are a standardized value representing the amount of a pollutant or greenhouse gas released per unit of a specific activity. The emission factors for the CEM are adjusted for locomotive technology and activity type.

- To estimate the “Fuel Efficiency” for the various scenarios and modeled operational analysis years, the CEM incorporates the BNSF Fuel Efficiency Model (FEM), a regression model based on actual 2023 Corridor fuel usage data provided by BNSF.

| Table 1<br>Summary of CEM Components for Proposed Project Compared to the No Project Scenario |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Component                                                                                     | No Project                                                                                                                                                                                                                                                                                                                                  | Proposed Project                                                                                                                                                                                                                             |
| Train Profiles                                                                                | Includes number of locomotives, locomotive weight, freight weight, direction of travel, distance traveled, and idling time. See Appendix A, which is based on 2022/2023 BNSF data, and which was developed in coordination with BNSF.                                                                                                       | Identical to the No Project scenario.                                                                                                                                                                                                        |
| Train Trips                                                                                   | Assumes compounded annual growth rates (CAGR) between 1% and 2.5% for Z, Q, and S trains and no growth for all other trains. CAGRs provided by BNSF. See Appendix B for details.                                                                                                                                                            | CAGR of 2.5% for Z trains. Volume adjusted change in train trips for Q and S trains. No growth for all other trains. CAGRs provided by BNSF. See Appendix B for details.                                                                     |
| Fleet Mix                                                                                     | Based on 2023 report for the 1998 MOU and adjusted for full conversion of Tier 0 and 1 to Tier 1+ and Tier 2 to Tier 2+. After 2023, forecasts for Annual Tier 4 purchases are based on 5-year historical average purchase rates, and Tier 1+ locomotives are planned to be replaced at a rate of 100 per every 85 Tier 4 credit purchases. | Identical to the No Project scenario except for the additional Dedicated Fleet of Tier 4 locomotives for the additional S train container volume (generated by the mode shift from truck to rail) between the San Pedro Ports and BIG’s IMF. |
| Fuel Blend                                                                                    | 1 percent renewable diesel for Eastbound trips. Zero renewable for Westbound trips.                                                                                                                                                                                                                                                         | 10 percent renewable diesel for Eastbound trips. Zero renewable for Westbound trips.                                                                                                                                                         |
| Fuel Emission Factors                                                                         | Based on line-haul locomotives. Criteria pollutant emissions factors based on EPA. GHG emission factors based on CARB.                                                                                                                                                                                                                      | Identical to the No Project scenario.                                                                                                                                                                                                        |
| Fuel Efficiency                                                                               | Regression model based on 2023 BNSF data. See Appendix D which was developed in coordination with BNSF.                                                                                                                                                                                                                                     | Identical to the No Project scenario.                                                                                                                                                                                                        |

For the CEM, train types fall into two categories, Non-Affected and Affected Train Types. The “Train Profiles” and “Train Trips” of Non-Affected Train Types are expected to remain unchanged in both the Proposed Project and No Project scenarios between each modeled operational analysis year because the average physical characteristics of those trains are not affected by the Proposed Project. Affected Train Types consist of B, Q, and S trains. The “Train Profiles” for Affected Train Types are not expected to change between the Proposed Project and No Project scenarios in each modeled operational analysis year because the average physical characteristics of those trains are not expected to change under the Proposed Project. However, the “Train Trips” for the Affected Train Types are anticipated to change between the Proposed Project and No Project scenarios in each modeled operational analysis year because, as the Proposed Project is a mode shift from truck to rail, the total volume of goods moving through the Corridor is affected by the Proposed Project. Since the average physical characteristic (Train Profiles) of those trains do not change in the CEM, the number of “Train Trips” is changed in the CEM to accommodate the change in volume. “Fleet Mix,” “Fuel Blend,” and “Fuel Efficiency” are applied equally to both

Non-Affected and Affected Train Types and only varies between Proposed Project and No Project scenarios.

### **3.1 CEM Methodology**

As stated earlier, one of the objectives of the CEM was to model mass emissions of criteria pollutants on the Corridor associated with BIG as these must be disclosed in the EIR. The CEM estimates peak daily and annual emissions for both moving emissions and idling emissions for trains in the Corridor. The peak daily emissions are based on the annual average result with a 13% safety margin. The methodologies for estimating these emissions for both the Proposed Project and No Project scenarios are discussed below.

#### **3.1.1 Train Types**

The CEM estimates emission from five train types. The five train types are described below.

- Z (Priority) trains: Trains that primarily consist of domestic containers with expedited delivery times such as FedEx and UPS, as well as some other high-priority intermodal goods, that have a guaranteed delivery time.
- S (Stack) trains: Trains composed of international containers that arrive at the San Pedro Ports and are loaded on-dock directly on to railcars for transport eastward as an Inland Point Intermodal (IPI) rail transport destined for a specific inland destination. With BIG, additional S trains will depart from the Ports due to the mode shift from truck to train and arrive at BIG's IMF for transloading at the on-site warehouses, as described in the cross-dock intermodal operation above.
- Q (Premium) trains: Trains that contain mostly domestic containers. A small portion of these trains contain goods that stay in international containers that are trucked from the San Pedro Ports to BNSF's Hobart intermodal facility for placement on an Eastbound train. The majority of these trains, however, contain mostly domestic containers that have been transloaded at local warehouses. Containers are primarily trucked from the Ports in international containers to local warehouses where they are sorted and repackaged (i.e. transloaded) into a domestic container and then trucked to a BNSF intermodal facility and loaded on an Eastbound train. With BIG, the additional S trains that result from the mode shift from truck to train described above, will depart BIG's IMF as Q trains after being transloaded from international containers into domestic containers, for transport to eastern destinations.

- B (Bare table) trains: Trains that do not carry loaded containers. They are used to move equipment and empty containers, including repositioning empty containers and equipment between rail stations on the rail network.
- All other trains (non-intermodal): All other trains (non-intermodal) are trains that are not composed of standard 20-foot, 40-foot or 53-foot intermodal containers. They are typically used to transport general merchandise such as liquids and bulk commodities such as grain, coal, and automobiles.

### **3.1.2 Corridor Segments**

The CEM breaks the Corridor into four segments, including 1) San Pedro Ports to San Bernardino station, 2) San Bernardino station to Summit station, 3) Summit station to Barstow station/BIG, and 4) Barstow station/BIG to the California/Arizona border near Needles station. Segment 1 between the San Pedro Ports and San Bernardino is part of the flatter geological Los Angeles basin region and is fully contained within the jurisdiction of SCAQMD. The topography of the mountainous region between the San Bernardino and Barstow stations (Segments 2 and 3) is remarkably different from the flatter Los Angeles basin, therefore, is distinguished from the segment between the San Pedro Ports and San Bernardino Station (Segment 1). This mountainous region is further divided into two segments at the Summit station to delineate the boundary between SCAQMD and MDAQMD jurisdictions. Segment 4 is the geographical region between the Barstow and the Needles stations, which is entirely within the jurisdiction of MDAQMD.

### **3.1.3 Moving Emissions**

Moving emissions are emissions associated with each train movement within the Corridor. Moving emissions are calculated by multiplying the gross tonnage of the train (freight plus locomotive weight) and the total miles the train traveled through the Corridor to produce the gross ton-mile (GTM). The gross ton-mile is combined with the fuel efficiency of the train from the FEM, which accounts for the direction the train is traveling using a positive or negative grade slope of the Corridor. Lastly, the model calculates a composite emission factor using the United States Environmental Protection Agency (U.S. EPA) Locomotive Line-Haul Tier Emission Factors. The composite emission factor is a weighted average, determined by the fleet mix (percentage of locomotives in each tier within the fleet), which is detailed in the "Fleet Mix" section below. Equation 1 describes the variables associated with calculating the total moving emissions for each pollutant; with the total emissions value calculated for each train trip by multiplying the total

number of trains. Equation 2 demonstrates the calculation for the FEM, and Equation 3 details the calculation method for determining the composite emission factor for each pollutant. All three equations are used to calculate moving emissions.

Equation 1.

$$\begin{aligned} \text{Moving Emissions}_i &= \left( \text{Freight Weight} \left( \frac{\text{tons}}{\text{train}} \right) + \text{Locomotive Weight} \left( \frac{\text{tons}}{\text{train}} \right) \right) \times \text{Corridor Distance} \left( \frac{\text{miles}}{\text{trip}} \right) \\ &\times \text{Number of Train Trips (train - trips)} \\ &\div \text{Fuel Efficiency} \left( \frac{\text{gross ton - miles}}{\text{gallon}} \right) \times EF_{iRR} \left( \frac{\text{g}}{\text{gallon}} \right) \end{aligned}$$

Equation 2.

$$\begin{aligned} \text{Fuel Efficiency} &= \text{Intercept (directional)} + \text{Grade Coefficient} * \text{Grade} \\ &+ \text{Distance Coefficient} * \text{Distance} + \text{Weight Coefficient} * \text{Weight} \\ &+ \text{HPT Coefficient} * \text{HPT} \end{aligned}$$

Equation 3.

$$EF_{iRR} = \sum_{T=1}^9 (EF_{iT} \times f_{TRR})$$

where,

$$\begin{aligned} EF_{iRR} &= \text{Composite Emission Factor for pollutant } i \text{ for Class I railroad (grams/gallon)} \\ EF_{iT} &= \text{Emission Factor for pollutant } i \text{ for locomotives in Tier } T \text{ (grams/gallon)} \\ f_{TRR} &= \text{Fraction of fleet in Tier } T. \end{aligned}$$

### 3.1.4 Idling Emissions

Idling emissions are emissions within the Corridor for all locomotives under minimum operating conditions (idling throttle position) while stationary. For this calculation, each line-haul locomotive is assumed to produce 25 horsepower during idling, with a brake-specific fuel consumption rate of 20.8 brake horsepower hour per gallon (U.S. EPA: Emission Factors for Locomotives, 2009). Equation 4 describes all the variables associated with calculating the total idling emissions for each pollutant, which are then multiplied by the total number of trains. The same equation was used for both the Project and No Project scenarios.

Equation 4.

*Idling Emissions<sub>i</sub>*

$$\begin{aligned}
 &= \text{Number of Locomotives per Train} \left( \frac{\text{loco}}{\text{train}} \right) \times \text{Number of Trains (trains)} \\
 &\times \text{Idling Time (hr)} \times \text{Idling Power} \left( \frac{\text{bhp}}{\text{loco}} \right) \\
 &\div \text{Brake Specific Fuel Consumption} \left( \frac{\text{bhp} - \text{hr}}{\text{gallon}} \right) \times EF_{\text{IRR}} \left( \frac{\text{g}}{\text{gallon}} \right)
 \end{aligned}$$

### 3.2 CEM Components and Assumptions

This analysis provides an overview of the six major aspects of the CEM. This section describes the additional technical details and the underlying assumptions for the Proposed Project and No Project scenarios.

#### 3.2.1 Train Profiles

The train profiles are based on the last three quarters of calendar year 2022 through the first quarter of calendar year 2023 train data provided by BNSF and have been defined for both the Proposed Project and No Project scenarios. See Appendix A. The train profiles define key characteristics for a typical train, by train type, along the Corridor including the number of locomotives, locomotive weight, freight weight, direction of travel, distance traveled, and idling time. That is to say, a typical S train may have a slightly different annual average number of locomotives, locomotive weight, freight weight, direction of travel, idling time, and distance traveled when compared to a different train type within the Corridor. Detailed train profiles can be found in Appendix A.

The number of locomotives on each train is determined by the Horsepower-per-Tons (HPTs), which represent the calculated locomotive power required to move a train of a measured weight across a given distance. The HPT value is assigned by BNSF based on train type, priority, and terrain (See Appendix E).

The formula for calculating the number of locomotives required for an individual train in the real world is presented in Equation 5:

Equation 5.

$$\text{Number of locomotives} = \frac{\text{Train freight weight} \times \text{HPT}}{4,400 \text{ horsepower per locomotive}}$$

The resulting value is then rounded up to the nearest number of whole locomotives. For example, if an 8,000-ton train has an HPT of 2.5, the required number of locomotives for the train would be 5 ( $8,000 \times 2.5 / 4,400 = 4.5$ ). While real world trains only operate with whole numbers of locomotives, the CEM is based on fractional locomotives since the train profiles are averaged based on an annual average for each train type, which is also fractional. The only exception to this calculation is for B trains, which, due to not carrying freight weight on the railcars, only have two locomotives, and so are assumed to operate with two locomotives in the CEM model.

The weight of each locomotive is based on an assumption of 209 tons per engine with an additional 18 tons per full tank of fuel per engine. The CEM conservatively assumes each locomotive carries a full tank of fuel throughout the Corridor. The weight of the locomotive also includes the weight of the freight which is determined by taking the total weight of freight moved through each segment of the Corridor and dividing by the number of trains that pass through that same segment, providing an average weight of freight per train for each corridor segment.

The mileage of each train trip is the distance traveled in each segment of the Corridor and is based on average distance traveled by train type for terminating segments and fixed distances for middle segments. The mileages for Segments 2, 3, and 4 are fixed distances because trains are not expected to terminate their trip anywhere along these middle segments. In other words, once a train enters any of these middle segments, it is expected to complete its journey through the segment. This is also true for S trains that traverse Segment 1. S trains in Segment 1 are assumed to travel the full distance between the San Pedro Ports and the San Bernardino station; therefore, their mileage is based on a fixed distance. The mileage for remaining train types that traverse Segment 1 are calculated based on the total miles traveled in a year divided by total train trips in a year, providing an average mileage per train. Unlike the trains in the middle segments (Segments 2, 3, and 4), most trains that are in Segment 1 can terminate their trip along several stations within the segment, shortening their mileage when compared to the full distance of the segment.

Idling time represents the amount of time a train will run their engines in the “idling” throttle position in each segment. The average idling times in each segment of the Corridor for each train type for the Project and No Project scenarios are presented in hours per trip. The average idling times were provided by BNSF.



### **3.2.2 Train Trips**

The number of train trips is based on the last three quarters of calendar year 2022 through the first quarter of calendar year 2023 data provided by BNSF shown in Appendix A (the most recent year for which data was available when the modeling commenced), and the daily train trip rate was generated by summing the total number of train trips in each segment and dividing by 365 days per year. The number of daily train trips is not expected to change for most train types in any scenario. The only train types that may experience growth on the Corridor for each scenario are Z trains and Affected Train Types (B, S and Q trains). Affected Train Types (B, S and Q trains) are trains that may be affected by the change in any of the following three categories of movement: 1) volume of international containers related to the Proposed Project based on the mode shift from truck to S trains between the San Pedro Ports and BIG IMF, 2) the change in volume of domestic containers transloaded on to Eastbound Q trains from international containers at BIG IMF, and 3) regional domestic containers on trucks that currently go to other BNSF intermodal facilities within California, but due to geographic proximity of the proposed BIG IMF, will instead go directly to BIG IMF to be placed on Eastbound Q trains. Affected Train Type movements are further described below:

- S (Stack) trains: With BIG, additional S trains will depart from the San Pedro Ports due to the mode shift from truck to train and arrive at BIG's IMF for transloading at the on-site warehouses. Therefore, S train types are considered Affected.
- Q (Premium) trains: With BIG, the additional S trains that result from the mode shift from truck to train described above, will depart BIG's IMF as Q trains after being transloaded from international containers into domestic containers, for transport to eastern destinations. Therefore, Q train types are considered Affected.
- B (Bare table) trains: Currently, BNSF moves empty containers and equipment out of terminals on B trains ahead of light loading days and moves them back to the terminals on heavy loading days. The BIG Block Swap yard in the Proposed Project will allow BNSF to utilize any unused loading capacity in the Q trains operating between BNSF terminals and BIG to handle some of the variations in light and heavy loading days. Consequently, B trains may experience a reduction in train trips, however, a conservative modeling approach was used which maintains the current B train trips under the Proposed Project. Since project elements (BIG Block Swap yard) can technically affect the number of B train trips, they are considered Affected, even though there is no anticipated change between the No Project and the Proposed Project in the CEM.

The Proposed Project 2028 scenario is the opening year of the BIG facility. An increase in opening year cross-dock international volume will occur in addition to the quarterly 2022/23 volumes noted above (with standard CAGRs applied to 2028). This initial volume increase is detailed below:

- An increase of 199,000 S train containers from the Ports to BIG's IMF. With BIG, these 199,000 international containers would depart the Ports directly by rail (replacing the existing move by heavy-duty truck) and travel on an S train to BIG's IMF.
- An increase of 133,333 Q train containers. Due to domestic containers being larger, the goods from three international containers can condense into two domestic containers via the cross-dock process, thus, 199,000 S train containers after being transloaded, results in approximately 132,667 Q train containers. There will also be an estimated 1,000 international containers annually (less than 3 per day) that will be trucked from the San Pedro Ports to BIG. These containers will be transloaded at BIG, resulting in an additional 666 domestic containers that will depart BIG's IMF eastward as a Q train. Therefore, the total estimated volume of Q train containers in the 2028 opening year is forecast to be 133,333.
- A decrease of 18,000 Q train containers west of BIG (53-foot intermodal truck volume currently traveling to existing BNSF intermodal facilities but will be added to trains at the BIG IMF instead of heading farther west to get transloaded on to Q trains at the existing facilities).

Further, the Proposed Project CAGR of 5.75% will be applied to S trains container volumes generated by the mode shift from truck to rail during the ramp up period between 2028 and 2033. This represents the growth of the market capture of existing international containers that, without BIG, are currently transported by truck from the San Pedro Ports eastward. With BIG, these international containers would convert from truck to a rail as S trains from the San Pedro Ports to BIG. This S train volume arriving at BIG would be transloaded onto domestic containers, as part of the cross-dock intermodal move, and depart BIG as Q trains eastward. Thus, cross-dock intermodal Q trains will also experience a ramp-up growth rate. BNSF did not calculate a separate growth rate for these cross-dock intermodal Q train containers, given there is no growth change in the volume of the goods that are transloaded from S train containers to Q train containers. Instead, the goods from three (3) cross-dock international containers are simply transloaded into two (2) cross-dock domestic containers. As a result, growth rates for the

domestic cross-dock intermodal Q train containers will be slightly less than, but directly proportional to, the CAGR for cross-dock intermodal S trains because for every three (3) S train international containers, two (2) Q train domestic containers will result. The underlying CAGR of all other Q train domestic containers remains at 2.5% and all other international containers remains at 1%. Since Z trains are primarily composed of domestic containers, the number of trips for Z trains is anticipated to change at a CAGR of 2.5% for all Proposed Project scenarios. The existing fleet of B trains are anticipated to cover the volume changes in the Proposed Project scenarios and the Block Swap yard is anticipated to manage the B trains more efficiently; therefore, no change in B trains is included in the Proposed Project scenario. The CAGRs and opening year volumes used for the Proposed Project scenarios were provided by BNSF. Detailed volume and train trips for the Proposed Project can be found in Appendices A and B.

Unlike the Proposed Project scenario, the No Project scenario will not have an initial volume increase in 2028. However, the No Project scenarios will experience some growth. For the No Project scenarios, international and domestic container volumes are expected to grow at a CAGR of 1% and 2.5%, respectively. Since Z trains are primarily composed of domestic containers, the number of trips for Z trains is anticipated to change at a CAGR of 2.5% for all No Project scenarios. S trains are primarily composed of international containers, and therefore the number of S trains is anticipated to change at a CAGR of 1% for all No Project scenarios. Q trains are composed of a mix of international and domestic containers, so their train trip rate is more variable. However, Q trains are mostly composed of domestic containers, therefore, the weighted CAGR applied to all Q train trips for No Project scenarios is closer to 2.5% than 1%. The current fleet of B trains is anticipated to cover the volume changes in the No Project scenarios, therefore, no change in B trains is included in the No Project scenario. The CAGRs used for the No Project scenarios were provided by BNSF. Detailed volume and train trips for No Project scenarios can be found in Appendix's A and B.

The CAGRs and other volume changes for the No Project and Proposed Project scenarios were provided by BNSF by train type as shown in Appendix B. The No Project and Project train trips and CAGRs are summarized in Table 2.

While this discussion focuses on Eastbound volume increases and CAGRs, the Westbound volumes are operationally engineered to match Eastbound volumes. That is to say, operations design systems to minimize empty trains by balancing the volumes in each direction. This could manifest as more trips with shorter trains in one direction, but fewer, longer, trains in the opposite. Since the volumes are equal in each direction, the number of train trips of both the Eastbound and

westbound directions can be volume adjusted to ensure train trips forecasts will account for volume increases any direction. Simply put, if the Eastbound train trips are increased by 10 percent in a segment in the eastern direction, then the Westbound train trips are also increased by 10 percent in the same segment, and vice versa. Using this transitive property, the CEM uses the Eastbound volumes to adjust both Eastbound and Westbound train trip for all scenarios.

| Table 2<br>Summary of Average Train Trip CAGRs for Proposed Project Compared to No Project Scenario 2022-23 to 2048                                               |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Train Type                                                                                                                                                        | No Project:                                                                                             | Proposed Project (Opening Year 2028):                                                                                                                                                                                                                                                                                                                  |
| Between the years 2022/23 and Opening Year 2028, the No Project CAGRs are applied to the actual 2022/23 base volumes for both the No Project and Proposed Project |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                        |
| <b>Z trains</b>                                                                                                                                                   | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048.</li> </ul>      | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048 (<b>same as No Project</b>).</li> </ul>                                                                                                                                                                                                                         |
| <b>S trains</b>                                                                                                                                                   | International containers: <ul style="list-style-type: none"> <li>CAGR of 1.0% for 2028-2048.</li> </ul> | International containers that go from Ports to BIG's IMF for transloading (cross-dock intermodal containers): <ul style="list-style-type: none"> <li>CAGR of 5.75% for 2028-2033 and then 1% from 2034-2048.</li> </ul>                                                                                                                                |
|                                                                                                                                                                   |                                                                                                         | All other international containers: <ul style="list-style-type: none"> <li>CAGR of 1.0 % for 2034-2048 (<b>same as No Project</b>).</li> </ul>                                                                                                                                                                                                         |
| <b>Q trains</b>                                                                                                                                                   | Q trains are a mix of domestic and international with CAGRs as follows:                                 | Q trains are a mix of domestic and international containers, with CAGRs as follows:                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                   | International containers: <ul style="list-style-type: none"> <li>CAGR of 1% for 2028-2048.</li> </ul>   | International containers: <ul style="list-style-type: none"> <li>CAGR of 1% for 2028 – 2048 (<b>same as No Project</b>).</li> </ul>                                                                                                                                                                                                                    |
|                                                                                                                                                                   | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048.</li> </ul>      | Domestic cross-dock intermodal containers that go from BIG eastward after transloading (previously known as international S-trains prior to transloading, which are converted to domestic Q-trains after transloading): <ul style="list-style-type: none"> <li>CAGR is directly proportional to S train growth for 2028-2033 and 2034-2048.</li> </ul> |
|                                                                                                                                                                   |                                                                                                         | All other Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048 (<b>same as No Project</b>).</li> </ul>                                                                                                                                                                                                               |
| <b>B trains</b>                                                                                                                                                   | No loaded containers. CAGR of 0% for 2028-2048.                                                         | No loaded containers. CAGR of 0% for 2028-2048 ( <b>same as No Project</b> ).                                                                                                                                                                                                                                                                          |
| <b>All other trains Non-Intermodal</b>                                                                                                                            | Mix of non-container commodities. CAGR of 0% for 2028-2048.                                             | Mix of non-container commodities. CAGR of 0% for 2028-2048 ( <b>same as No Project</b> ).                                                                                                                                                                                                                                                              |

### **3.2.3 Fleet Mix**

The fleet mix refers to the distribution of locomotive engine tiers within the usable BNSF fleet servicing the Corridor. The locomotive engine tiers range from Tier 0 (older, with higher air pollutant emissions) to Tier 4 (newest, with lower emissions). In order to make the CEM more representative of the activities within the Corridor, the usable fleet mix was limited to the Southern California region instead of using the active national BNSF fleet. The Southern California fleet mix was determined by using the CARB 1998 Memorandum of Mutual Understanding, which presents an annual reported fleet mix. The most current report is from 2023 and was used as a basis of the distribution. The detailed locomotive fleet mix can be found in Appendix C.

BNSF anticipates the following changes for Proposed Project and No Project scenarios to the fleet mix in California. 1) by 2028 all Tier 0 through Tier 1 locomotives are removed from service based on expected mechanical and operational needs provided by BNSF, 2) by 2028 all Tier 2 locomotives are expected to be converted to Tier 2+ service based on expected mechanical and operational needs provided by BNSF, 3) 33 Tier 4 credit locomotives will be purchased annually based on a 5-year historical average, and 4) Tier 1+ locomotives are planned to be replaced at a rate of 100 per every 85 Tier 4 credit locomotives purchased based on power demands.

For all Proposed Project scenarios, any increase in S train trips over No Project between the San Pedro Ports related to the cross-dock intermodal operations (Segment 1, 2, and 3) is assumed to be powered by a Dedicated Fleet of locomotives. The Dedicated Fleet is composed of newly purchased Tier 4 locomotives and is separate from the usable fleet mix that services all other rail traffic. Based on the predicted volumes, the assumed opening year (2028) Dedicated fleet size may be up to 26 Tier 4 locomotives and up to 36 Tier 4 locomotives by 2048. The Dedicated Fleet size is based on 6 locomotives per train for each additional S train trip that may occur in the Proposed Project scenarios, plus one additional set of 6 locomotives. This additional set is included to conservatively account for any fluctuations in several factors such as train profile, HPT and locomotive maintenance. The remaining train types in the Proposed Project would be operated by a fleet mix identical to the No Project.

### **3.2.4 Fuel Blend**

The Proposed Project scenarios would increase the use of renewable diesel in the locomotives traveling in the Eastbound direction (fueled in California). The Proposed Project scenarios would not change the use of renewable diesel in Westbound travel (trains fueled outside of California), because the availability of additional renewable fuel is not expected to change in stations outside California. Further, since the additional renewable will only be implemented if BIG is approved

and constructed, the Eastbound and Westbound traffic will continue to be one percent and zero percent renewable, respectively, for No Project scenarios. The Proposed Project scenarios will increase the renewable fuel usage in Eastbound traffic from one percent to no less than 10 percent beginning in the Proposed Project opening year. Renewable fuel usage in Westbound traffic is not expected to increase.

### **3.2.5 Fuel Emissions Factors**

The criteria pollutant fuel emission factors are based on U.S. EPA certified diesel emission factors (United States Environmental Protection Agency: Emission Factors for Locomotives, 2009) and are adjusted to account for the use of renewable diesel based on emission factors from the Renewable Diesel Fuel Effects on Exhaust Emissions from a Tier 3 GE ES44C4 Locomotive (CARB, 2021).

The greenhouse gas emission factors are based on The Climate Registry (2021) and were adjusted to reflect a 62 percent reduction based on the carbon intensity of renewable diesel compared to conventional diesel (California Air Resources Board LCSF Pathways, 2024, <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>). That is to say, the renewable diesel produces 62 percent fewer GHG emissions when compared to conventional diesel in a life-cycle analysis. The composite emission factors can be found in Appendix C.

### **3.2.6 Fuel Efficiency Model (FEM)**

Fuel efficiency is measured in gross ton miles per gallon. The fuel efficiency was calculated for each train type and each segment using the FEM. The FEM is a statistical regression model which establishes a mathematical equation to predict fuel efficiency based on actual fuel use data, provided by BNSF, for each train type and corresponding segment that operated in 2023. The FEM is a function of train type, slope grade, distance, weight, and HPT. The train type, distance, weight, and HPT are based on the same train profiles used in the CEM. The slope grade is based on the Train Track Charts provided by BNSF. A demonstration of the FEM is presented in Equation 2 and Appendix D.

#### **4.0 CRITERIA POLLUTANT EMISSIONS SUMMARY**

Below is a summary of criteria pollutant emissions for the No Project and Proposed Project scenarios for all analysis years.

##### **4.1 No Project Scenarios**

The following outlines the conditions applicable to all No Project scenarios. Conditions specific to individual analysis years are detailed in their respective sections.

- International containers have a CAGR of 1%.
- Domestic containers have a CAGR of 2.5%.
- B trains are not expected to change and are anticipated to cover the CAGR changes in the scenario.
- The fuel for all Eastbound traffic is modeled with 1% renewable diesel.
- The fuel for all Westbound traffic is modeled at 0% renewable diesel.
- Fleet mix assumes all locomotives below Tier 1 are removed from service, all Tier 2 locomotives are converted to Tier 2+, and standard replacement rates for Tier 1+ to Tier 4 locomotives.
- No Dedicated Fleet.

#### 4.1.1 2028 Emissions Summary

The No Project 2028 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Tables 3 and 4 summarize the No Project criteria pollutant emissions. See Appendix E for detailed calculations.

| Table 3<br>No Project 2028: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |         |       |         |          |          |      |
|------------------------------------------------------------------------------------------|---------|-------|---------|----------|----------|------|
| Region                                                                                   | PM10    | PM2.5 | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                            |         |       |         |          |          |      |
| SCAQMD                                                                                   | 230.1   | 223.2 | 431.9   | 11,008.3 | 2,776.3  | 9.8  |
| <b>MDAQMD</b>                                                                            |         |       |         |          |          |      |
| MDAQMD                                                                                   | 1,020.5 | 989.8 | 1,915.2 | 48,805.7 | 12,309.8 | 43.5 |
| West of BIG                                                                              | 110.5   | 107.2 | 207.4   | 5,284.0  | 1,332.9  | 4.7  |
| East of BIG                                                                              | 909.9   | 882.6 | 1,707.8 | 43,521.7 | 10,976.9 | 38.7 |

| Table 4<br>No Project 2028: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |       |       |         |         |     |
|---------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|-----|
| Region                                                                                | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                         |       |       |       |         |         |     |
| SCAQMD                                                                                | 37.2  | 36.0  | 69.8  | 1,777.9 | 448.4   | 1.6 |
| <b>MDAQMD</b>                                                                         |       |       |       |         |         |     |
| MDAQMD                                                                                | 164.8 | 159.9 | 309.3 | 7,882.3 | 1,988.1 | 7.0 |
| West of BIG                                                                           | 17.9  | 17.3  | 33.5  | 853.4   | 215.3   | 0.8 |
| East of BIG                                                                           | 147.0 | 142.5 | 275.8 | 7,028.9 | 1,772.8 | 6.3 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
 PM2.5 = Particulate matter less than 2.5 microns in diameter  
 VOC = Volatile organic compound  
 NOx = Nitrogen oxides  
 CO = Carbon monoxide  
 SOx = Sulfur dioxide  
 CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.



#### 4.1.2 2033 Emissions Summary

The No Project 2033 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Tables 5 and 6 summarize the No Project criteria pollutant emissions. See Appendix E for detailed calculations.

| Table 5<br>No Project 2033: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |         |       |         |          |          |      |
|------------------------------------------------------------------------------------------|---------|-------|---------|----------|----------|------|
| Region                                                                                   | PM10    | PM2.5 | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                            |         |       |         |          |          |      |
| SCAQMD                                                                                   | 229.3   | 222.4 | 434.9   | 11,301.9 | 2,986.7  | 10.5 |
| <b>MDAQMD</b>                                                                            |         |       |         |          |          |      |
| MDAQMD                                                                                   | 1,015.0 | 984.5 | 1,924.4 | 49,997.4 | 13,213.5 | 46.6 |
| West of BIG                                                                              | 109.6   | 106.4 | 207.8   | 5,398.6  | 1,426.9  | 5.0  |
| East of BIG                                                                              | 905.3   | 878.1 | 1,716.5 | 44,598.8 | 11,786.6 | 41.6 |

| Table 6<br>No Project 2033: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |       |       |         |         |     |
|---------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|-----|
| Region                                                                                | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                         |       |       |       |         |         |     |
| SCAQMD                                                                                | 37.0  | 35.9  | 70.2  | 1,825.3 | 482.4   | 1.7 |
| <b>MDAQMD</b>                                                                         |       |       |       |         |         |     |
| MDAQMD                                                                                | 163.9 | 159.0 | 310.8 | 8,074.8 | 2,134.0 | 7.5 |
| West of BIG                                                                           | 17.7  | 17.2  | 33.6  | 871.9   | 230.5   | 0.8 |
| East of BIG                                                                           | 146.2 | 141.8 | 277.2 | 7,202.9 | 1,903.6 | 6.7 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
 PM2.5 = Particulate matter less than 2.5 microns in diameter  
 VOC = Volatile organic compound  
 NOx = Nitrogen oxides  
 CO = Carbon monoxide  
 SOx = Sulfur dioxide  
 CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.

### 4.1.3 2048 Emissions Summary

The No Project 2048 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Tables 7 and 8 summarize the No Project criteria pollutant emissions. See Appendix E for detailed calculations.

| Table 7<br>No Project 2048: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |       |       |         |          |          |      |
|------------------------------------------------------------------------------------------|-------|-------|---------|----------|----------|------|
| Region                                                                                   | PM10  | PM2.5 | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                            |       |       |         |          |          |      |
| SCAQMD                                                                                   | 219.7 | 213.1 | 435.2   | 12,215.6 | 3,787.1  | 13.4 |
| <b>MDAQMD</b>                                                                            |       |       |         |          |          |      |
| MDAQMD                                                                                   | 968.9 | 939.9 | 1,919.2 | 53,860.5 | 16,699.5 | 58.9 |
| West of BIG                                                                              | 104.4 | 101.3 | 206.8   | 5,800.7  | 1,798.7  | 6.3  |
| East of BIG                                                                              | 864.5 | 838.6 | 1,712.5 | 48,059.8 | 14,900.8 | 52.6 |

| Table 8<br>No Project 2048: Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |       |       |         |         |     |
|---------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|-----|
| Region                                                                                | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                         |       |       |       |         |         |     |
| SCAQMD                                                                                | 35.5  | 34.4  | 70.3  | 1,972.9 | 611.6   | 2.2 |
| <b>MDAQMD</b>                                                                         |       |       |       |         |         |     |
| MDAQMD                                                                                | 156.5 | 151.8 | 310.0 | 8,698.7 | 2,697.0 | 9.5 |
| West of BIG                                                                           | 16.9  | 16.4  | 33.4  | 936.8   | 290.5   | 1.0 |
| East of BIG                                                                           | 139.6 | 135.4 | 276.6 | 7,761.9 | 2,406.5 | 8.5 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
 PM2.5 = Particulate matter less than 2.5 microns in diameter  
 VOC = Volatile organic compound  
 NOx = Nitrogen oxides  
 CO = Carbon monoxide  
 SOx = Sulfur dioxide  
 CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.

## **4.2 Proposed Project Scenarios**

The following outlines the conditions applicable to all Proposed Project scenarios. Conditions specific to individual analysis years are detailed in their respective sections.

- International containers have a CAGR of 1% for non-“ramp up” period.
- Domestic containers have a CAGR of 2.5% for non-“ramp up” period.
- The current B train fleet size is anticipated to cover the CAGR changes in the scenario.
- The fuel for all Eastbound traffic is modeled with 10% renewable diesel.
- The fuel for all Westbound traffic is modeled at 0% renewable diesel.
- Fleet mix assumes all locomotives below Tier 1 are removed from service, all Tier 2 locomotives are converted to Tier 2+, and standard replacement rates for Tier 1+ to Tier 4 locomotives.
- Dedicated Fleet for the volume of cross-dock intermodal international containers related to the Proposed Project based on the mode shift from truck to S trains between the San Pedro Ports and BIG IMF.

### **4.2.1 2028 Emissions Summary**

The Proposed Project 2028 scenario is the opening year of the BIG facility. An increase in opening year cross-dock international volume will occur in addition to the standard CAGRs. This initial volume increase is detailed below:

- An increase of 199,000 S train containers from San Pedro Ports to BIG’s IMF. These are containers associated with the mode shift from truck to rail.
- An increase of 133,333 Q train containers resulting from the transloaded S train containers that will head east from BIG’s IMF. These are containers associated with the mode shift from truck to rail.
- A decrease of 18,000 Q train containers west of BIG (localized domestic truck volume transloaded at BIG instead of heading farther west to other stations to get transloaded).

The Proposed Project 2028 scenario for other containers volumes loaded onto “Z”, “S”, and “Q” trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Tables 9 and 10 summarize the Proposed Project criteria pollutant emissions. See Appendix E for detailed calculations.

| <b>Table 9</b><br><b>Project 2028: Peak Daily Corridor Criteria Pollutant Emissions</b><br><b>(lb/day)</b> |         |         |         |          |          |      |
|------------------------------------------------------------------------------------------------------------|---------|---------|---------|----------|----------|------|
| Region                                                                                                     | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                                              |         |         |         |          |          |      |
| SCAQMD                                                                                                     | 227.7   | 220.8   | 435.7   | 11,118.2 | 3,079.7  | 11.0 |
| <b>MDAQMD</b>                                                                                              |         |         |         |          |          |      |
| MDAQMD                                                                                                     | 1,060.7 | 1,028.9 | 2,001.2 | 51,217.2 | 12,984.4 | 46.2 |
| West of BIG                                                                                                | 109.9   | 106.6   | 208.3   | 5,298.8  | 1,424.3  | 5.0  |
| East of BIG                                                                                                | 950.8   | 922.3   | 1,792.9 | 45,918.3 | 11,560.1 | 41.1 |

| <b>Table 10</b><br><b>Project 2028: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |       |       |       |         |         |     |
|----------------------------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|-----|
| Region                                                                                                   | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                                            |       |       |       |         |         |     |
| SCAQMD                                                                                                   | 36.8  | 35.7  | 70.4  | 1,795.6 | 497.4   | 1.8 |
| <b>MDAQMD</b>                                                                                            |       |       |       |         |         |     |
| MDAQMD                                                                                                   | 171.3 | 166.2 | 323.2 | 8,271.8 | 2,097.0 | 7.5 |
| West of BIG                                                                                              | 17.7  | 17.2  | 33.6  | 855.8   | 230.0   | 0.8 |
| East of BIG                                                                                              | 153.6 | 149.0 | 289.6 | 7,416.0 | 1,867.0 | 6.6 |

**Notes:**

PM10 = particulate matter less than 10 microns in diameter  
PM2.5 = particulate matter less than 2.5 microns in diameter  
VOC = volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide

Peak daily emissions based on 13% safety factor on average daily emissions.

Source: EnSafe, Inc.

## 4.2.2 2033 Emissions Summary

The Proposed Project 2033 scenario models the “ramp up” period of the BIG facility. The “ramp up” period is the 5-year period after the opening year of 2028 and includes 2029 to 2033. This CAGR adjustments for the “ramp up” period is detailed below:

- S Trains – CARG of 5.75% for international containers that go from San Pedro Ports to BIG’s IMF for transloading (cross-dock intermodal containers).

- Q Trains – Growth rates for the domestic cross-dock intermodal Q trains containers from will be slightly less than, but directly proportional to, the ramp up CAGR for cross-dock intermodal S trains because for every three (3) S train international containers, two (2) Q train domestic containers will result.

The Proposed Project 2033 scenario for other containers volumes loaded onto “Z”, “S”, and “Q” trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Tables 11 and 12 summarize the Proposed Project criteria pollutant emissions. See Appendix E for detailed calculations.

| <b>Table 11</b><br><b>Project 2033: Peak Daily Corridor Criteria Pollutant Emissions</b><br><b>(lb/day)</b> |         |         |         |          |          |      |
|-------------------------------------------------------------------------------------------------------------|---------|---------|---------|----------|----------|------|
| Region                                                                                                      | PM10    | PM2.5   | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                                               |         |         |         |          |          |      |
| SCAQMD                                                                                                      | 227.5   | 220.7   | 441.5   | 11,460.2 | 3,390.4  | 12.1 |
| <b>MDAQMD</b>                                                                                               |         |         |         |          |          |      |
| MDAQMD                                                                                                      | 1,067.9 | 1,035.9 | 2,036.1 | 53,122.1 | 14,130.8 | 50.3 |
| West of BIG                                                                                                 | 109.3   | 106.1   | 210.0   | 5,436.2  | 1,551.6  | 5.5  |
| East of BIG                                                                                                 | 958.6   | 929.8   | 1,826.1 | 47,685.9 | 12,579.2 | 44.8 |

| <b>Table 12</b><br><b>Project 2033: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |       |       |       |         |         |     |
|----------------------------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|-----|
| Region                                                                                                   | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                                            |       |       |       |         |         |     |
| SCAQMD                                                                                                   | 36.7  | 35.6  | 71.3  | 1,850.9 | 547.6   | 2.0 |
| <b>MDAQMD</b>                                                                                            |       |       |       |         |         |     |
| MDAQMD                                                                                                   | 172.5 | 167.3 | 328.8 | 8,579.5 | 2,282.2 | 8.1 |
| West of BIG                                                                                              | 17.7  | 17.1  | 33.9  | 878.0   | 250.6   | 0.9 |
| East of BIG                                                                                              | 154.8 | 150.2 | 294.9 | 7,701.5 | 2,031.6 | 7.2 |

**Notes:**

PM10 = particulate matter less than 10 microns in diameter  
PM2.5 = particulate matter less than 2.5 microns in diameter  
VOC = volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
Peak daily emissions based on 13% safety factor on average daily emissions.  
Source: EnSafe, Inc.

### 4.2.3 2048 Emissions Summary

The Proposed Project 2048 scenario for “Z”, “S”, and “Q” trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Tables 13 and 14 summarize the Proposed Project criteria pollutant emissions. See Appendix E for detailed calculations.

| <b>Table 13</b><br><b>Project 2048: Peak Daily Corridor Criteria Pollutant Emissions</b><br><b>(lb/day)</b> |         |       |         |          |          |      |
|-------------------------------------------------------------------------------------------------------------|---------|-------|---------|----------|----------|------|
| Region                                                                                                      | PM10    | PM2.5 | VOC     | NOx      | CO       | SOx  |
| <b>SCAQMD</b>                                                                                               |         |       |         |          |          |      |
| SCAQMD                                                                                                      | 219.6   | 213.0 | 445.8   | 12,451.5 | 4,258.9  | 15.2 |
| <b>MDAQMD</b>                                                                                               |         |       |         |          |          |      |
| MDAQMD                                                                                                      | 1,011.8 | 981.4 | 2,015.7 | 56,794.6 | 17,706.0 | 63.0 |
| West of BIG                                                                                                 | 103.8   | 100.7 | 208.4   | 5,814.2  | 1,929.5  | 6.8  |
| East of BIG                                                                                                 | 908.0   | 880.8 | 1,807.2 | 50,980.4 | 15,776.5 | 56.2 |

| <b>Table 14</b><br><b>Project 2048: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |       |       |       |         |         |      |
|----------------------------------------------------------------------------------------------------------|-------|-------|-------|---------|---------|------|
| Region                                                                                                   | PM10  | PM2.5 | VOC   | NOx     | CO      | SOx  |
| <b>SCAQMD</b>                                                                                            |       |       |       |         |         |      |
| SCAQMD                                                                                                   | 35.5  | 34.4  | 72.0  | 2,011.0 | 687.8   | 2.5  |
| <b>MDAQMD</b>                                                                                            |       |       |       |         |         |      |
| MDAQMD                                                                                                   | 163.4 | 158.5 | 325.5 | 9,172.6 | 2,859.6 | 10.2 |
| West of BIG                                                                                              | 16.8  | 16.3  | 33.7  | 939.0   | 311.6   | 1.1  |
| East of BIG                                                                                              | 146.6 | 142.2 | 291.9 | 8,233.6 | 2,548.0 | 9.1  |

**Notes:**

PM10 = particulate matter less than 10 microns in diameter  
PM2.5 = particulate matter less than 2.5 microns in diameter  
VOC = volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
Peak daily emissions based on 13% safety factor on average daily emissions.  
Source: EnSafe, Inc.

### 4.3 Proposed Project Incremental Emissions

Below is a summary of the comparison of criteria pollutants emissions for the No Project and Proposed Project scenarios for all analysis years.

#### 4.3.1 2028 Emissions Comparison

The comparison of peak daily criteria pollutant emissions is presented in Table 15.

The results from the peak daily corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 3.8, 110.0, 303.5, and 1.2 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 2.4 and 2.3 pounds per day for PM10 and PM2.5 respectively.

| <b>Table 15</b><br><b>Project Incremental 2028: Daily Corridor Criteria Pollutant Emissions</b><br><b>(lb/day)</b> |      |       |      |         |       |     |
|--------------------------------------------------------------------------------------------------------------------|------|-------|------|---------|-------|-----|
| Region                                                                                                             | PM10 | PM2.5 | VOC  | NOx     | CO    | SOx |
| <b>SCAQMD</b>                                                                                                      |      |       |      |         |       |     |
| SCAQMD                                                                                                             | -2.4 | -2.3  | 3.8  | 110.0   | 303.5 | 1.2 |
| <b>MDAQMD</b>                                                                                                      |      |       |      |         |       |     |
| MDAQMD                                                                                                             | 40.2 | 39.0  | 86.0 | 2,411.5 | 674.6 | 2.7 |
| West of BIG                                                                                                        | -0.7 | -0.6  | 0.9  | 14.9    | 91.4  | 0.3 |
| East of BIG                                                                                                        | 40.9 | 39.7  | 85.1 | 2,396.7 | 583.2 | 2.4 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
PM2.5 = Particulate matter less than 2.5 microns in diameter  
VOC = Volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.

The results from the peak daily corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 40.2, 39.0, 86.0, 2,411.5, 674.6, and 2.7 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the peak daily corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 0.9, 14.9, 91.4, and 0.3 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.7, and 0.6 pounds per day for PM10 and PM2.5 respectively.

The results from the peak daily corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 40.9, 39.7, 85.1, 2,396.7, 583.2, and 2.4 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The comparison of annual average criteria pollutant emissions is presented in Table 16.

| <b>Table 16</b><br><b>Project Incremental 2028: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |      |       |      |       |       |     |
|----------------------------------------------------------------------------------------------------------------------|------|-------|------|-------|-------|-----|
| Region                                                                                                               | PM10 | PM2.5 | VOC  | NOx   | CO    | SOx |
| <b>SCAQMD</b>                                                                                                        |      |       |      |       |       |     |
| SCAQMD                                                                                                               | -0.4 | -0.4  | 0.6  | 17.8  | 49.0  | 0.2 |
| <b>MDAQMD</b>                                                                                                        |      |       |      |       |       |     |
| MDAQMD                                                                                                               | 6.5  | 6.3   | 13.9 | 389.5 | 109.0 | 0.4 |
| West of BIG                                                                                                          | -0.1 | -0.1  | 0.1  | 2.4   | 14.8  | 0.1 |
| East of BIG                                                                                                          | 6.6  | 6.4   | 13.7 | 387.1 | 94.2  | 0.4 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
PM2.5 = Particulate matter less than 2.5 microns in diameter  
VOC = Volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
CO2e = Carbon dioxide equivalent

Source: EnSafe, Inc.

The results from the annual corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 0.6, 17.8, 49.0, and 0.2 tons per year for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.4 tons per year for PM10 and PM2.5.

The results from the annual corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 6.5, 6.3, 13.9, 389.5, 109.0, and 0.4 tons per year for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the annual corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 0.1, 2.4, 14.8, and 0.1 tons per year for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.1 tons per year for PM10 and PM2.5.

The results from the annual corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 6.6, 6.4., 13.7, 387.1, 94.2, and 0.4 tons per year for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.



### 4.3.2 2033 Emissions Comparison

The comparison of peak daily criteria pollutant emissions is presented in Table 17.

| Table 17<br>Project Incremental 2033: Peak Daily Corridor Criteria Pollutant Emissions<br>(lb/day) |      |       |       |         |       |     |
|----------------------------------------------------------------------------------------------------|------|-------|-------|---------|-------|-----|
| Region                                                                                             | PM10 | PM2.5 | VOC   | NOx     | CO    | SOx |
| <b>SCAQMD</b>                                                                                      |      |       |       |         |       |     |
| SCAQMD                                                                                             | -1.8 | -1.8  | 6.6   | 158.2   | 403.8 | 1.6 |
| <b>MDAQMD</b>                                                                                      |      |       |       |         |       |     |
| MDAQMD                                                                                             | 53.0 | 51.4  | 111.7 | 3,124.7 | 917.3 | 3.6 |
| West of BIG                                                                                        | -0.3 | -0.3  | 2.1   | 37.6    | 124.7 | 0.5 |
| East of BIG                                                                                        | 53.3 | 51.7  | 109.6 | 3,087.0 | 792.5 | 3.2 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
 PM2.5 = Particulate matter less than 2.5 microns in diameter  
 VOC = Volatile organic compound  
 NOx = Nitrogen oxides  
 CO = Carbon monoxide  
 SOx = Sulfur dioxide  
 CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.

The results from the peak daily corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 6.6, 158.2, 403.8, and 1.6 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 1.8 pounds per day for PM10 and PM2.5.

The results from the peak daily corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 53.0, 51.4, 111.7, 3,124.7, 917.3, and 3.6 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the peak daily corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 2.1, 37.6, 124.7, and 0.5 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.3 pounds per day for PM10 and PM2.5.

The results from the peak daily corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 53.3, 51.7, 109.6, 3,087.0, 792.5,

and 3.2 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The comparison of annual average criteria pollutant emissions is presented in Table 18.

| <b>Table 18</b><br><b>Project Incremental 2033: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |      |       |      |       |       |     |
|----------------------------------------------------------------------------------------------------------------------|------|-------|------|-------|-------|-----|
| Region                                                                                                               | PM10 | PM2.5 | VOC  | NOx   | CO    | SOx |
| <b>SCAQMD</b>                                                                                                        |      |       |      |       |       |     |
| SCAQMD                                                                                                               | -0.3 | -0.3  | 1.1  | 25.6  | 65.2  | 0.3 |
| <b>MDAQMD</b>                                                                                                        |      |       |      |       |       |     |
| MDAQMD                                                                                                               | 8.6  | 8.3   | 18.0 | 504.7 | 148.1 | 0.6 |
| West of BIG                                                                                                          | -0.1 | 0.0   | 0.3  | 6.1   | 20.1  | 0.1 |
| East of BIG                                                                                                          | 8.6  | 8.3   | 17.7 | 498.6 | 128.0 | 0.5 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
PM2.5 = Particulate matter less than 2.5 microns in diameter  
VOC = Volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
CO2e = Carbon dioxide equivalent

Source: EnSafe, Inc.

The results from the annual corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 1.1, 25.6, 65.2, and 0.3 tons per year for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.3 tons per year for PM10 and PM2.5.

The results from the annual corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 8.6, 8.3, 18.0, 504.7, 148.1, and 0.6 tons per year for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the annual corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 0.3, 6.1, 20.1, and 0.1 tons per year for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.1 and less than 0.0 tons per year for PM10 and PM2.5, respectively.

The results from the annual corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 8.6, 8.3, 17.7, 498.6, 128.0, and 0.5 tons per year for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

### 4.3.3 2048 Emissions Comparison

The comparison of peak daily criteria pollutant emissions is presented in Table 19.

| <b>Table 19</b><br><b>Project Incremental 2048: Peak Daily Corridor Criteria Pollutant Emissions</b><br><b>(lb/day)</b> |      |       |      |         |         |     |
|-------------------------------------------------------------------------------------------------------------------------|------|-------|------|---------|---------|-----|
| Region                                                                                                                  | PM10 | PM2.5 | VOC  | NOx     | CO      | SOx |
| <b>SCAQMD</b>                                                                                                           |      |       |      |         |         |     |
| SCAQMD                                                                                                                  | 0.0  | 0.0   | 10.7 | 235.8   | 471.8   | 1.8 |
| <b>MDAQMD</b>                                                                                                           |      |       |      |         |         |     |
| MDAQMD                                                                                                                  | 42.9 | 41.6  | 96.4 | 2,934.1 | 1,006.5 | 4.0 |
| West of BIG                                                                                                             | -0.6 | -0.6  | 1.7  | 13.5    | 130.8   | 0.5 |
| East of BIG                                                                                                             | 43.5 | 42.2  | 94.8 | 2,920.6 | 875.7   | 3.6 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
PM2.5 = Particulate matter less than 2.5 microns in diameter  
VOC = Volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
CO2e = Carbon dioxide equivalent

Peak daily emissions based on 13% safety factor on average daily emissions

Source: EnSafe, Inc.

The results from the peak daily corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate no increase in daily PM10 and PM2.5 and an increase of 10.7, 235.8, 471.8, and 1.8 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the peak daily corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 42.9, 41.6, 96.4, 2,934.1, 1,006.5, and 4.0 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the peak daily corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 1.7, 13.5, 130.8, and 0.5 pounds per

day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario, and a decrease of 0.6 pounds per day for PM10 and PM2.5.

The results from the peak daily corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 43.5, 42.2, 94.8, 2,920.6, 875.7, and 3.6 pounds per day for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The comparison of annual average criteria pollutant emissions is presented in Table 20.

| <b>Table 20</b><br><b>Project Incremental 2048: Annual Corridor Criteria Pollutant Emissions</b><br><b>(tons/yr)</b> |      |       |      |       |       |     |
|----------------------------------------------------------------------------------------------------------------------|------|-------|------|-------|-------|-----|
| Region                                                                                                               | PM10 | PM2.5 | VOC  | NOx   | CO    | SOx |
| <b>SCAQMD</b>                                                                                                        |      |       |      |       |       |     |
| SCAQMD                                                                                                               | 0.0  | 0.0   | 1.7  | 38.1  | 76.2  | 0.3 |
| <b>MDAQMD</b>                                                                                                        |      |       |      |       |       |     |
| MDAQMD                                                                                                               | 6.9  | 6.7   | 15.6 | 473.9 | 162.6 | 0.7 |
| West of BIG                                                                                                          | -0.1 | -0.1  | 0.3  | 2.2   | 21.1  | 0.1 |
| East of BIG                                                                                                          | 7.0  | 6.8   | 15.3 | 471.7 | 141.4 | 0.6 |

**Notes:**

PM10 = Particulate matter less than 10 microns in diameter  
PM2.5 = Particulate matter less than 2.5 microns in diameter  
VOC = Volatile organic compound  
NOx = Nitrogen oxides  
CO = Carbon monoxide  
SOx = Sulfur dioxide  
CO2e = Carbon dioxide equivalent  
Peak daily emissions based on 13% safety factor on average daily emissions  
Source: EnSafe, Inc.

The results from the annual corridor criteria pollutants emissions for the SCAQMD region under the Proposed Project scenario indicate no increase in daily PM10 and PM2.5 and an increase of 1.7, 38.1, 76.2, and 0.3 pounds per day for VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the annual corridor criteria pollutants emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 6.9, 6.7, 15.6, 473.9, 162.6, and 0.7 tons per year for PM10, PM2.5, VOC, NOx, CO, and SOx, respectively, compared to the No Project scenario.

The results from the annual corridor criteria pollutants emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 0.3, 2.2, 21.1, and 0.1 tons per year for VOC, NO<sub>x</sub>, CO, and SO<sub>x</sub>, respectively, compared to the No Project scenario, and a decrease of 0.1 tons per year for PM<sub>10</sub> and PM<sub>2.5</sub>.

The results from the annual corridor criteria pollutants emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 7.0, 6.8, 15.3, 471.7, 141.4, and 0.6 tons per year for PM<sub>10</sub>, PM<sub>2.5</sub>, VOC, NO<sub>x</sub>, CO, and SO<sub>x</sub>, respectively, compared to the No Project scenario.

## **5.0 GHG EMISSIONS SUMMARY**

Below is a summary of GHG emissions for the No Project and Proposed Project scenarios for all analysis years.

### **5.1 No Project Scenarios**

The following outlines the conditions applicable to all No Project scenarios. Conditions specific to individual analysis years are detailed in their respective sections.

- International containers have a CAGR of 1%.
- Domestic containers have a CAGR of 2.5%.
- The current B train fleet size is anticipated to cover the CAGR changes in the scenario.
- The fuel for all Eastbound traffic is modeled with 1% renewable diesel.
- The fuel for all Westbound traffic is modeled at 0% renewable diesel.
- Fleet mix assumes all locomotives below Tier 1 are removed from service, all Tier 2 locomotives are converted to Tier 2+, and standard replacement rates for Tier 1+ to Tier 4 locomotives.
- No Dedicated Fleet.

#### **5.1.1 2028 Emissions Summary**

The No Project 2028 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Table 21 summarizes the No Project GHG emissions. See Appendix E for detailed calculations.

| Table 21<br>No Project 2028: Annual Corridor GHG Emissions<br>(metric tons/yr) |                 |                  |                 |                                |
|--------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                         | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                  |                 |                  |                 |                                |
| SCAQMD                                                                         | 155,410.4       | 4.0              | 12.2            | 156,894.2                      |
| <b>MDAQMD</b>                                                                  |                 |                  |                 |                                |
| MDAQMD                                                                         | 689,907.6       | 17.6             | 54.1            | 696,494.5                      |
| West of BIG                                                                    | 74,800.1        | 1.9              | 5.9             | 75,514.3                       |
| East of BIG                                                                    | 615,107.5       | 15.7             | 48.2            | 620,980.2                      |
| Total                                                                          | 845,318.0       | 21.5             | 66.2            | 853,388.7                      |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

### 5.1.2 2033 Emissions Summary

The No Project 2033 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Table 22 summarizes the No Project GHG emissions. See Appendix E for detailed calculations.

| Table 22<br>No Project 2033: Annual Corridor GHG Emissions<br>(metric tons/yr) |                 |                  |                 |                                |
|--------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                         | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                  |                 |                  |                 |                                |
| SCAQMD                                                                         | 167,186.3       | 4.3              | 13.1            | 168,782.5                      |
| <b>MDAQMD</b>                                                                  |                 |                  |                 |                                |
| MDAQMD                                                                         | 740,544.5       | 18.9             | 58.0            | 747,614.8                      |
| West of BIG                                                                    | 80,077.1        | 2.0              | 6.3             | 80,841.6                       |
| East of BIG                                                                    | 660,467.4       | 16.8             | 51.8            | 666,773.2                      |
| Total                                                                          | 907,730.8       | 23.1             | 71.1            | 916,397.3                      |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

### 5.1.3 2048 Emissions Summary

The No Project 2048 scenario for “Z”, “S”, and “Q” trains assume growth based on CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for No Project scenarios can be found in Appendix A. Table 23 summarizes the No Project GHG emissions. See Appendix E for detailed calculations.

| <b>Table 23</b><br><b>No Project 2048: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|-----------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                              | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                       |                 |                  |                 |                                |
| SCAQMD                                                                                              | 211,988.8       | 5.4              | 16.6            | 214,012.8                      |
| <b>MDAQMD</b>                                                                                       |                 |                  |                 |                                |
| MDAQMD                                                                                              | 935,859.3       | 23.8             | 73.3            | 944,794.4                      |
| West of BIG                                                                                         | 100,936.3       | 2.6              | 7.9             | 101,900.0                      |
| East of BIG                                                                                         | 834,923.0       | 21.3             | 65.4            | 842,894.4                      |
| Total                                                                                               | 1,147,848.1     | 29.2             | 89.9            | 1,158,807.2                    |

**Notes:**

GHG = Greenhouse gas  
CO<sub>2</sub> = Carbon dioxide  
N<sub>2</sub>O = Nitrous Oxide  
CH<sub>4</sub> = Methane  
CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

### 5.2 Proposed Project Scenarios

The following outlines the conditions applicable to all Proposed Project scenarios. Conditions specific to individual analysis years are detailed in their respective sections.

- International containers have a CAGR of 1% for non-“ramp up” period.
- Domestic containers have a CAGR of 2.5% for non-“ramp up” period.
- The current B train fleet size is anticipated to cover the CAGR changes in the scenario.
- The fuel for all Eastbound traffic is modeled with 10% renewable diesel.
- The fuel for all Westbound traffic is modeled at 0% renewable diesel.



- Fleet mix assumes all locomotives below Tier 1 are removed from service, all Tier 2 locomotives are converted to Tier 2+, and standard replacement rates for Tier 1+ to Tier 4 locomotives.

Dedicated Fleet for the volume of international containers related to the Proposed Project based on the mode shift from truck to S trains between the San Pedro Ports and BIG IMF.

### **5.2.1 2028 Emissions Summary**

The Proposed Project 2028 scenario is the opening year of the BIG facility. An increase in opening year cross-dock international volume will occur in addition to the standard CAGRs. This initial volume increase is detailed below:

- An increase of 199,000 S train containers from San Pedro Ports to BIG's IMF. These are containers associated with the mode shift from truck to rail.
- An increase of 133,333 Q train containers resulting from the transloaded S train containers that will head east from BIG's IMF. These are containers associated with the mode shift from truck to rail.
- A decrease of 18,000 Q train containers west of BIG (localized domestic truck volume transloaded at BIG instead of heading farther west to other stations to get transloaded).

The Proposed Project 2028 scenario for other containers volumes loaded onto "Z", "S", and "Q" trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Table 24 summarizes the Proposed Project GHG emissions. See Appendix E for detailed calculations.

| <b>Table 24</b><br><b>Project 2028: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                           | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                    |                 |                  |                 |                                |
| SCAQMD                                                                                           | 171,354.7       | 4.4              | 13.4            | 172,990.7                      |
| <b>MDAQMD</b>                                                                                    |                 |                  |                 |                                |
| MDAQMD                                                                                           | 711,017.1       | 18.1             | 55.7            | 717,805.5                      |
| West of BIG                                                                                      | 79,064.9        | 2.0              | 6.2             | 79,819.8                       |
| East of BIG                                                                                      | 631,952.2       | 16.1             | 49.5            | 637,985.7                      |
| Total                                                                                            | 882,371.8       | 22.5             | 69.1            | 890,796.2                      |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

## 5.2.2 2033 Emissions Summary

The Proposed Project 2033 scenario models the “ramp up” period of the BIG facility. The “ramp up” period is the 5-year period after the opening year of 2028 and includes 2029 to 2033. This CAGR adjustments for the “ramp up” period is detailed below:

- S Trains – CAGR of 5.75% for international containers that go from San Pedro Ports to BIG’s IMF for transloading (cross-dock intermodal containers).
- Q Trains – Growth rates for the domestic cross-dock intermodal Q trains containers from will be slightly less than, but directly proportional to, the ramp up CAGR for cross-dock intermodal S trains because for every three (3) S train international containers, two (2) Q train domestic containers will result.

The Proposed Project 2033 scenario for other containers volumes loaded onto “Z”, “S”, and “Q” trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Table 25 summarizes the Proposed Project GHG emissions. See Appendix E for detailed calculations.

| <b>Table 25</b><br><b>Project 2033: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                           | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                    |                 |                  |                 |                                |
| SCAQMD                                                                                           | 188,573.4       | 4.8              | 14.8            | 190,373.8                      |
| <b>MDAQMD</b>                                                                                    |                 |                  |                 |                                |
| MDAQMD                                                                                           | 773,624.7       | 19.7             | 60.6            | 781,010.9                      |
| West of BIG                                                                                      | 86,124.6        | 2.2              | 6.7             | 86,946.9                       |
| East of BIG                                                                                      | 687,500.1       | 17.5             | 53.9            | 694,064.0                      |
| Total                                                                                            | 962,198.1       | 24.5             | 75.4            | 971,384.6                      |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

### 5.2.3 2048 Emissions Summary

The Proposed Project 2048 scenario for “Z”, “S”, and “Q” trains assume growth based on standard CAGRs. All other train types were not modeled for any growth. Detailed volume and train trips for Proposed Project scenarios can be found in Appendix A. Table 26 summarizes the Proposed Project GHG emissions. See Appendix E for detailed calculations.

| <b>Table 26</b><br><b>Project 2048: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                           | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                    |                 |                  |                 |                                |
| SCAQMD                                                                                           | 237,239.5       | 6.0              | 18.6            | 239,504.6                      |
| <b>MDAQMD</b>                                                                                    |                 |                  |                 |                                |
| MDAQMD                                                                                           | 968,825.1       | 24.7             | 75.9            | 978,074.9                      |
| West of BIG                                                                                      | 107,056.3       | 2.7              | 8.4             | 108,078.4                      |
| East of BIG                                                                                      | 861,768.8       | 21.9             | 67.5            | 869,996.5                      |
| Total                                                                                            | 1,206,064.6     | 30.7             | 94.5            | 1,217,579.5                    |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

### 5.3 Proposed Project Incremental Emissions

Below is a summary of the comparison of GHG emissions for the No Project and Proposed Project scenarios for all analysis years.

#### 5.3.1 2028 Emissions Comparison

The comparison of 2028 GHG emissions is presented in Table 27.

| <b>Table 27</b><br><b>Incremental Project 2028: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                                       | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                                |                 |                  |                 |                                |
| SCAQMD                                                                                                       | 15,944.3        | 0.4              | 1.2             | 16,096.6                       |
| <b>MDAQMD</b>                                                                                                |                 |                  |                 |                                |
| MDAQMD                                                                                                       | 21,109.5        | 0.5              | 1.7             | 21,311.0                       |
| West of BIG                                                                                                  | 4,264.8         | 0.1              | 0.3             | 4,305.5                        |
| East of BIG                                                                                                  | 16,844.7        | 0.4              | 1.3             | 17,005.5                       |
| Total                                                                                                        | 37,053.8        | 0.9              | 2.9             | 37,407.6                       |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

The results from the annual moving corridor GHG emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 16,096.6 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 21,311.0 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 4,305.5 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 17,005.5 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the total (SCAQMD and MDAQMD) region under the Proposed Project scenario indicate an increase of 37,407.6 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

### 5.3.2 2033 Emissions Comparison

The comparison of 2033 GHG emissions is presented in Table 28.

| <b>Table 28</b><br><b>Incremental Project 2033: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                                       | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                                |                 |                  |                 |                                |
| SCAQMD                                                                                                       | 21,387.1        | 0.5              | 1.7             | 21,591.2                       |
| <b>MDAQMD</b>                                                                                                |                 |                  |                 |                                |
| MDAQMD                                                                                                       | 33,080.2        | 0.8              | 2.6             | 33,396.1                       |
| West of BIG                                                                                                  | 6,047.5         | 0.2              | 0.5             | 6,105.3                        |
| East of BIG                                                                                                  | 27,032.7        | 0.7              | 2.1             | 27,290.8                       |
| Total                                                                                                        | 54,467.3        | 1.4              | 4.3             | 54,987.3                       |

**Notes:**

GHG = Greenhouse gas

CO<sub>2</sub> = Carbon dioxide

N<sub>2</sub>O = Nitrous Oxide

CH<sub>4</sub> = Methane

CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

The results from the annual moving corridor GHG emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of 21,591.2 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 33,396.1 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 6,105.3 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 27,290.8 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the total (SCAQMD and MDAQMD) region under the Proposed Project scenario indicate of increase of 54,987.3 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

### 5.3.3 2048 Emissions Comparison

The comparison of 2048 GHG emissions is presented in Table 29.

| <b>Table 29</b><br><b>Incremental Project 2048: Annual Corridor GHG Emissions</b><br><b>(metric tons/yr)</b> |                 |                  |                 |                                |
|--------------------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|--------------------------------|
| Region                                                                                                       | CO <sub>2</sub> | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| <b>SCAQMD</b>                                                                                                |                 |                  |                 |                                |
| SCAQMD                                                                                                       | 25,250.7        | 0.6              | 2.0             | 25,491.8                       |
| <b>MDAQMD</b>                                                                                                |                 |                  |                 |                                |
| MDAQMD                                                                                                       | 32,965.8        | 0.8              | 2.6             | 33,280.5                       |
| West of BIG                                                                                                  | 6,120.0         | 0.2              | 0.5             | 6,178.4                        |
| East of BIG                                                                                                  | 26,845.8        | 0.7              | 2.1             | 27,102.1                       |
| Total                                                                                                        | 58,216.5        | 1.5              | 4.6             | 58,772.3                       |

**Notes:**

GHG = Greenhouse gas  
CO<sub>2</sub> = Carbon dioxide  
N<sub>2</sub>O = Nitrous Oxide  
CH<sub>4</sub> = Methane  
CO<sub>2</sub>e = Carbon dioxide equivalent

Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40.

Source: EnSafe, Inc.

The results from the annual moving corridor GHG emissions for the SCAQMD region under the Proposed Project scenario indicate an increase of increase of 25,491.8 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the MDAQMD region under the Proposed Project scenario indicate an increase of 33,280.5 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the West of BIG region under the Proposed Project scenario indicate an increase of 6,178.4 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the East of BIG region under the Proposed Project scenario indicate an increase of 27,102.1 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

The results from the annual moving corridor GHG emissions for the total (SCAQMD and MDAQMD) region under the Proposed Project scenario indicate an increase of 58,772.3 metric tons per year for CO<sub>2</sub>e compared to the No Project scenario.

## 6.0 GLOSSARY

**Affected Train Types** — Train types that may be affected by the change in any of the following three categories of movement: 1) volume of international containers related to the Proposed Project based on the mode shift from truck to S trains between the San Pedro Ports and BIG IMF, 2) the change in volume of domestic containers transloaded on to Eastbound Q trains from international containers at BIG IMF, and 3) regional domestic containers on trucks that currently go to other BNSF intermodal facilities within California, but due to geographic proximity of the proposed BIG IMF, will instead go directly to BIG IMF to be placed on Eastbound Q trains. This includes train types B, Q, and S.

**Analysis Year** — This includes 2028, project opening, 2033, interim operational year, and 2048, full operational build out.

**Corridor** — Rail line owned and operated by BNSF between the San Pedro Ports and Needles Station as shown on Figure 1. The Corridor does not include any station/facility emissions, only emissions occurring on the railroad tracks.

**Corridor Segments** — There are four segments in the CEM. 1) San Pedro Ports to San Bernardino station, 2) San Bernardino station to Summit station, 3) Summit station to Barstow station/BIG, and 4) Barstow station/BIG to Needles station.

**Criteria Pollutants** — Includes volatile organic compounds (VOCs), carbon monoxide (CO), nitrous oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and particulate matter emissions smaller than 10 micron (PM<sub>10</sub>), and particulate matter smaller than 2.5 micron (PM<sub>2.5</sub>).

**Dedicated Fleet** — A dedicated fleet of Tier 4 locomotives that will move the additional volume of containers generated by the Project on S trains between the San Pedro Ports and the intermodal facility at BIG.

**Domestic Container** — 53-foot intermodal container used for freight movement in North America.

**Eastbound** — Trains traveling in an easterly direction in the rail corridor (ex: Los Angeles, CA towards Chicago, Illinois).



**Fleet Mix** — Characterization of the mix of engine tiers of the locomotives in the BNSF fleet. The projected fleet mixes are based on the actual 2023 fleet mix provided by BNSF and adjusted for the No Project and Proposed Project conditions.

**Fuel Efficiency Model (FEM)** — A regression model based on actual 2023 fuel usage data provided by BNSF to estimate the fuel efficiency for the various scenarios and modeled operational analysis years.

**Gross Ton-Miles** — The calculation of the weight of a train times the distance traveled within the rail corridor.

**Horsepower Ton (HPT)** — A measure of theoretical locomotive power required to move a train of a measured weight across a distance.

**Idling Emissions** — Emissions within the rail corridor between Los Angeles, California and Needles, California for all locomotives under minimum operating conditions while a train is not moving. Assumes that each locomotive outputs 25 horsepower during idling conditions.

**International Container** — 40-foot or 20-foot intermodal container used to transport goods internationally.

**Mojave Desert Air Quality Management District Emissions** — The rail corridor moving and idling emissions occurring within the jurisdiction of MDAQMD extending from Summit station to Needles station.

**Moving Emissions** — Emissions associated with all train movements within the rail corridor between Los Angeles, California, and Needles, California.

**Non-Affected Train Types** — All other BNSF train types, such as trains that haul a mix of commodities and container types, road switchers, and helper trains. These trains will not have any additional train trips due to changes in container volumes in the Proposed Project scenarios.

**Scenarios** – No Project and Project scenarios are summarized in the table below.

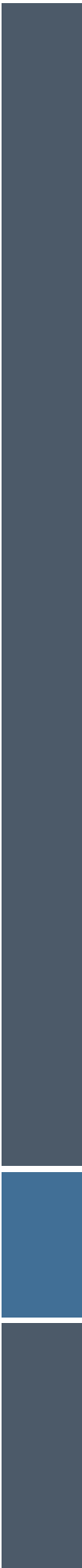
| Component             | No Project                                                                                                                                                                                                                                                                                                                                  | Proposed Project                                                                                                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Train Profiles        | Includes number of locomotives, locomotive weight, freight weight, direction of travel, distance traveled, and idling time. See Appendix A, which is based on 2022/2023 BNSF data, and which was developed in coordination with BNSF.                                                                                                       | Identical to the No Project scenario.                                                                                                                                                                                                        |
| Train Trips           | Assumes compounded annual growth rates (CAGR) between 1% and 2.5% for Z, Q, and S trains and no growth for all other trains. CAGRs provided by BNSF. See Appendix B for details.                                                                                                                                                            | CAGR of 2.5% for Z trains. Volume adjusted change in train trips for Q and S trains. No growth for all other trains. CAGRs provided by BNSF. See Appendix B for details.                                                                     |
| Fleet Mix             | Based on 2023 report for the 1998 MOU and adjusted for full conversion of Tier 0 and 1 to Tier 1+ and Tier 2 to Tier 2+. After 2023, forecasts for Annual Tier 4 purchases are based on 5-year historical average purchase rates, and Tier 1+ locomotives are planned to be replaced at a rate of 100 per every 85 Tier 4 credit purchases. | Identical to the No Project scenario except for the additional Dedicated Fleet of Tier 4 locomotives for the additional S train container volume (generated by the mode shift from truck to rail) between the San Pedro Ports and BIG's IMF. |
| Fuel Blend            | 1 percent renewable diesel for Eastbound trips. Zero renewable for Westbound trips.                                                                                                                                                                                                                                                         | 10 percent renewable diesel for Eastbound trips. Zero renewable for Westbound trips.                                                                                                                                                         |
| Fuel Emission Factors | Based on line-haul locomotives. Criteria pollutant emissions factors based on EPA. GHG emission factors based on CARB.                                                                                                                                                                                                                      | Identical to the No Project scenario.                                                                                                                                                                                                        |
| Fuel Efficiency       | Regression model based on 2023 BNSF data. See Appendix D which was developed in coordination with BNSF.                                                                                                                                                                                                                                     | Identical to the No Project scenario.                                                                                                                                                                                                        |

**South Coast Air Quality Management District Emissions** — The rail corridor moving and idling emissions occurring within the jurisdiction of the South Coast Air Quality Management District extending from San Pedro Ports to the Summit Station.

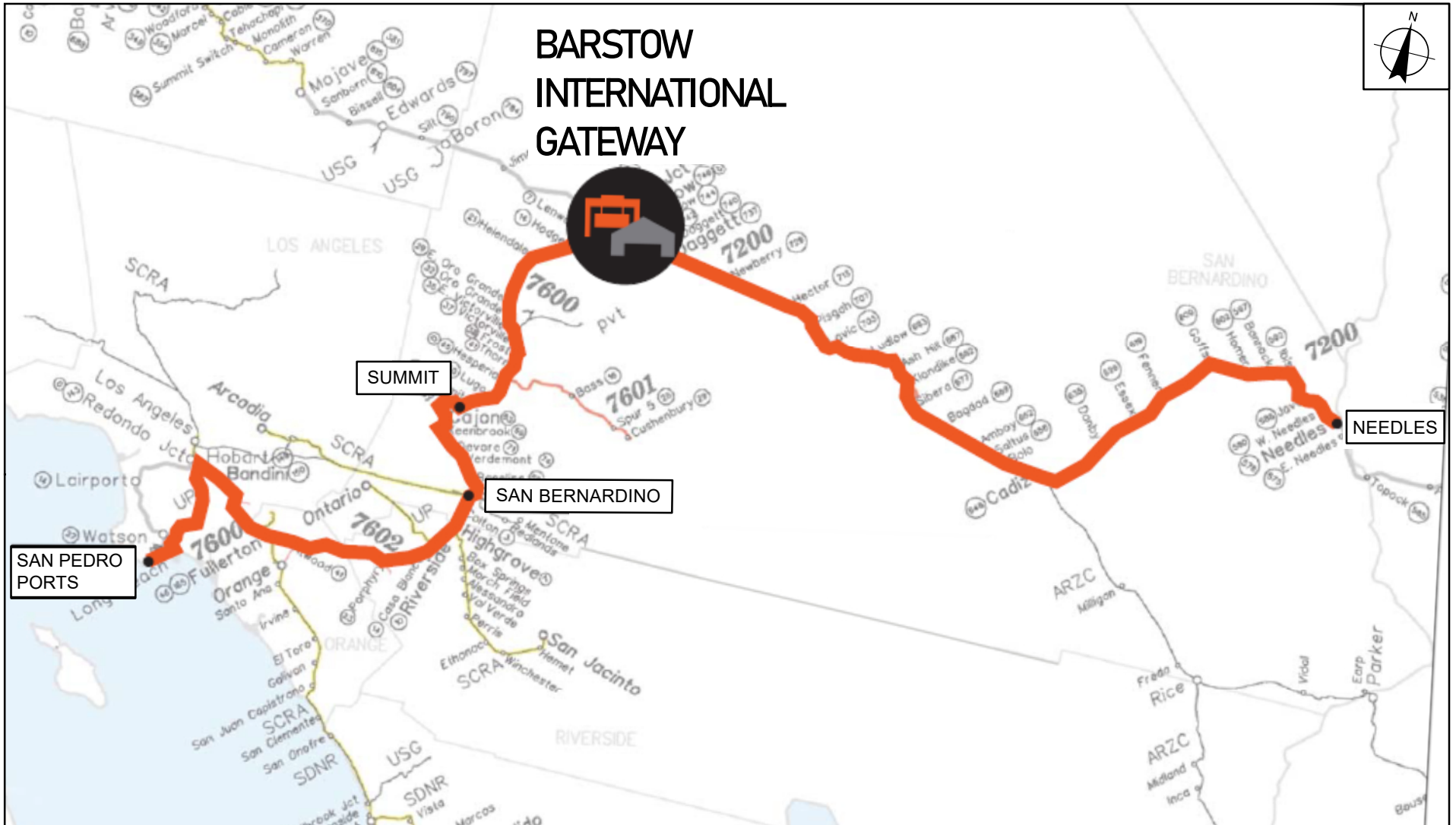
**Train Profile** — Characterizes the number of locomotives, weight of locomotives, weight of freight, direction of travel, and distance traveled for an average train type in the rail corridor between Los Angeles, California and Needles, California. The projected train profiles are based on the last three quarters of calendar year 2022 through the first quarter of calendar year 2023 train profile data and adjusted for the Project. Actual train compositions vary daily; therefore, an annual average was used to generate representative train profiles for each train type.

**Train Trips** – The number of train trips is based on the last three quarters of calendar year 2022 through the first quarter of calendar year 2023 data (the most recent year for which data was available when the modeling commenced), and the daily train trip rate was generated by summing the total number of train trips in each segment and dividing by 365 days per year.

**Westbound** — Trains traveling in a westerly direction in the rail corridor (ex: Chicago, Illinois towards Los Angeles, California).



# Figures



#### LEGEND

- STATIONS
- CORRIDOR

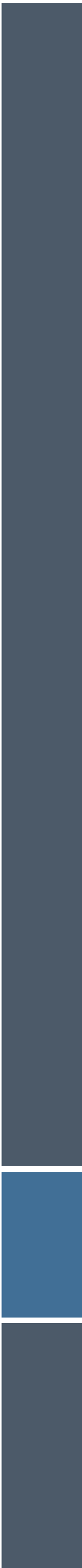
WGS 1984 WEB MERCATOR  
(AUXILIARY SPHERE)

0 16.5 33  
SCALE IN MILES

FIGURE 1  
SITE LOCATION AND CORRIDOR MAP  
BNSF BARSTOW INTERNATIONAL GATEWAY  
CORRIDOR EMISSION MODEL  
CALIFORNIA

|               |            |
|---------------|------------|
| REQUESTED BY: | MC         |
| DRAWN BY:     | RC         |
| DATE:         | 9/23/2025  |
| PROJECT:      | 0888840509 |

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# **Appendix A**

## **Train Profiles**

No Project - port\_sbd

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 2.66                     | 3.10                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 3.68                     | 4.56                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 5.06                     | 4.02                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2028 No Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 2.97                     | 3.46                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 3.86                     | 4.79                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 5.73                     | 4.55                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2033 No Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 3.33                     | 3.87                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 4.06                     | 5.03                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 6.48                     | 5.15                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2048 No Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 4.67                     | 5.43                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 4.72                     | 5.84                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 9.38                     | 7.46                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

No Project - sbd\_suc

Base Year

2023

| Train Type           |     | Train-Trip Length<br>(Eastbound) | Train-Trip Length<br>(Westbound) | Daily Trains<br>(Eastbound) | Daily Trains<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive Weight<br>(Eastbound) | Locomotive Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) |
|----------------------|-----|----------------------------------|----------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------------|-------------------------------|-------------------------------|
| Units                |     | miles/train-trip                 | miles/train-trip                 | train-trips/day             | train-trips/day             | loco/train                 | loco/train                 | tons/train                       | tons/train                       | tons/train                    | tons/train                    |
| B-Bare Table Intrmdl | B   | 25.20                            | 25.20                            | 0.71                        | 2.86                        | 2.00                       | 2.00                       | 454.00                           | 454.00                           | 2344.22                       | 2684.37                       |
| Q-Guaranteed Intrmdl | Q   | 25.20                            | 25.20                            | 3.23                        | 3.97                        | 3.35                       | 2.47                       | 759.41                           | 561.52                           | 5887.94                       | 5442.03                       |
| S-Stack Train        | S   | 25.20                            | 25.20                            | 3.64                        | 4.54                        | 5.56                       | 3.62                       | 1262.58                          | 821.83                           | 9789.19                       | 7964.85                       |
| Z                    | Z   | 25.20                            | 25.20                            | 8.76                        | 6.95                        | 3.94                       | 3.45                       | 894.77                           | 782.51                           | 5592.40                       | 5005.04                       |
| NIM-Non-Intrmdl      | NIM | 25.20                            | 25.20                            | 5.18                        | 5.79                        | 2.95                       | 3.40                       | 670.10                           | 772.67                           | 5195.49                       | 7488.44                       |

2028 No Project

2028

| Train Type           |     | Train-Trip Length<br>(Eastbound) | Train-Trip Length<br>(Westbound) | Daily Trains<br>(Eastbound) | Daily Trains<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive Weight<br>(Eastbound) | Locomotive Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) |
|----------------------|-----|----------------------------------|----------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------------|-------------------------------|-------------------------------|
| Units                |     | miles/train-trip                 | miles/train-trip                 | train-trips/day             | train-trips/day             | loco/train                 | loco/train                 | tons/train                       | tons/train                       | tons/train                    | tons/train                    |
| B-Bare Table Intrmdl | B   | 25.20                            | 25.20                            | 0.71                        | 2.86                        | 2.00                       | 2.00                       | 454.00                           | 454.00                           | 2344.22                       | 2684.37                       |
| Q-Guaranteed Intrmdl | Q   | 25.20                            | 25.20                            | 3.62                        | 4.44                        | 3.35                       | 2.47                       | 759.41                           | 561.52                           | 5887.94                       | 5442.03                       |
| S-Stack Train        | S   | 25.20                            | 25.20                            | 3.83                        | 4.77                        | 5.56                       | 3.62                       | 1262.58                          | 821.83                           | 9789.19                       | 7964.85                       |
| Z                    | Z   | 25.20                            | 25.20                            | 9.92                        | 7.86                        | 3.94                       | 3.45                       | 894.77                           | 782.51                           | 5592.40                       | 5005.04                       |
| NIM-Non-Intrmdl      | NIM | 25.20                            | 25.20                            | 5.18                        | 5.79                        | 2.95                       | 3.40                       | 670.10                           | 772.67                           | 5195.49                       | 7488.44                       |

2033 No Project

2033

| Train Type           |     | Train-Trip Length<br>(Eastbound) | Train-Trip Length<br>(Westbound) | Daily Trains<br>(Eastbound) | Daily Trains<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive Weight<br>(Eastbound) | Locomotive Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) |
|----------------------|-----|----------------------------------|----------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------------|-------------------------------|-------------------------------|
| Units                |     | miles/train-trip                 | miles/train-trip                 | train-trips/day             | train-trips/day             | loco/train                 | loco/train                 | tons/train                       | tons/train                       | tons/train                    | tons/train                    |
| B-Bare Table Intrmdl | B   | 25.20                            | 25.20                            | 0.71                        | 2.86                        | 2.00                       | 2.00                       | 454.00                           | 454.00                           | 2344.22                       | 2684.37                       |
| Q-Guaranteed Intrmdl | Q   | 25.20                            | 25.20                            | 4.05                        | 4.98                        | 3.35                       | 2.47                       | 759.41                           | 561.52                           | 5887.94                       | 5442.03                       |
| S-Stack Train        | S   | 25.20                            | 25.20                            | 4.03                        | 5.01                        | 5.56                       | 3.62                       | 1262.58                          | 821.83                           | 9789.19                       | 7964.85                       |
| Z                    | Z   | 25.20                            | 25.20                            | 11.22                       | 8.90                        | 3.94                       | 3.45                       | 894.77                           | 782.51                           | 5592.40                       | 5005.04                       |
| NIM-Non-Intrmdl      | NIM | 25.20                            | 25.20                            | 5.18                        | 5.79                        | 2.95                       | 3.40                       | 670.10                           | 772.67                           | 5195.49                       | 7488.44                       |

2048 No Project

2048

| Train Type           |     | Train-Trip Length<br>(Eastbound) | Train-Trip Length<br>(Westbound) | Daily Trains<br>(Eastbound) | Daily Trains<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive Weight<br>(Eastbound) | Locomotive Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) |
|----------------------|-----|----------------------------------|----------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------------|----------------------------------|-------------------------------|-------------------------------|
| Units                |     | miles/train-trip                 | miles/train-trip                 | train-trips/day             | train-trips/day             | loco/train                 | loco/train                 | tons/train                       | tons/train                       | tons/train                    | tons/train                    |
| B-Bare Table Intrmdl | B   | 25.20                            | 25.20                            | 0.71                        | 2.86                        | 2.00                       | 2.00                       | 454.00                           | 454.00                           | 2344.22                       | 2684.37                       |
| Q-Guaranteed Intrmdl | Q   | 25.20                            | 25.20                            | 5.72                        | 7.03                        | 3.35                       | 2.47                       | 759.41                           | 561.52                           | 5887.94                       | 5442.03                       |
| S-Stack Train        | S   | 25.20                            | 25.20                            | 4.67                        | 5.82                        | 5.56                       | 3.62                       | 1262.58                          | 821.83                           | 9789.19                       | 7964.85                       |
| Z                    | Z   | 25.20                            | 25.20                            | 16.25                       | 12.89                       | 3.94                       | 3.45                       | 894.77                           | 782.51                           | 5592.40                       | 5005.04                       |
| NIM-Non-Intrmdl      | NIM | 25.20                            | 25.20                            | 5.18                        | 5.79                        | 2.95                       | 3.40                       | 670.10                           | 772.67                           | 5195.49                       | 7488.44                       |

No Project - suc\_bar

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 3.23                     | 3.97                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 3.64                     | 4.53                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 8.76                     | 6.95                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2028 No Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 3.62                     | 4.45                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 3.83                     | 4.77                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 9.92                     | 7.86                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2033 No Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 4.05                     | 4.98                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 4.03                     | 5.01                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 11.22                    | 8.90                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2048 No Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 5.72                     | 7.03                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 4.67                     | 5.81                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 16.25                    | 12.89                    | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |



No Project - bar\_nee

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 5.05                     | 5.22                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 3.72                     | 4.57                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 10.84                    | 9.59                     | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2028 No Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 5.67                     | 5.86                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 3.91                     | 4.80                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 12.27                    | 10.86                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2033 No Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 6.36                     | 6.58                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 4.11                     | 5.04                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 13.88                    | 12.28                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2048 No Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 9.04                     | 9.34                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 4.77                     | 5.86                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 20.10                    | 17.79                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

Project - port\_sbd

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 2.66                     | 3.10                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 3.68                     | 4.56                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 5.06                     | 4.02                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2028 Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 2.88                     | 3.35                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 5.32                     | 6.59                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 5.73                     | 4.55                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2033 Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 3.22                     | 3.75                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 5.98                     | 7.41                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 6.48                     | 5.15                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

2048 Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 65.49                         | 66.85                         | 0.39                     | 2.11                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    |
| Q-Guaranteed Intrmdl | Q   | 67.77                         | 65.65                         | 4.51                     | 5.25                     | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    |
| S-Stack Train        | S   | 86.20                         | 86.20                         | 6.92                     | 8.58                     | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    |
| Z                    | Z   | 65.08                         | 65.23                         | 9.38                     | 7.46                     | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    |
| NIM-Non-Intrmdl      | NIM | 56.95                         | 58.84                         | 3.49                     | 4.12                     | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    |

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Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 25.20                         | 25.20                         | 0.71                     | 2.86                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    |
| Q-Guaranteed Intrmdl | Q   | 25.20                         | 25.20                         | 3.23                     | 3.97                     | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    |
| S-Stack Train        | S   | 25.20                         | 25.20                         | 3.64                     | 4.54                     | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    |
| Z                    | Z   | 25.20                         | 25.20                         | 8.76                     | 6.95                     | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    |
| NIM-Non-Intrmdl      | NIM | 25.20                         | 25.20                         | 5.18                     | 5.79                     | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    |

2028 Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 25.20                         | 25.20                         | 0.71                     | 2.86                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    |
| Q-Guaranteed Intrmdl | Q   | 25.20                         | 25.20                         | 3.38                     | 4.16                     | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    |
| S-Stack Train        | S   | 25.20                         | 25.20                         | 5.27                     | 6.56                     | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    |
| Z                    | Z   | 25.20                         | 25.20                         | 9.92                     | 7.86                     | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    |
| NIM-Non-Intrmdl      | NIM | 25.20                         | 25.20                         | 5.18                     | 5.79                     | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    |

2033 Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 25.20                         | 25.20                         | 0.71                     | 2.86                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    |
| Q-Guaranteed Intrmdl | Q   | 25.20                         | 25.20                         | 3.79                     | 4.65                     | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    |
| S-Stack Train        | S   | 25.20                         | 25.20                         | 5.93                     | 7.38                     | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    |
| Z                    | Z   | 25.20                         | 25.20                         | 11.22                    | 8.90                     | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    |
| NIM-Non-Intrmdl      | NIM | 25.20                         | 25.20                         | 5.18                     | 5.79                     | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    |

2048 Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 25.20                         | 25.20                         | 0.71                     | 2.86                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    |
| Q-Guaranteed Intrmdl | Q   | 25.20                         | 25.20                         | 5.33                     | 6.55                     | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    |
| S-Stack Train        | S   | 25.20                         | 25.20                         | 6.86                     | 8.54                     | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    |
| Z                    | Z   | 25.20                         | 25.20                         | 16.25                    | 12.89                    | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    |
| NIM-Non-Intrmdl      | NIM | 25.20                         | 25.20                         | 5.18                     | 5.79                     | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    |

Project - suc\_bar

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 3.23                     | 3.97                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 3.64                     | 4.53                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 8.76                     | 6.95                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2028 Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 3.38                     | 4.16                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 5.27                     | 6.56                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 9.92                     | 7.86                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2033 Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 3.79                     | 4.66                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 5.93                     | 7.38                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 11.22                    | 8.90                     | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

2048 Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 56.10                         | 56.10                         | 0.70                     | 2.85                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    |
| Q-Guaranteed Intrmdl | Q   | 56.10                         | 56.10                         | 5.33                     | 6.56                     | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    |
| S-Stack Train        | S   | 56.10                         | 56.10                         | 6.86                     | 8.54                     | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    |
| Z                    | Z   | 56.10                         | 56.10                         | 16.25                    | 12.89                    | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    |
| NIM-Non-Intrmdl      | NIM | 56.10                         | 56.10                         | 5.02                     | 5.64                     | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    |

Project - bar\_nee

Base Year

2023

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 5.05                     | 5.22                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 3.72                     | 4.57                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 10.84                    | 9.59                     | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2028 Project

2028

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 7.72                     | 7.98                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 3.91                     | 4.80                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 12.27                    | 10.86                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2033 Project

2033

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 9.08                     | 9.39                     | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 4.11                     | 5.04                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 13.88                    | 12.28                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

2048 Project

2048

| Train Type           |     | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Trains (Eastbound) | Daily Trains (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) |
|----------------------|-----|-------------------------------|-------------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|
| Units                |     | miles/train-trip              | miles/train-trip              | train-trips/day          | train-trips/day          | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 |
| B-Bare Table Intrmdl | B   | 167.40                        | 167.40                        | 0.55                     | 1.88                     | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    |
| Q-Guaranteed Intrmdl | Q   | 167.40                        | 167.40                        | 12.16                    | 12.57                    | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    |
| S-Stack Train        | S   | 167.40                        | 167.40                        | 4.77                     | 5.86                     | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    |
| Z                    | Z   | 167.40                        | 167.40                        | 20.10                    | 17.79                    | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    |
| NIM-Non-Intrmdl      | NIM | 167.40                        | 167.40                        | 6.81                     | 7.75                     | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   |

Appendix A

**No Project**

Idling - SCAQMD

2028

2048

2026

| Train Type           |     | Idling Time<br>(Non-<br>Directional) | Idling Time<br>(Non-<br>Directional) | Idling Time<br>(Non-<br>Directional) |
|----------------------|-----|--------------------------------------|--------------------------------------|--------------------------------------|
| Units                |     | hours/day                            | hours/day                            | hours/day                            |
| B-Bare Table Intrmdl | B   | 0.71                                 | 0.94                                 | 0.63                                 |
| Q-Guaranteed Intrmdl | Q   | 0.67                                 | 1.93                                 | 0.64                                 |
| S-Stack Train        | S   | 1.56                                 | 2.58                                 | 1.50                                 |
| Z                    | Z   | 1.72                                 | 2.86                                 | 1.62                                 |
| NIM-Non-Intrmdl      | NIM | 6.05                                 | 6.57                                 | 5.78                                 |

Provided by BNSF.

Appendix A

**Project**

Idling - SCAQMD

2028

2048

2026

| Train Type           |     | Idling Time<br>(Non-<br>Directional) | Idling Time<br>(Non-<br>Directional) | Idling Time<br>(Non-<br>Directional) |
|----------------------|-----|--------------------------------------|--------------------------------------|--------------------------------------|
| Units                |     | hours/day                            | hours/day                            | hours/day                            |
| B-Bare Table Intrmdl | B   | 0.69                                 | 0.91                                 | 0.63                                 |
| Q-Guaranteed Intrmdl | Q   | 0.82                                 | 2.20                                 | 0.64                                 |
| S-Stack Train        | S   | 2.52                                 | 4.63                                 | 1.50                                 |
| Z                    | Z   | 1.78                                 | 2.96                                 | 1.62                                 |
| NIM-Non-Intrmdl      | NIM | 5.91                                 | 6.92                                 | 5.78                                 |

Provided by BNSF.

Appendix A

**No Project**

Idling - sub\_bar

2028

2048

2026

| Train Type           |     | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) |
|----------------------|-----|----------------------------------|----------------------------------|----------------------------------|
| Units                |     | hours/day                        | hours/day                        | hours/day                        |
| B-Bare Table Intrmdl | B   | 0.14                             | 0.21                             | 0.14                             |
| Q-Guaranteed Intrmdl | Q   | 1.03                             | 2.42                             | 0.99                             |
| S-Stack Train        | S   | 0.61                             | 1.61                             | 0.57                             |
| Z                    | Z   | 0.45                             | 1.19                             | 0.43                             |
| NIM-Non-Intrmdl      | NIM | 3.43                             | 5.08                             | 3.39                             |

Provided by BNSF.

Idling - bar\_nee

| Train Type           |     | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) |
|----------------------|-----|----------------------------------|----------------------------------|----------------------------------|
| Units                |     | hours/day                        | hours/day                        | hours/day                        |
| B-Bare Table Intrmdl | B   | 0.19                             | 0.76                             | 0.18                             |
| Q-Guaranteed Intrmdl | Q   | 1.00                             | 3.53                             | 0.92                             |
| S-Stack Train        | S   | 1.29                             | 4.25                             | 1.20                             |
| Z                    | Z   | 0.83                             | 2.64                             | 0.83                             |
| NIM-Non-Intrmdl      | NIM | 2.63                             | 5.55                             | 2.61                             |

Provided by BNSF.



Appendix A

**Project**

Idling - sub\_bar

2028

2048

2026

| Train Type           |     | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) |
|----------------------|-----|----------------------------------|----------------------------------|----------------------------------|
| Units                |     | hours/day                        | hours/day                        | hours/day                        |
| B-Bare Table Intrmdl | B   | 0.15                             | 0.23                             | 0.14                             |
| Q-Guaranteed Intrmdl | Q   | 0.45                             | 1.09                             | 0.99                             |
| S-Stack Train        | S   | 0.67                             | 1.35                             | 0.57                             |
| Z                    | Z   | 0.35                             | 0.68                             | 0.43                             |
| NIM-Non-Intrmdl      | NIM | 3.48                             | 4.72                             | 3.39                             |

Provided by BNSF.

Idling - bar\_nee

| Train Type           |     | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) | Idling Time<br>(Non-Directional) |
|----------------------|-----|----------------------------------|----------------------------------|----------------------------------|
| Units                |     | hours/day                        | hours/day                        | hours/day                        |
| B-Bare Table Intrmdl | B   | 0.52                             | 1.24                             | 0.18                             |
| Q-Guaranteed Intrmdl | Q   | 0.92                             | 2.01                             | 0.92                             |
| S-Stack Train        | S   | 1.16                             | 2.06                             | 1.20                             |
| Z                    | Z   | 0.94                             | 1.98                             | 0.83                             |
| NIM-Non-Intrmdl      | NIM | 2.69                             | 5.02                             | 2.61                             |

Provided by BNSF.

## BIG Daily Train Trip Estimates for Affected Trains

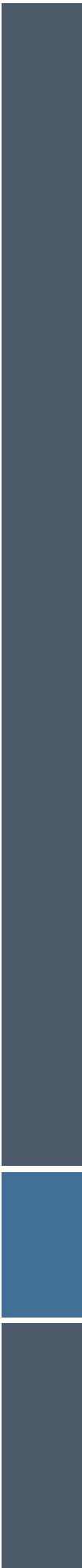
| Project Trip Rates |                      | rdj_sbd  |          | sbd_suc  |          | suc_bar  |          | bar_nee  |          |
|--------------------|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|
|                    |                      | Project  |          | Project  |          | Project  |          | Project  |          |
| Year               | Train                | EB Trips | WB Trips | EB Trips | WB Trips | EB Trips | WB Trips | EB Trips | WB Trips |
| 2023               | Q-Guaranteed Intrmdl | 2.66     | 3.10     | 3.23     | 3.97     | 3.23     | 3.97     | 5.05     | 5.22     |
| 2023               | S-Stack Train        | 3.68     | 4.56     | 3.64     | 4.54     | 3.64     | 4.53     | 3.72     | 4.57     |
| 2028               | Q-Guaranteed Intrmdl | 2.88     | 3.35     | 3.38     | 4.16     | 3.38     | 4.16     | 7.73     | 7.99     |
| 2028               | S-Stack Train        | 5.31     | 6.58     | 5.26     | 6.55     | 5.26     | 6.55     | 3.91     | 4.80     |
| 2033               | Q-Guaranteed Intrmdl | 3.22     | 3.75     | 3.79     | 4.65     | 3.79     | 4.66     | 9.10     | 9.40     |
| 2033               | S-Stack Train        | 5.97     | 7.40     | 5.92     | 7.37     | 5.92     | 7.37     | 4.11     | 5.04     |
| 2048               | Q-Guaranteed Intrmdl | 4.51     | 5.25     | 5.33     | 6.55     | 5.33     | 6.56     | 12.18    | 12.59    |
| 2048               | S-Stack Train        | 6.91     | 8.57     | 6.85     | 8.53     | 6.85     | 8.52     | 4.77     | 5.86     |

|                       |                      | rdj_sbd    |          | sbd_suc  |                |          |         |            |          | suc_bar  |                |         |          |            |          | bar_nee  |                |          |          |            |          |          |                |  |  |
|-----------------------|----------------------|------------|----------|----------|----------------|----------|---------|------------|----------|----------|----------------|---------|----------|------------|----------|----------|----------------|----------|----------|------------|----------|----------|----------------|--|--|
| No Project Trip Rates |                      | No Project |          |          | Trips per 100K |          |         | No Project |          |          | Trips per 100K |         |          | No Project |          |          | Trips per 100K |          |          | No Project |          |          | Trips per 100K |  |  |
| Year                  | Train                | Volumes    | EB Trips | WB Trips | EB Trips       | WB Trips | Volumes | EB Trips   | WB Trips | EB Trips | WB Trips       | Volumes | EB Trips | WB Trips   | EB Trips | WB Trips | Volumes        | EB Trips | WB Trips | EB Trips   | WB Trips | EB Trips | WB Trips       |  |  |
| 2023                  | Q-Guaranteed Intrmdl | 205,257    | 2.66     | 3.10     | 1.30           | 1.51     | 248,172 | 3.23       | 3.97     | 1.30     | 1.60           | 248,172 | 3.23     | 3.97       | 1.30     | 1.60     | 325,869        | 5.05     | 5.22     | 1.55       | 1.60     |          |                |  |  |
| 2023                  | S-Stack Train        | 506,317    | 3.68     | 4.56     | 0.73           | 0.90     | 506,317 | 3.64       | 4.54     | 0.72     | 0.90           | 506,317 | 3.64     | 4.53       | 0.72     | 0.90     | 510,017        | 3.72     | 4.57     | 0.73       | 0.90     |          |                |  |  |
| 2026                  | Q-Guaranteed Intrmdl | 219,336    | 2.85     | 3.31     | 1.30           | 1.51     | 265,551 | 3.46       | 4.25     | 1.30     | 1.60           | 265,551 | 3.46     | 4.25       | 1.30     | 1.60     | 349,222        | 5.41     | 5.59     | 1.55       | 1.60     |          |                |  |  |
| 2026                  | S-Stack Train        | 521,659    | 3.79     | 4.69     | 0.73           | 0.90     | 521,659 | 3.75       | 4.67     | 0.72     | 0.90           | 521,659 | 3.75     | 4.67       | 0.72     | 0.90     | 525,471        | 3.83     | 4.71     | 0.73       | 0.90     |          |                |  |  |
| 2028                  | Q-Guaranteed Intrmdl | 229,290    | 2.97     | 3.46     | 1.30           | 1.51     | 277,844 | 3.62       | 4.44     | 1.30     | 1.60           | 277,844 | 3.62     | 4.45       | 1.30     | 1.60     | 365,751        | 5.67     | 5.86     | 1.55       | 1.60     |          |                |  |  |
| 2028                  | S-Stack Train        | 532,144    | 3.86     | 4.79     | 0.73           | 0.90     | 532,144 | 3.83       | 4.77     | 0.72     | 0.90           | 532,144 | 3.83     | 4.77       | 0.72     | 0.90     | 536,033        | 3.91     | 4.80     | 0.73       | 0.90     |          |                |  |  |
| 2033                  | Q-Guaranteed Intrmdl | 256,331    | 3.33     | 3.87     | 1.30           | 1.51     | 311,266 | 4.05       | 4.98     | 1.30     | 1.60           | 311,266 | 4.05     | 4.98       | 1.30     | 1.60     | 410,725        | 6.36     | 6.58     | 1.55       | 1.60     |          |                |  |  |
| 2033                  | S-Stack Train        | 559,289    | 4.06     | 5.03     | 0.73           | 0.90     | 559,289 | 4.03       | 5.01     | 0.72     | 0.90           | 559,289 | 4.03     | 5.01       | 0.72     | 0.90     | 4,087          | 4.11     | 5.04     | 100.56     | 123.44   |          |                |  |  |
| 2048                  | Q-Guaranteed Intrmdl | 359,640    | 4.67     | 5.43     | 1.30           | 1.51     | 439,202 | 5.72       | 7.03     | 1.30     | 1.60           | 439,202 | 5.72     | 7.03       | 1.30     | 1.60     | 583,248        | 9.04     | 9.34     | 1.55       | 1.60     |          |                |  |  |
| 2048                  | S-Stack Train        | 649,317    | 4.72     | 5.84     | 0.73           | 0.90     | 649,317 | 4.67       | 5.82     | 0.72     | 0.90           | 649,317 | 4.67     | 5.81       | 0.72     | 0.90     | 4,745          | 4.77     | 5.86     | 100.56     | 123.44   |          |                |  |  |

EB volumes forcasting provided by BNSF. WB volumes are assumed to balance EB volumes. Trips based on Q2 2022 through Q1 2023 train data provided by BSNF.

| Incremental Change |                      | rdj_sbd  |          |          | sbd_suc  |          |          | suc_bar  |          |          | bar_nee |          |          |
|--------------------|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|----------|----------|
|                    |                      | Project  |          |          | Project  |          |          | Project  |          |          | Project |          |          |
| Year               | Train                | Volume   | EB Trips | WB Trips | Volume   | EB Trips | WB Trips | Volume   | EB Trips | WB Trips | Volume  | EB Trips | WB Trips |
| 2028               | Q-Guaranteed Intrmdl | (7,200)  | -0.09    | -0.11    | (18,000) | -0.23    | -0.29    | (18,000) | -0.23    | -0.29    | 133,333 | 2.07     | 2.14     |
| 2028               | S-Stack Train        | 199,000  | 1.45     | 1.79     | 199,000  | 1.43     | 1.78     | 199,000  | 1.43     | 1.78     | -       | 0.00     | 0.00     |
| 2033               | Q-Guaranteed Intrmdl | (8,146)  | -0.11    | -0.12    | (20,365) | -0.27    | -0.33    | (20,365) | -0.27    | -0.33    | 176,336 | 2.73     | 2.82     |
| 2033               | S-Stack Train        | 263,181  | 1.91     | 2.37     | 263,181  | 1.89     | 2.36     | 263,181  | 1.89     | 2.36     | -       | 0.00     | 0.00     |
| 2048               | Q-Guaranteed Intrmdl | (11,798) | -0.15    | -0.18    | (29,495) | -0.38    | -0.47    | (29,495) | -0.38    | -0.47    | 202,704 | 3.14     | 3.25     |
| 2048               | S-Stack Train        | 302,520  | 2.20     | 2.72     | 302,520  | 2.18     | 2.71     | 302,520  | 2.18     | 2.71     | -       | 0.00     | 0.00     |

Note: Incremental Change is for S trains powered by the Dedicated Fleet. Volumes are for EB direction. Assumes WB volumes will balance EB volumes.



## **Appendix B**

### **BNSF CAGRs Used in BIG**



## SUPPORT FOR TRAIN TRIP COMPOUND ANNUAL GROWTH RATES (CAGR) USED IN BARSTOW INTERNATIONAL GATEWAY (BIG) EIR

### 1. Actual historical BNSF 2022-23 train trip data by train type.

BNSF defines various types of trains that run on its network primarily by a letter designation. The following is a list of relevant train types that travel on the rail corridor between the Ports of Los Angeles and Long Beach (Ports) to BIG and from BIG to the California Border<sup>1</sup> that are discussed in this document:

- Z (Priority) trains: These are trains that primarily consist of 53-foot containers (hereinafter referred to as “domestic” containers) with expedited delivery times such as FedEx and UPS, as well as some other high-priority intermodal goods, that have a guaranteed delivery time.
- S (Stack) trains: These are trains composed of 20-foot and 40-foot containers (hereinafter referred to as “international” containers) that arrive at the Ports and are loaded on-dock directly onto railcars. Most of these containers are transported eastward as an Inland Point Intermodal (IPI) rail transport destined for a specific inland destination. With BIG, additional S trains will depart from the Ports due to the mode shift from truck to train (further described below) and arrive at BIG’s IMF for transloading at the on-site warehouses.
- Q (Premium) trains: A small portion of these trains contain goods that stay in international containers that are trucked from the Ports to BNSF’s Hobart intermodal facility for placement on an eastbound train. The majority of these trains, however, contain mostly domestic containers that have been transloaded at local warehouses. Containers are primarily trucked from the Ports in international containers to local warehouses where they are sorted and repackaged (i.e. transloaded) into a domestic container and then trucked to a BNSF intermodal facility and loaded on an eastbound train. With BIG, the additional S trains that result from the mode shift from truck to train described above, will depart BIG’s IMF as Q trains after being transloaded from international containers into domestic containers, for transport to eastern destinations.
- B (Bare table) trains: These trains do not carry loaded containers. They are used to move equipment and empty containers, including repositioning empty containers between rail stations on the rail network.
- All other trains (non-intermodal): All other trains (non-intermodal) are trains that aren’t composed of standard international or domestic containers. They generally transport general merchandise such as liquids and bulk commodities such as grain, coal, and automobiles.

<sup>1</sup> The rail corridor from the Ports to the California Border is referred to herein as the “Corridor”.



Utilizing these train types, BNSF compiled train trip data for the last four quarters prior to analysis commencing (the last three calendar year quarters of 2022 and the first calendar year quarter of 2023) for each rail segment on the Corridor to be modeled for BIG. The rail segments included the following, which represent key points and/or rail junctions, changes in terrain, and changes in air districts, along the rail Corridor:

- San Pedro Ports to San Bernardino Station
- San Bernardino Station to Summit Station
- Summit Station to Barstow Station/BIG
- Barstow Station/BIG to the California/Arizona border, near the BNSF Needles substation

These segments were selected for modeling because they are the only segments of the rail corridor that are affected by BIG.

## 2. Estimated future Compounded Annual Growth Rates by train type at No Project (NP) conditions.

BNSF developed its long-range forecasts for future growth of cargo by train type based on commonly used economic forecasts (e.g. consumer goods spending, inflation, Gross Domestic Product (GDP) growth, etc.), historical rail volume growth, customer input regarding future needs, and other general rail market and capacity knowledge and direct industry expertise. More specifically, BNSF reviewed the historical data for various types of containerized goods, assessing for potential trends, including BNSF's assumed market share of that growth, held discussions with major customers, reviewed forecast data from industry groups such as Mercator and Intermodal Association of North America (IANA) and BNSF expert opinions. BNSF looked at 10 years of its historical container growth volumes which includes years of increase and decrease of volume to average out the peaks and valleys that can be associated with container volumes in addition to other market-based factors that it anticipates will adjust the historical growth. Projections for Port volume growth are driven by customer preference for port locations within North America and is not expected to change as a result of the BIG project. The estimated future Compounded Annual Growth Rates (CAGRs)<sup>2</sup> by train type under No Project (NP) conditions were estimated based on these factors. Table 1, Summary of CAGRs for No Project Scenario, summarizes the CAGRs used for the analysis years for the No Project Scenario. The weighted average of these NP CAGRs is approximately equal to 2%.

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<sup>2</sup> A Compound Annual Growth Rate (CAGR) used in this context represents a smoothed average annual rate at which the number of trains (or container volume carried by trains) is projected to grow over time (in this case, from 2022-23 actual volume to a future year 2048). It is an estimated growth rate that smooths year-to-year fluctuations and is used to project future trends.



| Table 1 -Summary of CAGRs for No Project Scenario 2022/23 - 2048 |                                                                                  |
|------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Train Type                                                       | No Project:                                                                      |
| Z trains                                                         | Domestic containers: CAGR of 2.5%                                                |
| S trains                                                         | International containers: CAGR of 1.0%                                           |
| Q trains                                                         | Q trains are a mix of domestic, international containers, with CAGRs as follows: |
|                                                                  | International containers: CAGR of 1.0%                                           |
|                                                                  | Domestic containers: CAGR of 2.5%                                                |
| B trains                                                         | No loaded containers. CAGR of 0%                                                 |
| All other trains (Non-Intermodal)                                | Mix of non-container commodities. CAGR of 0%                                     |

### 3. Estimated Opening Year (2028) Volumes for Cross-Dock Intermodal Containers

BIG's Intermodal facility (IMF) is expected to improve the performance of rail-borne container transport by introducing a new on-property "cross-dock intermodal" container mode as a more competitive alternative to trucking. BIG's IMF would focus on goods arriving at the Ports by ship in international containers and converting them from a heavy-duty truck mode of transport to a rail mode of transport. The existing market stream that BIG's IMF would convert to rail is represented by a portion of one BNSF defined train type: S trains. All S trains are comprised of international containers, a portion of which represent the market stream that would increase in volume with the conversion of container transport from truck to rail.

BNSF considered the anticipated volume of containers that could be captured as customers convert from truck to rail transport, and the timing for customers to convert their supply chains to utilize BIG. To determine the estimated Opening Year (2028) volumes that could be anticipated as part of the mode shift from truck to rail, BNSF analyzed the volumes of international containers that are unloaded from ships onto heavy-duty trucks, transloaded into domestic intermodal containers (domestic containers), and transported to eastern destinations by heavy-duty truck. Based on analysis of this data the market analysis described above, and discussions with customers, including large scale retailers, Beneficial Cargo Operators (BCOs), and Brokers, BNSF determined the estimated Opening Year (2028) container volumes for the new cross-dock intermodal market was approximately 199,000 S train containers from the Ports to BIG's IMF. With BIG, these 199,000 international containers would depart the Ports directly by rail (replacing the existing move by heavy-duty truck) and travel on an S train to BIG's IMF where they would be transloaded into domestic containers at the on-site warehouses as part of BIG's unique cross-dock intermodal move. After on-site transloading, the domestic containers would be loaded onto



a Q train at the IMF and transported to eastern destinations. Therefore, east of BIG, there would be an associated increase of 133,333 Q train resulting from the transloaded "S" train containers that will head east from BIG's IMF<sup>3</sup>.

#### 4. Estimated future CAGRs for Project conditions.

BNSF does not anticipate any changes in growth rates between No Project and Project for its existing volumes that are not a part of the mode shift from truck to rail. All changes in growth calculations in the modeling are directly attributed to the BIG IMF's cross-dock intermodal move, which is represented by a portion of the S and Q trains as described below. The proposed block swap operation does not cause any growth in train volumes between the No Project and the Project, rather it is an efficiency move to align blocks of trains to similar destinations. See Table 2, Summary of Average Train Trip CAGRs for Proposed Project Compared to the No Project Scenario 2022-23 to 2048.

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<sup>3</sup> Due to domestic containers being larger, the goods from three international containers can condense into two domestic containers via the cross-dock process, thus, 199,000 S train containers after being transloaded, result in approximately 132,667 Q train containers. There will also be an estimated 1,000 international containers annually (less than 3 per day) that will be trucked from the Port to BIG. These containers will be transloaded at BIG, resulting in an additional 666 domestic containers that will depart BIG's IMF eastward as a Q train. Therefore, the total estimated volume of Q train containers in 2028 is forecast to be 133,333.



| Table 2<br>Summary of Average Train Trip CAGRs for Proposed Project Compared to No Project Scenario 2022-23 to 2048                                               |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Train Type                                                                                                                                                        | No Project:                                                                                             | Proposed Project (Opening Year 2028):                                                                                                                                                                                                                                                                                                                                |
| Between the years 2022/23 and Opening Year 2028, the No Project CAGRs are applied to the actual 2022/23 base volumes for both the No Project and Proposed Project |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                      |
| Z trains                                                                                                                                                          | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048.</li> </ul>      | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048 (same as No Project).</li> </ul>                                                                                                                                                                                                                                              |
| S trains                                                                                                                                                          | International containers: <ul style="list-style-type: none"> <li>CAGR of 1.0% for 2028-2048.</li> </ul> | International containers that go from Ports to BIG's IMF for transloading (cross-dock intermodal containers): <ul style="list-style-type: none"> <li>CAGR of 5.75% for 2028-2033<sup>4</sup> and then 1% from 2034 – 2048.</li> </ul>                                                                                                                                |
|                                                                                                                                                                   |                                                                                                         | All other international containers: <ul style="list-style-type: none"> <li>CAGR of 1.0 % for 2034 -2048 (same as No Project).</li> </ul>                                                                                                                                                                                                                             |
| Q trains                                                                                                                                                          | Q trains are a mix of domestic and international with CAGRs as follows:                                 | Q trains are a mix of domestic and international containers, with CAGRs as follows:                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                   | International containers: <ul style="list-style-type: none"> <li>CAGR of 1% for 2028-2048.</li> </ul>   | International containers: <ul style="list-style-type: none"> <li>CAGR of 1% for 2028 – 2048 (same as No Project).</li> </ul>                                                                                                                                                                                                                                         |
|                                                                                                                                                                   | Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048.</li> </ul>      | Domestic cross-dock intermodal containers that go from BIG eastward after transloading (previously known as international S-trains prior to transloading, which are converted to domestic Q-trains after transloading): <ul style="list-style-type: none"> <li>CAGR is directly proportional to S train growth for 2028-2033<sup>1</sup> and 2034 – 2048.</li> </ul> |
|                                                                                                                                                                   |                                                                                                         | All other Domestic containers: <ul style="list-style-type: none"> <li>CAGR of 2.5% for 2028-2048 (same as No Project).</li> </ul>                                                                                                                                                                                                                                    |
| B trains                                                                                                                                                          | No loaded containers. CAGR of 0% for 2028-2048.                                                         | No loaded containers. CAGR of 0% for 2028-2048 (same as No Project).                                                                                                                                                                                                                                                                                                 |
| All other trains<br>Non-Intermodal                                                                                                                                | Mix of non-container commodities. CAGR of 0% for 2028-2048.                                             | Mix of non-container commodities. CAGR of 0% for 2028-2048 (same as No Project).                                                                                                                                                                                                                                                                                     |

<sup>4</sup> The Proposed Project CAGR of 5.75% is only applied to S train container volume generated by the mode shift from truck to rail during the ramp up period from 2028 - 2033. It represents the growth of the market capture of existing international containers that, without BIG, are currently transported by truck from the Ports to eastern destinations. With BIG, these containers would convert to a rail mode of transport as international S trains from the Ports to BIG and be transloaded at BIG as part of the cross-dock intermodal move. These containers (arriving at BIG designated as international S trains prior to transloading) would then depart BIG eastward as domestic Q trains. Thus, the rate of growth for the domestic Q trains would be directly proportional to the 5.75% S train ramp up CAGR from 2028-2033 and the 1% CAGR from 2034-2048, given that (3) cross-dock intermodal S train containers equate to (2) cross-dock intermodal Q train containers. The underlying CAGR of all other (non-cross-dock intermodal) domestic Q train containers remains at 2.5% and all other international S train containers remains at 1%.





Based on discussions with customers, it is anticipated that most customers would utilize the BIG IMF facility and convert their operations from a truck mode of transport to a rail mode of transport over a 5-year “ramp-up” period following Opening Year, due to the complexity of the supply chain. Based on the anticipated volume of containers in Opening Year and utilizing the 5-year “ramp-up” period, BNSF calculated the projected CAGR over that period. The resulting CAGR determined from those factors was 5.75% from opening day, 2028 to 2033 for the cross-dock intermodal S train containers. After 2033, the CAGRs for the cross-dock intermodal S train containers normalize closer to growth rates used for all other S trains of 1%. This is because once the initial mode shift from truck to rail is complete, the underlying CAGR for that market segment (1%) would resume. This means that the S trains associated with the cross-dock intermodal move will have a different CAGR compared to the NP condition, given with BIG, a portion of the S trains represent the anticipated market capture of this mode shift from truck to rail. All other S trains not associated with the cross-dock intermodal move (those that are currently operating on BNSF and will not stop at the BIG IMF) are projected to grow at 1% from 2028-2048 (i.e. no anticipated change in CAGR between the NP and Proposed Project).

Similarly, domestic Q train containers resulting from the transloading of the international S train containers (as part of the cross-dock intermodal move) would be directly proportional to the S train containers. Therefore, BNSF did not calculate a separate growth rate for the cross-dock intermodal Q train containers, given there is no growth change in the volume of the goods in these containers. The goods from (3) cross-dock intermodal international containers are simply transloaded into (2) cross-dock intermodal domestic containers. As a result, growth rates for the domestic cross-dock intermodal Q trains containers from 2028-2033 and 2033-2048 will be slightly less than, but directly proportional to, the CAGR for cross-dock intermodal S trains because for every (3) S train containers, (2) Q train containers will result. All other Q trains not associated with the cross-dock intermodal move (those that are currently operating on BNSF) are projected to grow at 2.5% from 2028-2048 (i.e. no anticipated change in CAGR between the NP and Proposed Project).

BNSF does not anticipate growth in B trains through 2048, since any related locomotive or equipment growth related to the new cross-dock intermodal operations would return to the Port on an S train symbol. Although B trains likely would experience a reduction in train trips due to the introduction of the block swap yard, a conservative modeling approach was used which maintains the current B train trips under the Proposed Project with a 0% CAGR (rather than a potential negative CAGR). Therefore, there is not an anticipated change in CAGR between the NP and Proposed Project.

Z Trains and All Other Trains (non-intermodal) will continue to have a CAGR of 0% (i.e. no anticipated change in CAGR between the NP and Proposed Project).

## 5. Estimated Future Volumes for Project Conditions

The NP CAGRs were applied to the actual 2022-23 trip data to determine the future NP train trip volumes by train type. For example, to arrive at the projected 2028 opening year NP volumes,



the NP CAGR was applied to the 2022-23 daily train trip rates for each segment. The same methodology was used to determine the projected NP volumes for analysis years 2033 and 2048.

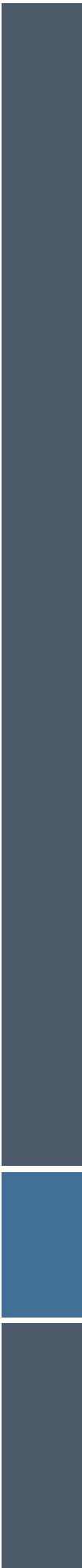
The Proposed Project CAGRs for the cross-dock intermodal S trains were applied to the Opening Year container volumes (described in Section 3 above) to determine the future Proposed Project train trips for S and Q trains in 2033 and 2048. All other train type volumes are the same between the No Project and the Proposed Project for 2033 and 2048, given there is no change in the CAGR between No Project and the Proposed Project for all other train types.

### Authors/Contributors

Brad Womack, General Director of Intermodal Strategy and Innovation, BNSF – 40+ year veteran of Transportation and Distribution operational leadership as a carrier, 3PL and BCO. Brad began his career with BNSF in 2023 in his current role of Intermodal Strategy and Innovation with commercial responsibilities for customer co-location strategies, and customer technology innovation initiatives.

Travis Thowe, Director of Network Strategy, BNSF – 27-year veteran of BNSF with experience in Operations, Finance and Service Design. Current position in Network Strategy focuses on strategic planning and projects to support BNSF's long-term growth initiatives.

Jacob Sass, Assistant Director, Network Strategy, BNSF - 16 years of experience in Operations, Mechanical, Intermodal, Terminal/Line Capacity, and FP&A. Current responsibilities include long-term strategic planning with a focus on operations and capacity modeling



## **Appendix C**

### **Fleet Mix and Emission Factors**

LINE-HAUL EMISSION FACTORS

Appendix C

| Tier         | Criteria Pollutants (g/bhp-hr) <sup>1</sup> |       |      |      | Criteria Pollutants (g/gal) <sup>1,2,3,4</sup> |       |       |        |       |       | GHG (g/gal) <sup>5</sup> |                  |                 |
|--------------|---------------------------------------------|-------|------|------|------------------------------------------------|-------|-------|--------|-------|-------|--------------------------|------------------|-----------------|
|              | PM                                          | NOx   | HC   | CO   | PM10                                           | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled | 0.32                                        | 13.00 | 0.48 | 1.28 | 6.66                                           | 6.46  | 12.08 | 270.40 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 0       | 0.32                                        | 8.60  | 0.48 | 1.28 | 6.66                                           | 6.46  | 12.08 | 178.88 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 0+      | 0.20                                        | 7.20  | 0.30 | 1.28 | 4.16                                           | 4.04  | 7.55  | 149.76 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 1       | 0.32                                        | 6.70  | 0.47 | 1.28 | 6.66                                           | 6.46  | 11.83 | 139.36 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 1+      | 0.20                                        | 6.70  | 0.29 | 1.28 | 4.16                                           | 4.04  | 7.30  | 139.36 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier2        | 0.18                                        | 4.95  | 0.26 | 1.28 | 3.74                                           | 3.63  | 6.54  | 102.96 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 2+      | 0.08                                        | 4.95  | 0.13 | 1.28 | 1.66                                           | 1.61  | 3.27  | 102.96 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 3       | 0.08                                        | 4.95  | 0.13 | 1.28 | 1.66                                           | 1.61  | 3.27  | 102.96 | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |
| Tier 4       | 0.015                                       | 1.00  | 0.04 | 1.28 | 0.31                                           | 0.30  | 1.01  | 20.80  | 26.62 | 0.094 | 10,210                   | 0.26             | 0.80            |

| Brake Specific Fuel Consumption |                                             |
|---------------------------------|---------------------------------------------|
| Locomotive Application          | Conversion Factor <sup>1</sup> (bhp-hr/gal) |
| Large Line-Haul and Passenger   | 20.8                                        |

**Notes:**

1. EPA Technical Highlights: Emission Factors for Locomotives, EPA Office of Transportation and Air Quality, EPA-420-F-09-025, April 2009. <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF>

2. PM<sub>2.5</sub> emissions can be estimated as 0.97 times the PM10. Referenced EPA Technical Highlights: Emission Factors for Locomotives, EPA Office of Transportation and Air Quality, EPA-420-F-09-025, April 2009. <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF>

3. VOC (volatile organic compounds) were assumed equivalent to ROG (reactive organic compounds). VOC and ROG emission factor was estimated as 1.21 times the emission factor for HC, per CARB 2016 Line haul Locomotive Model & Update, October 2017. Accessed September 2021 at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road>

4. SOx emission factor calculated:

$$SO_x = \text{Fuel Density} \times \text{Conversion factor} \times 64 \text{ gSO}_2/32 \text{ gS} \times S \text{ content of fuel}$$

where

SO<sub>2</sub> is in g/gal

Density is the fuel density of diesel which is 3200 g/gal (Source: U.S. EPA Emission Factors for Locomotives, U.S. EPA-420-F-09-025, April 2009)

453.6 is the conversion factor from pounds to grams

The conversion factor is the fraction of fuel sulfur converted to SO<sub>2</sub> which is 97.8 percent

2 is the grams of SO<sub>2</sub> formed from a gram of sulfur

Sulfur content of fuel for locomotives are fueled with low sulfur diesel which has a sulfur content of 15 parts per million (ppm). S content of fuel = 15 g S / 1,000,000 g fuel.

5. GHG emission factors obtained from The Climate Registry. 2021 Emission Factors, Tables 2.1 and 2.7.

ALTERNATIVE FUEL EMISSION FACTOR ADJUSTMENTS

Appendix C

| Commodity Blend Specifications | Emission Factors (g/bhp-hr) |       |      |      |       |                 | Percent Reduction from Renewable Diesel (%) |       |       |       |      |       | Percent Reduction including Carbon Intensity (%) |       |       |       |       |       |
|--------------------------------|-----------------------------|-------|------|------|-------|-----------------|---------------------------------------------|-------|-------|-------|------|-------|--------------------------------------------------|-------|-------|-------|-------|-------|
| Commodity                      | PM                          | HC    | NOx  | CO   | CO2   | Fuel (lb/hp-hr) | PM                                          | HC    | NOx   | CO    | CO2  | Fuel  | PM                                               | HC    | NOx   | CO    | CO2   | Fuel  |
| EPA Cert Diesel                | 0.041                       | 0.096 | 7.60 | 0.35 | 597.7 | 0.363           | --                                          | --    | --    | --    | --   | --    | --                                               | --    | --    | --    | --    | --    |
| B5 - Hybrid                    | 0.041                       | 0.096 | 7.60 | 0.35 | 579.2 | 0.363           | 0.0%                                        | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0%                                             | 0.0%  | 0.0%  | 0.0%  | 3.1%  | 0.0%  |
| R20 -Hybrid                    | 0.039                       | 0.092 | 7.42 | 0.34 | 523.6 | 0.364           | 6.1%                                        | 4.3%  | 2.4%  | 3.1%  | 1.3% | -0.3% | 6.1%                                             | 4.3%  | 2.4%  | 3.1%  | 12.4% | -0.3% |
| R30 - Hybrid                   | 0.037                       | 0.090 | 7.32 | 0.33 | 486.5 | 0.365           | 9.1%                                        | 6.5%  | 3.6%  | 4.7%  | 2.0% | -0.5% | 9.1%                                             | 6.5%  | 3.6%  | 4.7%  | 18.6% | -0.5% |
| R100 - Hybrid                  | 0.029                       | 0.075 | 6.68 | 0.30 | 227.1 | 0.369           | 30.4%                                       | 21.6% | 12.1% | 15.6% | 6.7% | -1.7% | 30.4%                                            | 21.6% | 12.1% | 15.6% | 62.0% | -1.7% |

**Source:**

EPA Cert diesel based on Renewable Diesel Fuel Effectson on Exhaust Emissions from a Tier 3 GE ES44C4 Locomotive (CARB, 2021)

Biodiesel 5% not statistacally significantly different from conventional diesel. (Locomotive Emissions Measurements for Various Blends of Biodiesel Fuel, US DOT 2014).

Renewable fuel emission factors and fuel use scaled from Renewable Diesel Fuel Effectson on Exhaust Emissions fomr a Tier 3 GE ES44C4 Locomotive (CARB, 2021)

Carbon Intensity Reduction of 62% based on RD CI of 38.05 and conventional diesel CI of 100.45 (CARB, 2024)

# Appendix C

## BNSF Fleet Mix for Southern California

### No Project and Project

| Year                | Fleet Mix Engine Tier Count |    |    |     |      |     |      |      |      |    | Dedicated<br>Fleet T4 | Count of<br>Locomotives |
|---------------------|-----------------------------|----|----|-----|------|-----|------|------|------|----|-----------------------|-------------------------|
|                     | Non Tier                    | 0  | 0+ | 1   | 1+   | 2   | 2+   | 3    | 4    |    |                       |                         |
| 2023 <sup>(1)</sup> | 0                           | 39 | 37 | 119 | 1215 | 161 | 1428 | 1198 | 303  | 0  | 4,500                 |                         |
| 2028 <sup>(2)</sup> | 0                           | 0  | 0  | 0   | 1137 | 0   | 1589 | 1198 | 369  | 26 | 4,319                 |                         |
| 2033 <sup>(2)</sup> | 0                           | 0  | 0  | 0   | 943  | 0   | 1589 | 1198 | 534  | 32 | 4,296                 |                         |
| 2048 <sup>(2)</sup> | 0                           | 0  | 0  | 0   | 360  | 0   | 1589 | 1198 | 1029 | 36 | 4,212                 |                         |

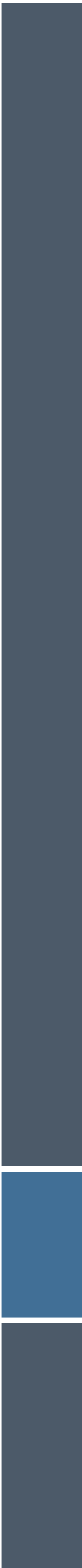
#### Notes:

1. Data is sourced from the most recently published CARB MOU (2023).
2. All T0/T1 retire by 2028 and all T2 are converted to T2+. Based on a historical replacement rate of 33 T4 per year starting in 2026. T1 replaced at a rate of 100 T1 for every 85 T4.

C-4

|         |        |     |                                                                                                                                                                                                                                                                                                                                                          |            |                                        |                        |                 |       |                 |       |       |            |                                |                  |                                 |                             |                                                                                                                                                                                                                                                                        |                           |       |
|---------|--------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------|------------------------|-----------------|-------|-----------------|-------|-------|------------|--------------------------------|------------------|---------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------|
| B026802 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Brooks Alberta Canada transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)               | California | W (animal and poultry fat)             | Renewable Diesel (RND) | RND020802680200 | 18.87 | RND020802680201 | 18.93 | 18.93 | 3/28/2022  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Brooks Alberta Canada transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                    | 2021 AFPR Recent Complete | Noted |
| B026811 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Dromore Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional) | California | W (animal and poultry fat)             | Renewable Diesel (RND) | RND020802681100 | 29.26 | RND020802681101 | 29.78 | 29.78 | 3/28/2022  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Dromore Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)      | 2021 AFPR Recent Complete | Noted |
| B039401 | Tier 2 | 3.0 | Fuel Producer: Chevron Products Company (0086); Facility Name: Chevron El Segundo (01013); Soybean oil transported by rail to California; natural gas, steam, grid electricity and hydrogen; renewable diesel produced from co-processing soybean oil with fossil feedstock in a diesel hydrotreater (VGO unit) in El Segundo, California (PROV3.0)      | California | Soybean Oil (005)                      | Renewable Diesel (RND) | None            | None  | RND090803940100 | 51.74 | 51.74 | 6/30/2023  | <a href="#">Apply for Fuel</a> | Renewable Diesel | Chevron Products Company (0086) | Chevron El Segundo (01013)  | Soybean oil transported by rail to California; natural gas, steam, grid electricity and hydrogen; renewable diesel produced from co-processing soybean oil with fossil feedstock in a diesel hydrotreater (VGO unit) in El Segundo, California (Provisional)           | None                      |       |
| B056001 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); North American sourced Soybean Oil, pre-treated at various facilities, transported by truck, rail, and barge to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (PROV3.0)                              | California | Soybean Oil (005)                      | Renewable Diesel (RND) | None            | None  | RND090805600100 | 62.93 | 62.93 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Soybean Oil, pre-treated at various facilities, transported by truck, rail, and barge to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (Provisional)                                 | None                      |       |
| B056002 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); North American sourced Canada Oil transported by rail and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (PROV3.0)                                                                    | California | Canada Oil (006)                       | Renewable Diesel (RND) | None            | None  | RND090805600200 | 56.54 | 56.54 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Canada Oil transported by rail and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (Provisional)                                                                       | None                      |       |
| B056003 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); North American sourced Distillers' Corn Oil, pre-treated at various facilities, transported by truck, rail, and barge to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (PROV3.0)                     | California | Distillers' Corn Oil (003)             | Renewable Diesel (RND) | None            | None  | RND090805600300 | 35.24 | 35.24 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Distillers' Corn Oil, pre-treated at various facilities, transported by truck, rail, and barge to Renewable Diesel plant in Martinez, California; Natural Gas and Electricity; fuel produced in California (Provisional)                        | None                      |       |
| B056004 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); North American sourced Used Cooking Oil, pre-treated at various facilities, transported by truck and rail to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (PROV3.0)                            | California | Used Cooking Oil/Waste Oil (UCO) (001) | Renewable Diesel (RND) | None            | None  | RND090805600400 | 29.22 | 29.22 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Used Cooking Oil, pre-treated at various facilities, transported by truck and rail to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (Provisional)                               | None                      |       |
| B056005 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); North American sourced Animal Fat, pre-treated at various facilities, transported by truck, rail, barge, and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (PROV3.0)            | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | None            | None  | RND090805600500 | 37.14 | 37.14 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Animal Fat, pre-treated at various facilities, transported by truck, rail, barge, and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (Provisional)               | None                      |       |
| B056006 | Tier 2 | 3.0 | Fuel Producer: MARTINEZ RENEWABLES LLC (1845); Facility Name: MARTINEZ REFINERY (00001); Globally sourced Animal Fat, pre-treated at various facilities, transported by truck, rail, and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (PROV3.0)                         | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | None            | None  | RND090805600600 | 46.40 | 46.40 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | MARTINEZ RENEWABLES LLC (1845)  | MARTINEZ REFINERY (00001)   | North American sourced Animal Fat, pre-treated at various facilities, transported by truck, rail, and ocean tanker to Renewable Diesel plant in Martinez, California; Natural Gas and Grid Electricity; fuel produced in California (Provisional)                      | None                      |       |
| B052001 | Tier 2 | 3.0 | Fuel Producer: PHILLIPS 66 COMPANY (4528); Facility Name: Phillips 66 Rodero (B2191); Renewable diesel produced from Argentinian soybean oil transported by ocean tanker to California; natural gas, steam, off gases, grid electricity and hydrogen; distributed in California via barge (3.0)                                                          | California | Soybean Oil (005)                      | Renewable Diesel (RND) | None            | None  | RND090805200100 | 61.98 | 61.98 | 12/26/2023 | <a href="#">Apply for Fuel</a> | Renewable Diesel | PHILLIPS 66 COMPANY (4528)      | Phillips 66 Rodero (B2191)  | Globally sourced Animal Fat, pre-treated at various facilities, transported by truck, rail, and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)    | 2022 AFPR Recent Complete |       |
| B026802 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Brooks Alberta Canada transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                   | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802680201 | 18.93 | RND020802680203 | 22.00 | 22.00 | 12/14/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Brooks Alberta Canada transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                    | 2022 AFPR Recent Complete |       |
| B026805 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Greely Colorado transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                         | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802680500 | 19.54 | RND020802680502 | 22.00 | 22.00 | 12/14/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Greely Colorado transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                          | 2022 AFPR Recent Complete |       |
| B026808 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Hyman Utah transported by Truck and rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                    | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802680800 | 15.64 | RND020802680801 | 17.98 | 17.98 | 12/12/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Hyman Utah transported by Truck and rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                     | 2022 AFPR Recent Complete |       |
| B026811 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat Sourced from JBS Dromore Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)     | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802681101 | 29.78 | RND020802681103 | 32.00 | 32.00 | 12/14/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat Sourced from JBS Dromore Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)      | 2022 AFPR Recent Complete |       |
| B026814 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); North American Sourced Redwood Animal Fat transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                                                  | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802681400 | 32.93 | RND020802681401 | 37.00 | 37.00 | 12/12/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | North American Sourced Redwood Animal Fat transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                                                   | 2022 AFPR Recent Complete |       |
| B026817 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Australian Sourced Animal Fat transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                     | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | RND020802681700 | 38.43 | RND020802681701 | 43.00 | 43.00 | 12/12/2023 | None                           | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Australian Sourced Animal Fat transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                      | 2022 AFPR Recent Complete |       |
| B044001 | Tier 2 | 3.0 | Fuel Producer: PHILLIPS 66 COMPANY (4528); Facility Name: Phillips 66 Rodero (B2191); Renewable diesel produced from used cooking oil (UCO) collected from Japan, Malaysia, Singapore and South Korea, transported by ocean tanker to Renewable Diesel Plant in Rodero, California; Natural gas, Steam, Off gases, Grid electricity and (Tunc) (PROV3.0) | California | Used Cooking Oil/Waste Oil (UCO) (001) | Renewable Diesel (RND) | None            | None  | RND091004001000 | 25.96 | 25.96 | 3/25/2024  | <a href="#">Apply for Fuel</a> | Renewable Diesel | PHILLIPS 66 COMPANY (4528)      | Phillips 66 Rodero (B2191)  | Renewable diesel produced from used cooking oil (UCO) collected from Japan, Malaysia, Singapore and South Korea, transported by ocean tanker to Renewable Diesel Plant in Rodero, California; Natural gas, Steam, Off gases, Grid electricity and (Tunc) (Provisional) | None                      |       |
| B056002 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); North American sourced Soybean Oil transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                                                         | California | Soybean Oil (005)                      | Renewable Diesel (RND) | None            | None  | RND090805600200 | 60.50 | 60.50 | 6/26/2024  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | North American sourced Soybean Oil transported by rail to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                                                          | None                      |       |
| B056005 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); North American sourced Distillers' Corn Oil transported by truck to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                                               | California | Distillers' Corn Oil (003)             | Renewable Diesel (RND) | None            | None  | RND090805600500 | 36.50 | 36.50 | 6/26/2024  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | North American sourced Distillers' Corn Oil transported by truck to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                                                | None                      |       |
| B056008 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); North American sourced Used Cooking transported by truck to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)                                                       | California | Used Cooking Oil/Waste Oil (UCO) (001) | Renewable Diesel (RND) | None            | None  | RND090805600800 | 22.00 | 22.00 | 6/26/2024  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | North American sourced Used Cooking transported by truck to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)                                                        | None                      |       |
| B056011 | Tier 2 | 3.0 | Fuel Producer: ABAR Paramount, LLC (B281); Facility Name: ABAR Paramount, LLC (B3180); Site-Specific: Redwood Animal Fat sourced from JBS Beef Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (PROV3.0)        | California | Tallow (animal and poultry fat) (002)  | Renewable Diesel (RND) | None            | None  | RND020805601100 | 24.00 | 24.00 | 6/26/2024  | <a href="#">Apply for Fuel</a> | Renewable Diesel | ABAR Paramount, LLC (B281)      | ABAR Paramount, LLC (B3180) | Site-Specific: Redwood Animal Fat sourced from JBS Beef Australia transported by truck and ocean tanker to Renewable Diesel plant in Paramount, California; Natural Gas, Grid Electricity, and Hydrogen; Renewable Diesel produced in California (Provisional)         | None                      |       |





## **Appendix D**

### **Fuel Efficiency Model**

**FUEL EFFICIENCY MODEL****Appendix D**

| Eastbound Regression Model Factors |          |
|------------------------------------|----------|
| Intercept                          | 7.886    |
| Grade Coefficient                  | -100.886 |
| Distance Coefficient               | -0.01147 |
| Weight Coefficient                 | 0.000024 |
| HPT Coefficient                    | -0.1616  |

| Westbound Regression Model Factors |           |
|------------------------------------|-----------|
| Intercept                          | 7.476     |
| Grade Coefficient                  | -84.425   |
| Distance Coefficient               | -0.00392  |
| Weight Coefficient                 | 0.0000091 |
| HPT Coefficient                    | -0.1194   |

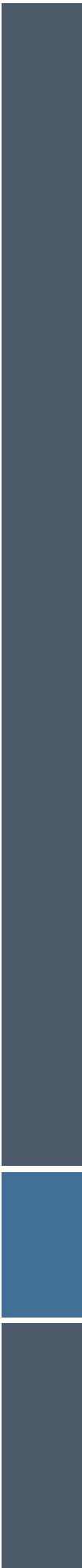
**Train Factor**

|              |         |
|--------------|---------|
| <b>B</b>     | -0.0218 |
| <b>Q</b>     | 0.1222  |
| <b>S</b>     | -0.126  |
| <b>Z</b>     | 0.0825  |
| <b>Other</b> | -0.057  |

**Train Factor**

|              |         |
|--------------|---------|
| <b>B</b>     | -0.0668 |
| <b>Q</b>     | 0.1085  |
| <b>S</b>     | -0.0215 |
| <b>Z</b>     | -0.05   |
| <b>Other</b> | 0.030   |

Regression model developed using JMP Statistical Model with 2023 train data provided by BNSF.



## **Appendix E**

### **Summary of CEM Results**

## Summary of Corridor Emissions - 2028

## No Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|-------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5 | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |       |         |          |          |      |
| SCAQMD      | 230.1                                                                           | 223.2 | 431.9   | 11,008.3 | 2,776.3  | 9.8  |
| MDAQMD      |                                                                                 |       |         |          |          |      |
| MDAQMD      | 1,020.5                                                                         | 989.8 | 1,915.2 | 48,805.7 | 12,309.8 | 43.5 |
| West of BIG | 110.5                                                                           | 107.2 | 207.4   | 5,284.0  | 1,332.9  | 4.7  |
| East of BIG | 909.9                                                                           | 882.6 | 1,707.8 | 43,521.7 | 10,976.9 | 38.7 |

| Region      | Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |       |         |         |     |
|-------------|-----------------------------------------------------------|-------|-------|---------|---------|-----|
| Pollutant   | PM10                                                      | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD      |                                                           |       |       |         |         |     |
| SCAQMD      | 37.2                                                      | 36.0  | 69.8  | 1,777.9 | 448.4   | 1.6 |
| MDAQMD      |                                                           |       |       |         |         |     |
| MDAQMD      | 164.8                                                     | 159.9 | 309.3 | 7,882.3 | 1,988.1 | 7.0 |
| West of BIG | 17.9                                                      | 17.3  | 33.5  | 853.4   | 215.3   | 0.8 |
| East of BIG | 147.0                                                     | 142.5 | 275.8 | 7,028.9 | 1,772.8 | 6.3 |

## Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |         |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|---------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |         |         |          |          |      |
| SCAQMD      | 227.7                                                                           | 220.8   | 435.7   | 11,118.2 | 3,079.7  | 11.0 |
| MDAQMD      |                                                                                 |         |         |          |          |      |
| MDAQMD      | 1,060.7                                                                         | 1,028.9 | 2,001.2 | 51,217.2 | 12,984.4 | 46.2 |
| West of BIG | 109.9                                                                           | 106.6   | 208.3   | 5,298.8  | 1,424.3  | 5.0  |
| East of BIG | 950.8                                                                           | 922.3   | 1,792.9 | 45,918.3 | 11,560.1 | 41.1 |

| Region      | Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |       |         |         |     |
|-------------|-----------------------------------------------------------|-------|-------|---------|---------|-----|
| Pollutant   | PM10                                                      | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD      |                                                           |       |       |         |         |     |
| SCAQMD      | 36.8                                                      | 35.7  | 70.4  | 1,795.6 | 497.4   | 1.8 |
| MDAQMD      |                                                           |       |       |         |         |     |
| MDAQMD      | 171.3                                                     | 166.2 | 323.2 | 8,271.8 | 2,097.0 | 7.5 |
| West of BIG | 17.7                                                      | 17.2  | 33.6  | 855.8   | 230.0   | 0.8 |
| East of BIG | 153.6                                                     | 149.0 | 289.6 | 7,416.0 | 1,867.0 | 6.6 |

## Project Increment

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |      |         |       |     |
|-------------|---------------------------------------------------------------------------------|-------|------|---------|-------|-----|
| Pollutant   | PM10                                                                            | PM2.5 | VOC  | NOx     | CO    | SOx |
| SCAQMD      |                                                                                 |       |      |         |       |     |
| SCAQMD      | -2.4                                                                            | -2.3  | 3.8  | 110.0   | 303.5 | 1.2 |
| MDAQMD      |                                                                                 |       |      |         |       |     |
| MDAQMD      | 40.2                                                                            | 39.0  | 86.0 | 2,411.5 | 674.6 | 2.7 |
| West of BIG | -0.7                                                                            | -0.6  | 0.9  | 14.9    | 91.4  | 0.3 |
| East of BIG | 40.9                                                                            | 39.7  | 85.1 | 2,396.7 | 583.2 | 2.4 |

| Region      | Annual Corridor Criteria Pollutant Emissions<br>(tons/yr) |       |      |       |       |     |
|-------------|-----------------------------------------------------------|-------|------|-------|-------|-----|
| Pollutant   | PM10                                                      | PM2.5 | VOC  | NOx   | CO    | SOx |
| SCAQMD      |                                                           |       |      |       |       |     |
| SCAQMD      | -0.4                                                      | -0.4  | 0.6  | 17.8  | 49.0  | 0.2 |
| MDAQMD      |                                                           |       |      |       |       |     |
| MDAQMD      | 6.5                                                       | 6.3   | 13.9 | 389.5 | 109.0 | 0.4 |
| West of BIG | -0.1                                                      | -0.1  | 0.1  | 2.4   | 14.8  | 0.1 |
| East of BIG | 6.6                                                       | 6.4   | 13.7 | 387.1 | 94.2  | 0.4 |

## Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Summary of Corridor Emissions - 2033

## No Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|-------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5 | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |       |         |          |          |      |
| SCAQMD      | 229.3                                                                           | 222.4 | 434.9   | 11,301.9 | 2,986.7  | 10.5 |
| MDAQMD      |                                                                                 |       |         |          |          |      |
| MDAQMD      | 1,015.0                                                                         | 984.5 | 1,924.4 | 49,997.4 | 13,213.5 | 46.6 |
| West of BIG | 109.6                                                                           | 106.4 | 207.8   | 5,398.6  | 1,426.9  | 5.0  |
| East of BIG | 905.3                                                                           | 878.1 | 1,716.5 | 44,598.8 | 11,786.6 | 41.6 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |       |         |         |     |
|-------------|------------------------------------------------------------------------|-------|-------|---------|---------|-----|
| Pollutant   | PM10                                                                   | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD      |                                                                        |       |       |         |         |     |
| SCAQMD      | 37.0                                                                   | 35.9  | 70.2  | 1,825.3 | 482.4   | 1.7 |
| MDAQMD      |                                                                        |       |       |         |         |     |
| MDAQMD      | 163.9                                                                  | 159.0 | 310.8 | 8,074.8 | 2,134.0 | 7.5 |
| West of BIG | 17.7                                                                   | 17.2  | 33.6  | 871.9   | 230.5   | 0.8 |
| East of BIG | 146.2                                                                  | 141.8 | 277.2 | 7,202.9 | 1,903.6 | 6.7 |

## Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |         |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|---------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5   | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |         |         |          |          |      |
| SCAQMD      | 227.5                                                                           | 220.7   | 441.5   | 11,460.2 | 3,390.4  | 12.1 |
| MDAQMD      |                                                                                 |         |         |          |          |      |
| MDAQMD      | 1,067.9                                                                         | 1,035.9 | 2,036.1 | 53,122.1 | 14,130.8 | 50.3 |
| West of BIG | 109.3                                                                           | 106.1   | 210.0   | 5,436.2  | 1,551.6  | 5.5  |
| East of BIG | 958.6                                                                           | 929.8   | 1,826.1 | 47,685.9 | 12,579.2 | 44.8 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |       |         |         |     |
|-------------|------------------------------------------------------------------------|-------|-------|---------|---------|-----|
| Pollutant   | PM10                                                                   | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD      |                                                                        |       |       |         |         |     |
| SCAQMD      | 36.7                                                                   | 35.6  | 71.3  | 1,850.9 | 547.6   | 2.0 |
| MDAQMD      |                                                                        |       |       |         |         |     |
| MDAQMD      | 172.5                                                                  | 167.3 | 328.8 | 8,579.5 | 2,282.2 | 8.1 |
| West of BIG | 17.7                                                                   | 17.1  | 33.9  | 878.0   | 250.6   | 0.9 |
| East of BIG | 154.8                                                                  | 150.2 | 294.9 | 7,701.5 | 2,031.6 | 7.2 |

## Project Increment

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |       |         |       |     |
|-------------|---------------------------------------------------------------------------------|-------|-------|---------|-------|-----|
| Pollutant   | PM10                                                                            | PM2.5 | VOC   | NOx     | CO    | SOx |
| SCAQMD      |                                                                                 |       |       |         |       |     |
| SCAQMD      | -1.8                                                                            | -1.8  | 6.6   | 158.2   | 403.8 | 1.6 |
| MDAQMD      |                                                                                 |       |       |         |       |     |
| MDAQMD      | 53.0                                                                            | 51.4  | 111.7 | 3,124.7 | 917.3 | 3.6 |
| West of BIG | -0.3                                                                            | -0.3  | 2.1   | 37.6    | 124.7 | 0.5 |
| East of BIG | 53.3                                                                            | 51.7  | 109.6 | 3,087.0 | 792.5 | 3.2 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |      |       |       |     |
|-------------|------------------------------------------------------------------------|-------|------|-------|-------|-----|
| Pollutant   | PM10                                                                   | PM2.5 | VOC  | NOx   | CO    | SOx |
| SCAQMD      |                                                                        |       |      |       |       |     |
| SCAQMD      | -0.3                                                                   | -0.3  | 1.1  | 25.6  | 65.2  | 0.3 |
| MDAQMD      |                                                                        |       |      |       |       |     |
| MDAQMD      | 8.6                                                                    | 8.3   | 18.0 | 504.7 | 148.1 | 0.6 |
| West of BIG | -0.1                                                                   | 0.0   | 0.3  | 6.1   | 20.1  | 0.1 |
| East of BIG | 8.6                                                                    | 8.3   | 17.7 | 498.6 | 128.0 | 0.5 |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Summary of Corridor Emissions - 2048

## No Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|-------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5 | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |       |         |          |          |      |
| SCAQMD      | 219.7                                                                           | 213.1 | 435.2   | 12,215.6 | 3,787.1  | 13.4 |
| MDAQMD      |                                                                                 |       |         |          |          |      |
| MDAQMD      | 968.9                                                                           | 939.9 | 1,919.2 | 53,860.5 | 16,699.5 | 58.9 |
| West of BIG | 104.4                                                                           | 101.3 | 206.8   | 5,800.7  | 1,798.7  | 6.3  |
| East of BIG | 864.5                                                                           | 838.6 | 1,712.5 | 48,059.8 | 14,900.8 | 52.6 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |       |         |         |     |
|-------------|------------------------------------------------------------------------|-------|-------|---------|---------|-----|
| Pollutant   | PM10                                                                   | PM2.5 | VOC   | NOx     | CO      | SOx |
| SCAQMD      |                                                                        |       |       |         |         |     |
| SCAQMD      | 35.5                                                                   | 34.4  | 70.3  | 1,972.9 | 611.6   | 2.2 |
| MDAQMD      |                                                                        |       |       |         |         |     |
| MDAQMD      | 156.5                                                                  | 151.8 | 310.0 | 8,698.7 | 2,697.0 | 9.5 |
| West of BIG | 16.9                                                                   | 16.4  | 33.4  | 936.8   | 290.5   | 1.0 |
| East of BIG | 139.6                                                                  | 135.4 | 276.6 | 7,761.9 | 2,406.5 | 8.5 |

## Project

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |         |          |          |      |
|-------------|---------------------------------------------------------------------------------|-------|---------|----------|----------|------|
| Pollutant   | PM10                                                                            | PM2.5 | VOC     | NOx      | CO       | SOx  |
| SCAQMD      |                                                                                 |       |         |          |          |      |
| SCAQMD      | 219.6                                                                           | 213.0 | 445.8   | 12,451.5 | 4,258.9  | 15.2 |
| MDAQMD      |                                                                                 |       |         |          |          |      |
| MDAQMD      | 1,011.8                                                                         | 981.4 | 2,015.7 | 56,794.6 | 17,706.0 | 63.0 |
| West of BIG | 103.8                                                                           | 100.7 | 208.4   | 5,814.2  | 1,929.5  | 6.8  |
| East of BIG | 908.0                                                                           | 880.8 | 1,807.2 | 50,980.4 | 15,776.5 | 56.2 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |       |         |         |      |
|-------------|------------------------------------------------------------------------|-------|-------|---------|---------|------|
| Pollutant   | PM10                                                                   | PM2.5 | VOC   | NOx     | CO      | SOx  |
| SCAQMD      |                                                                        |       |       |         |         |      |
| SCAQMD      | 35.5                                                                   | 34.4  | 72.0  | 2,011.0 | 687.8   | 2.5  |
| MDAQMD      |                                                                        |       |       |         |         |      |
| MDAQMD      | 163.4                                                                  | 158.5 | 325.5 | 9,172.6 | 2,859.6 | 10.2 |
| West of BIG | 16.8                                                                   | 16.3  | 33.7  | 939.0   | 311.6   | 1.1  |
| East of BIG | 146.6                                                                  | 142.2 | 291.9 | 8,233.6 | 2,548.0 | 9.1  |

## Project Increment

| Region      | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(lb/day) |       |      |         |         |     |
|-------------|---------------------------------------------------------------------------------|-------|------|---------|---------|-----|
| Pollutant   | PM10                                                                            | PM2.5 | VOC  | NOx     | CO      | SOx |
| SCAQMD      |                                                                                 |       |      |         |         |     |
| SCAQMD      | 0.0                                                                             | 0.0   | 10.7 | 235.8   | 471.8   | 1.8 |
| MDAQMD      |                                                                                 |       |      |         |         |     |
| MDAQMD      | 42.9                                                                            | 41.6  | 96.4 | 2,934.1 | 1,006.5 | 4.0 |
| West of BIG | -0.6                                                                            | -0.6  | 1.7  | 13.5    | 130.8   | 0.5 |
| East of BIG | 43.5                                                                            | 42.2  | 94.8 | 2,920.6 | 875.7   | 3.6 |

| Region      | Annual Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/yr) |       |      |       |       |     |
|-------------|------------------------------------------------------------------------|-------|------|-------|-------|-----|
| Pollutant   | PM10                                                                   | PM2.5 | VOC  | NOx   | CO    | SOx |
| SCAQMD      |                                                                        |       |      |       |       |     |
| SCAQMD      | 0.0                                                                    | 0.0   | 1.7  | 38.1  | 76.2  | 0.3 |
| MDAQMD      |                                                                        |       |      |       |       |     |
| MDAQMD      | 6.9                                                                    | 6.7   | 15.6 | 473.9 | 162.6 | 0.7 |
| West of BIG | -0.1                                                                   | -0.1  | 0.3  | 2.2   | 21.1  | 0.1 |
| East of BIG | 7.0                                                                    | 6.8   | 15.3 | 471.7 | 141.4 | 0.6 |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Summary of Corridor Emissions - 2028

## No Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 481.1                                                                     | 0.0              | 0.0             | 485.7                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,135.9                                                                   | 0.1              | 0.2             | 2,156.3                        |
| West of BIG | 231.6                                                                     | 0.0              | 0.0             | 233.8                          |
| East of BIG | 1,904.3                                                                   | 0.0              | 0.1             | 1,922.5                        |
| Total       | 2,617.0                                                                   | 0.1              | 0.2             | 2,642.0                        |

| Region      | Annual Corridor GHG Emissions<br>(metric tons/yr) |                  |                 |                                |
|-------------|---------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                   |                  |                 |                                |
| SCAQMD      | 155,410.4                                         | 4.0              | 12.2            | 156,894.2                      |
| MDAQMD      |                                                   |                  |                 |                                |
| MDAQMD      | 689,907.6                                         | 17.6             | 54.1            | 696,494.5                      |
| West of BIG | 74,800.1                                          | 1.9              | 5.9             | 75,514.3                       |
| East of BIG | 615,107.5                                         | 15.7             | 48.2            | 620,980.2                      |
| Total       | 845,318.0                                         | 21.5             | 66.2            | 853,388.7                      |

## Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 530.5                                                                     | 0.0              | 0.0             | 535.6                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,201.2                                                                   | 0.1              | 0.2             | 2,222.2                        |
| West of BIG | 244.8                                                                     | 0.0              | 0.0             | 247.1                          |
| East of BIG | 1,956.5                                                                   | 0.0              | 0.2             | 1,975.1                        |
| Total       | 2,731.7                                                                   | 0.1              | 0.2             | 2,757.8                        |

| Region      | Annual Corridor GHG Emissions<br>(metric tons/yr) |                  |                 |                                |
|-------------|---------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                   |                  |                 |                                |
| SCAQMD      | 171,354.7                                         | 4.4              | 13.4            | 172,990.7                      |
| MDAQMD      |                                                   |                  |                 |                                |
| MDAQMD      | 711,017.1                                         | 18.1             | 55.7            | 717,805.5                      |
| West of BIG | 79,064.9                                          | 2.0              | 6.2             | 79,819.8                       |
| East of BIG | 631,952.2                                         | 16.1             | 49.5            | 637,985.7                      |
| Total       | 882,371.8                                         | 22.5             | 69.1            | 890,796.2                      |

## Project Increment

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 49.4                                                                      | 0.0              | 0.0             | 49.8                           |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 65.4                                                                      | 0.0              | 0.0             | 66.0                           |
| West of BIG | 13.2                                                                      | 0.0              | 0.0             | 13.3                           |
| East of BIG | 52.1                                                                      | 0.0              | 0.0             | 52.6                           |
| Total       | 114.7                                                                     | 0.0              | 0.0             | 115.8                          |

| Region      | Annual Corridor GHG Emissions<br>(metric tons/yr) |                  |                 |                                |
|-------------|---------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                   |                  |                 |                                |
| SCAQMD      | 15,944.3                                          | 0.4              | 1.2             | 16,096.6                       |
| MDAQMD      |                                                   |                  |                 |                                |
| MDAQMD      | 21,109.5                                          | 0.5              | 1.7             | 21,311.0                       |
| West of BIG | 4,264.8                                           | 0.1              | 0.3             | 4,305.5                        |
| East of BIG | 16,844.7                                          | 0.4              | 1.3             | 17,005.5                       |
| Total       | 37,053.8                                          | 0.9              | 2.9             | 37,407.6                       |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. <https://www.ecfr.gov/current/title-40/part-98/appendix>

## Summary of Corridor Emissions - 2033

## No Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 517.6                                                                     | 0.0              | 0.0             | 522.5                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,292.6                                                                   | 0.1              | 0.2             | 2,314.5                        |
| West of BIG | 247.9                                                                     | 0.0              | 0.0             | 250.3                          |
| East of BIG | 2,044.7                                                                   | 0.1              | 0.2             | 2,064.3                        |
| Total       | 2,810.2                                                                   | 0.1              | 0.2             | 2,837.1                        |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 167,186.3                                                      | 4.3              | 13.1            | 168,782.5                      |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 740,544.5                                                      | 18.9             | 58.0            | 747,614.8                      |
| West of BIG | 80,077.1                                                       | 2.0              | 6.3             | 80,841.6                       |
| East of BIG | 660,467.4                                                      | 16.8             | 51.8            | 666,773.2                      |
| Total       | 907,730.8                                                      | 23.1             | 71.1            | 916,397.3                      |

## Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 583.8                                                                     | 0.0              | 0.0             | 589.4                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,395.1                                                                   | 0.1              | 0.2             | 2,417.9                        |
| West of BIG | 266.6                                                                     | 0.0              | 0.0             | 269.2                          |
| East of BIG | 2,128.4                                                                   | 0.1              | 0.2             | 2,148.7                        |
| Total       | 2,978.9                                                                   | 0.1              | 0.2             | 3,007.3                        |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 188,573.4                                                      | 4.8              | 14.8            | 190,373.8                      |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 773,624.7                                                      | 19.7             | 60.6            | 781,010.9                      |
| West of BIG | 86,124.6                                                       | 2.2              | 6.7             | 86,946.9                       |
| East of BIG | 687,500.1                                                      | 17.5             | 53.9            | 694,064.0                      |
| Total       | 962,198.1                                                      | 24.5             | 75.4            | 971,384.6                      |

## Project Increment

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 66.2                                                                      | 0.0              | 0.0             | 66.8                           |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 102.4                                                                     | 0.0              | 0.0             | 103.4                          |
| West of BIG | 18.7                                                                      | 0.0              | 0.0             | 18.9                           |
| East of BIG | 83.7                                                                      | 0.0              | 0.0             | 84.5                           |
| Total       | 168.6                                                                     | 0.0              | 0.0             | 170.2                          |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 21,387.1                                                       | 0.5              | 1.7             | 21,591.2                       |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 33,080.2                                                       | 0.8              | 2.6             | 33,396.1                       |
| West of BIG | 6,047.5                                                        | 0.2              | 0.5             | 6,105.3                        |
| East of BIG | 27,032.7                                                       | 0.7              | 2.1             | 27,290.8                       |
| Total       | 54,467.3                                                       | 1.4              | 4.3             | 54,987.3                       |

## Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)



## Summary of Corridor Emissions - 2048

## No Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 656.3                                                                     | 0.0              | 0.1             | 662.6                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,897.3                                                                   | 0.1              | 0.2             | 2,925.0                        |
| West of BIG | 312.5                                                                     | 0.0              | 0.0             | 315.5                          |
| East of BIG | 2,584.8                                                                   | 0.1              | 0.2             | 2,609.5                        |
| Total       | 3,553.6                                                                   | 0.1              | 0.3             | 3,587.5                        |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 211,988.8                                                      | 5.4              | 16.6            | 214,012.8                      |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 935,859.3                                                      | 23.8             | 73.3            | 944,794.4                      |
| West of BIG | 100,936.3                                                      | 2.6              | 7.9             | 101,900.0                      |
| East of BIG | 834,923.0                                                      | 21.3             | 65.4            | 842,894.4                      |
| Total       | 1,147,848.1                                                    | 29.2             | 89.9            | 1,158,807.2                    |

## Project

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 734.5                                                                     | 0.0              | 0.1             | 741.5                          |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 2,999.4                                                                   | 0.1              | 0.2             | 3,028.0                        |
| West of BIG | 331.4                                                                     | 0.0              | 0.0             | 334.6                          |
| East of BIG | 2,667.9                                                                   | 0.1              | 0.2             | 2,693.4                        |
| Total       | 3,733.8                                                                   | 0.1              | 0.3             | 3,769.5                        |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 237,239.5                                                      | 6.0              | 18.6            | 239,504.6                      |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 968,825.1                                                      | 24.7             | 75.9            | 978,074.9                      |
| West of BIG | 107,056.3                                                      | 2.7              | 8.4             | 108,078.4                      |
| East of BIG | 861,768.8                                                      | 21.9             | 67.5            | 869,996.5                      |
| Total       | 1,206,064.6                                                    | 30.7             | 94.5            | 1,217,579.5                    |

## Project Increment

| Region      | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|-------------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                           |                  |                 |                                |
| SCAQMD      | 78.2                                                                      | 0.0              | 0.0             | 78.9                           |
| MDAQMD      |                                                                           |                  |                 |                                |
| MDAQMD      | 102.1                                                                     | 0.0              | 0.0             | 103.0                          |
| West of BIG | 18.9                                                                      | 0.0              | 0.0             | 19.1                           |
| East of BIG | 83.1                                                                      | 0.0              | 0.0             | 83.9                           |
| Total       | 180.2                                                                     | 0.0              | 0.0             | 182.0                          |

| Region      | Annual Corridor GHG Emissions <sup>1</sup><br>(metric tons/yr) |                  |                 |                                |
|-------------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant   | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| SCAQMD      |                                                                |                  |                 |                                |
| SCAQMD      | 25,250.7                                                       | 0.6              | 2.0             | 25,491.8                       |
| MDAQMD      |                                                                |                  |                 |                                |
| MDAQMD      | 32,965.8                                                       | 0.8              | 2.6             | 33,280.5                       |
| West of BIG | 6,120.0                                                        | 0.2              | 0.5             | 6,178.4                        |
| East of BIG | 26,845.8                                                       | 0.7              | 2.1             | 27,102.1                       |
| Total       | 58,216.5                                                       | 1.5              | 4.6             | 58,772.3                       |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.20</b>                                                     | <b>2.14</b> | <b>4.13</b> | <b>105.41</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 65.49                               | 66.85                               | 0.39                             | 2.11                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2456.63                       | 2586.85                       | 0.35                                 |
| Q-Guaranteed             | 67.77                               | 65.65                               | 2.97                             | 3.46                             | 3.32                       | 2.38                       | 754.64                              | 541.38                              | 5850.98                       | 5246.88                       | 0.33                                 |
| S-Stack                  | 86.20                               | 86.20                               | 3.86                             | 4.79                             | 5.60                       | 3.49                       | 1271.07                             | 792.43                              | 9854.98                       | 7679.92                       | 0.78                                 |
| Z-Z Trains               | 65.08                               | 65.23                               | 5.73                             | 4.55                             | 3.86                       | 3.17                       | 875.71                              | 720.03                              | 5473.26                       | 4605.37                       | 0.86                                 |
| NIM-Other Non-Intermodal | 56.95                               | 58.84                               | 3.49                             | 4.12                             | 3.32                       | 3.37                       | 753.03                              | 764.03                              | 5838.46                       | 7404.69                       | 3.02                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                         | 1196.11                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                         | 1468.25                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                         | 1218.87                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                         | 1105.13                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                         | 1424.61                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.022                                                                             | 0.021 | 0.041 | 1.039 | 0.262 | 0.001 | 90.9                                                                      | 0.0              | 0.0             | 91.8              |
| Affected Trains     | 0.031                                                                             | 0.030 | 0.059 | 1.497 | 0.377 | 0.001 | 130.9                                                                     | 0.0              | 0.0             | 132.2             |
| Total               | 0.053                                                                             | 0.051 | 0.100 | 2.536 | 0.640 | 0.002 | 221.9                                                                     | 0.0              | 0.0             | 224.0             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.011 | 0.021 | 0.529 | 0.134 | 0.000 | 46.2                                                                  | 0.0              | 0.0             | 46.7              |
| Westbound           | 0.008                                                                                        | 0.008 | 0.015 | 0.375 | 0.095 | 0.000 | 32.9                                                                  | 0.0              | 0.0             | 33.2              |
| Total               | 0.019                                                                                        | 0.018 | 0.035 | 0.904 | 0.228 | 0.001 | 79.1                                                                  | 0.0              | 0.0             | 79.9              |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.017                                                                                    | 0.016 | 0.032 | 0.809 | 0.204 | 0.001 | 70.7                                                              | 0.0              | 0.0             | 71.3              |
| Westbound           | 0.011                                                                                    | 0.010 | 0.020 | 0.510 | 0.129 | 0.000 | 44.7                                                              | 0.0              | 0.0             | 45.2              |
| Total               | 0.028                                                                                    | 0.027 | 0.052 | 1.319 | 0.333 | 0.001 | 115.4                                                             | 0.0              | 0.0             | 116.5             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.17E-04                                                                 | 3.07E-04 | 5.94E-04 | 1.51E-02 | 3.82E-03 | 1.35E-05 | 1.3                                                            | 0.0              | 0.0             | 1.3               |
| Affected Trains     | 1.10E-04                                                                 | 1.07E-04 | 2.07E-04 | 5.27E-03 | 1.33E-03 | 4.69E-06 | 0.5                                                            | 0.0              | 0.0             | 0.5               |
| Total               | 4.27E-04                                                                 | 4.14E-04 | 8.01E-04 | 2.04E-02 | 5.15E-03 | 1.82E-05 | 1.8                                                            | 0.0              | 0.0             | 1.8               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.20</b>                                                     | <b>2.14</b> | <b>4.13</b> | <b>105.41</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 25.20                               | 25.20                               | 0.71                             | 2.86                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2344.22                       | 2684.37                       | 0.35                                 |
| Q-Guaranteed             | 25.20                               | 25.20                               | 3.62                             | 4.44                             | 3.35                       | 2.47                       | 759.41                              | 561.52                              | 5887.94                       | 5442.03                       | 0.33                                 |
| S-Stack                  | 25.20                               | 25.20                               | 3.83                             | 4.77                             | 5.56                       | 3.62                       | 1262.58                             | 821.83                              | 9789.19                       | 7964.85                       | 0.78                                 |
| Z-Z Trains               | 25.20                               | 25.20                               | 9.92                             | 7.86                             | 3.94                       | 3.45                       | 894.77                              | 782.51                              | 5592.40                       | 5005.04                       | 0.86                                 |
| NIM-Other Non-Intermodal | 25.20                               | 25.20                               | 5.18                             | 5.79                             | 2.95                       | 3.40                       | 670.10                              | 772.67                              | 5195.49                       | 7488.44                       | 3.02                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                         | 6731.05                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                         | 8232.62                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                         | 7414.45                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                         | 6200.32                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                         | 7769.06                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.035                                                                             | 0.034 | 0.065 | 1.663 | 0.419 | 0.001 | 145.3                                                                     | 0.0              | 0.0             | 146.6             |
| Affected Trains     | 0.027                                                                             | 0.026 | 0.051 | 1.305 | 0.329 | 0.001 | 114.0                                                                     | 0.0              | 0.0             | 115.1             |
| Total               | 0.062                                                                             | 0.060 | 0.116 | 2.968 | 0.749 | 0.003 | 259.3                                                                     | 0.0              | 0.0             | 261.7             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.029                                                                                        | 0.028 | 0.055 | 1.405 | 0.354 | 0.001 | 122.7                                                                 | 0.0              | 0.0             | 123.9             |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.044 | 0.011 | 0.000 | 3.9                                                                   | 0.0              | 0.0             | 3.9               |
| Total               | 0.030                                                                                        | 0.029 | 0.057 | 1.449 | 0.365 | 0.001 | 126.6                                                                 | 0.0              | 0.0             | 127.8             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.023                                                                                    | 0.023 | 0.044 | 1.116 | 0.281 | 0.001 | 97.4                                                              | 0.0              | 0.0             | 98.4              |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.034 | 0.009 | 0.000 | 3.0                                                               | 0.0              | 0.0             | 3.0               |
| Total               | 0.024                                                                                    | 0.023 | 0.045 | 1.150 | 0.290 | 0.001 | 100.4                                                             | 0.0              | 0.0             | 101.4             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.75E-04                                                                 | 4.61E-04 | 8.92E-04 | 2.27E-02 | 5.73E-03 | 2.02E-05 | 2.0                                                            | 0.0              | 0.0             | 2.0               |
| Affected Trains     | 1.18E-04                                                                 | 1.14E-04 | 2.21E-04 | 5.63E-03 | 1.42E-03 | 5.01E-06 | 0.5                                                            | 0.0              | 0.0             | 0.5               |
| Total               | 5.93E-04                                                                 | 5.75E-04 | 1.11E-03 | 2.84E-02 | 7.15E-03 | 2.53E-05 | 2.5                                                            | 0.0              | 0.0             | 2.5               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Baseline Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.20</b>                                                     | <b>2.14</b> | <b>4.13</b> | <b>105.41</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                   |      |
|-------------------|------|
| Baseline Scenario |      |
| Analysis Year     | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 56.10                         | 56.10                         | 0.70                          | 2.85                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    | 0.14                          |
| Q-Guaranteed             | 56.10                         | 56.10                         | 3.62                          | 4.45                          | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    | 1.03                          |
| S-Stack                  | 56.10                         | 56.10                         | 3.83                          | 4.77                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 0.61                          |
| Z-Z Trains               | 56.10                         | 56.10                         | 9.92                          | 7.86                          | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    | 0.45                          |
| NIM-Other Non-Intermodal | 56.10                         | 56.10                         | 5.02                          | 5.64                          | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    | 3.43                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                     | 669.51                      |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                     | 818.95                      |
| S-Stack                  | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                     | 616.75                      |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                     | 772.47                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Baseline Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.031                                                                             | 0.030 | 0.058 | 1.487 | 0.375 | 0.001 | 130.3                                                                     | 0.0              | 0.0             | 131.6             |
| Affected Trains     | 0.024                                                                             | 0.023 | 0.045 | 1.155 | 0.291 | 0.001 | 101.2                                                                     | 0.0              | 0.0             | 102.2             |
| Total               | 0.055                                                                             | 0.054 | 0.104 | 2.642 | 0.666 | 0.002 | 231.6                                                                     | 0.0              | 0.0             | 233.8             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.007 | 0.013 | 0.323 | 0.081 | 0.000 | 28.2                                                                  | 0.0              | 0.0             | 28.5              |
| Westbound           | 0.020                                                                                        | 0.020 | 0.038 | 0.973 | 0.245 | 0.001 | 85.4                                                                  | 0.0              | 0.0             | 86.2              |
| Total               | 0.027                                                                                        | 0.026 | 0.051 | 1.296 | 0.327 | 0.001 | 113.6                                                                 | 0.0              | 0.0             | 114.6             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.260 | 0.065 | 0.000 | 22.7                                                              | 0.0              | 0.0             | 22.9              |
| Westbound           | 0.016                                                                                    | 0.015 | 0.030 | 0.756 | 0.191 | 0.001 | 66.3                                                              | 0.0              | 0.0             | 67.0              |
| Total               | 0.021                                                                                    | 0.021 | 0.040 | 1.015 | 0.256 | 0.001 | 89.0                                                              | 0.0              | 0.0             | 89.8              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.27E-04                                                                 | 4.14E-04 | 8.01E-04 | 2.04E-02 | 5.15E-03 | 1.82E-05 | 1.8                                                            | 0.0              | 0.0             | 1.8               |
| Affected Trains     | 1.42E-04                                                                 | 1.38E-04 | 2.66E-04 | 6.79E-03 | 1.71E-03 | 6.04E-06 | 0.6                                                            | 0.0              | 0.0             | 0.6               |
| Total               | 5.69E-04                                                                 | 5.52E-04 | 1.07E-03 | 2.72E-02 | 6.86E-03 | 2.42E-05 | 2.4                                                            | 0.0              | 0.0             | 2.4               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Baseline Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.20</b>                                                     | <b>2.14</b> | <b>4.13</b> | <b>105.41</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                   |      |
|-------------------|------|
| Baseline Scenario |      |
| Analysis Year     | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 167.40                        | 167.40                        | 0.55                          | 1.88                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    | 0.19                          |
| Q-Guaranteed             | 167.40                        | 167.40                        | 5.67                          | 5.86                          | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    | 1.00                          |
| S-Stack                  | 167.40                        | 167.40                        | 3.91                          | 4.80                          | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    | 1.29                          |
| Z-Z Trains               | 167.40                        | 167.40                        | 12.27                         | 10.86                         | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    | 0.83                          |
| NIM-Other Non-Intermodal | 167.40                        | 167.40                        | 6.81                          | 7.75                          | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   | 2.63                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                      | 594.45                      |
| Q-Guaranteed             | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                      | 729.83                      |
| S-Stack                  | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                      | 654.95                      |
| Z-Z Trains               | 3.10                                 | 3.10                                 | 490            | 2117           | 167            | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                      | 541.73                      |
| NIM-Other Non-Intermodal | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                      | 705.39                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Baseline Scenario  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Baseline.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages for the baseline year provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.284                                                                             | 0.276 | 0.533 | 13.584 | 3.426 | 0.012 | 1188.9                                                                    | 0.0              | 0.1             | 1200.3            |
| Affected Trains     | 0.171                                                                             | 0.166 | 0.321 | 8.176  | 2.062 | 0.007 | 715.4                                                                     | 0.0              | 0.1             | 722.2             |
| Total               | 0.455                                                                             | 0.441 | 0.854 | 21.761 | 5.488 | 0.019 | 1904.3                                                                    | 0.0              | 0.1             | 1922.5            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.139                                                                                        | 0.135 | 0.261 | 6.652  | 1.678 | 0.006 | 580.9                                                                 | 0.0              | 0.0             | 586.5             |
| Westbound           | 0.112                                                                                        | 0.108 | 0.210 | 5.339  | 1.347 | 0.005 | 468.6                                                                 | 0.0              | 0.0             | 473.1             |
| Total               | 0.251                                                                                        | 0.243 | 0.471 | 11.992 | 3.025 | 0.011 | 1049.5                                                                | 0.0              | 0.1             | 1059.5            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.092                                                                                    | 0.089 | 0.173 | 4.399 | 1.109 | 0.004 | 384.2                                                             | 0.0              | 0.0             | 387.8             |
| Westbound           | 0.059                                                                                    | 0.057 | 0.111 | 2.826 | 0.713 | 0.003 | 248.0                                                             | 0.0              | 0.0             | 250.4             |
| Total               | 0.151                                                                                    | 0.147 | 0.284 | 7.225 | 1.822 | 0.006 | 632.2                                                             | 0.0              | 0.0             | 638.2             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 6.28E-04                                                                 | 6.09E-04 | 1.18E-03 | 3.00E-02 | 7.57E-03 | 2.67E-05 | 2.6                                                            | 0.0              | 0.0             | 2.7               |
| Affected Trains     | 2.24E-04                                                                 | 2.17E-04 | 4.20E-04 | 1.07E-02 | 2.70E-03 | 9.53E-06 | 0.9                                                            | 0.0              | 0.0             | 0.9               |
| Total               | 8.52E-04                                                                 | 8.26E-04 | 1.60E-03 | 4.07E-02 | 1.03E-02 | 3.63E-05 | 3.6                                                            | 0.0              | 0.0             | 3.6               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.14</b>                                                     | <b>2.08</b> | <b>4.05</b> | <b>104.26</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 65.49                         | 66.85                         | 0.39                          | 2.11                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    | 0.35                          |
| Q-Guaranteed             | 67.77                         | 65.65                         | 2.88                          | 3.35                          | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    | 0.41                          |
| S-Stack                  | 86.20                         | 86.20                         | 3.86                          | 4.79                          | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    | 1.26                          |
| Z-Z Trains               | 65.08                         | 65.23                         | 5.73                          | 4.55                          | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    | 0.89                          |
| NIM-Other Non-Intermodal | 56.95                         | 58.84                         | 3.49                          | 4.12                          | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    | 2.96                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                      | 1196.11                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                      | 1468.25                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                      | 1218.87                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                      | 1105.13                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                      | 1424.61                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

#### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.021                                                                             | 0.021 | 0.040 | 1.032 | 0.260 | 0.001 | 90.0                                                                      | 0.0              | 0.0             | 90.9              |
| Affected Trains     | 0.031                                                                             | 0.030 | 0.058 | 1.478 | 0.372 | 0.001 | 125.7                                                                     | 0.0              | 0.0             | 126.9             |
| Total               | 0.052                                                                             | 0.050 | 0.098 | 2.510 | 0.632 | 0.002 | 215.7                                                                     | 0.0              | 0.0             | 217.7             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.010 | 0.020 | 0.524 | 0.132 | 0.000 | 47.9                                                                  | 0.0              | 0.0             | 48.4              |
| Westbound           | 0.008                                                                                        | 0.008 | 0.015 | 0.375 | 0.095 | 0.000 | 30.4                                                                  | 0.0              | 0.0             | 30.7              |
| Total               | 0.019                                                                                        | 0.018 | 0.035 | 0.899 | 0.226 | 0.001 | 78.4                                                                  | 0.0              | 0.0             | 79.1              |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.016                                                                                    | 0.016 | 0.031 | 0.794 | 0.200 | 0.001 | 66.2                                                              | 0.0              | 0.0             | 66.8              |
| Westbound           | 0.011                                                                                    | 0.010 | 0.020 | 0.506 | 0.128 | 0.000 | 44.4                                                              | 0.0              | 0.0             | 44.8              |
| Total               | 0.027                                                                                    | 0.026 | 0.051 | 1.300 | 0.327 | 0.001 | 110.5                                                             | 0.0              | 0.0             | 111.6             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.11E-04                                                                 | 3.01E-04 | 5.86E-04 | 1.50E-02 | 3.77E-03 | 1.34E-05 | 1.3                                                            | 0.0              | 0.0             | 1.3               |
| Affected Trains     | 1.65E-04                                                                 | 1.60E-04 | 3.11E-04 | 7.96E-03 | 2.00E-03 | 7.12E-06 | 0.7                                                            | 0.0              | 0.0             | 0.7               |
| Total               | 4.76E-04                                                                 | 4.61E-04 | 8.96E-04 | 2.29E-02 | 5.78E-03 | 2.05E-05 | 2.0                                                            | 0.0              | 0.0             | 2.0               |

Notes:

4.59E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.14</b>                                                     | <b>2.08</b> | <b>4.05</b> | <b>104.26</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 25.20                         | 25.20                         | 0.71                          | 2.86                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    | 0.35                          |
| Q-Guaranteed             | 25.20                         | 25.20                         | 3.38                          | 4.16                          | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    | 0.41                          |
| S-Stack                  | 25.20                         | 25.20                         | 3.83                          | 4.77                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 1.26                          |
| Z-Z Trains               | 25.20                         | 25.20                         | 9.92                          | 7.86                          | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    | 0.89                          |
| NIM-Other Non-Intermodal | 25.20                         | 25.20                         | 5.18                          | 5.79                          | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    | 2.96                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                      | 6731.05                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                      | 8232.62                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                      | 6200.32                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                      | 7769.06                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.034                                                                             | 0.033 | 0.064 | 1.646 | 0.414 | 0.001 | 150.2                                                                     | 0.0              | 0.0             | 151.6             |
| Affected Trains     | 0.026                                                                             | 0.025 | 0.049 | 1.265 | 0.318 | 0.001 | 105.6                                                                     | 0.0              | 0.0             | 106.6             |
| Total               | 0.060                                                                             | 0.058 | 0.113 | 2.911 | 0.732 | 0.003 | 255.8                                                                     | 0.0              | 0.0             | 258.2             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.029                                                                                        | 0.028 | 0.054 | 1.390 | 0.349 | 0.001 | 127.4                                                                 | 0.0              | 0.0             | 128.6             |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.044 | 0.011 | 0.000 | 3.6                                                                   | 0.0              | 0.0             | 3.6               |
| Total               | 0.029                                                                                        | 0.029 | 0.056 | 1.434 | 0.360 | 0.001 | 131.0                                                                 | 0.0              | 0.0             | 132.2             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.022                                                                                    | 0.021 | 0.042 | 1.078 | 0.271 | 0.001 | 89.9                                                              | 0.0              | 0.0             | 90.7              |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.033 | 0.008 | 0.000 | 2.9                                                               | 0.0              | 0.0             | 2.9               |
| Total               | 0.023                                                                                    | 0.022 | 0.043 | 1.111 | 0.279 | 0.001 | 92.8                                                              | 0.0              | 0.0             | 93.6              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.68E-04                                                                 | 4.54E-04 | 8.82E-04 | 2.26E-02 | 5.69E-03 | 2.02E-05 | 1.9                                                            | 0.0              | 0.0             | 2.0               |
| Affected Trains     | 1.73E-04                                                                 | 1.67E-04 | 3.25E-04 | 8.33E-03 | 2.10E-03 | 7.45E-06 | 0.7                                                            | 0.0              | 0.0             | 0.7               |
| Total               | 6.41E-04                                                                 | 6.22E-04 | 1.21E-03 | 3.09E-02 | 7.78E-03 | 2.77E-05 | 2.6                                                            | 0.0              | 0.0             | 2.7               |

Notes:

6.18E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.14</b>                                                     | <b>2.08</b> | <b>4.05</b> | <b>104.26</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 56.10                         | 56.10                         | 0.70                          | 2.85                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    | 0.15                          |
| Q-Guaranteed             | 56.10                         | 56.10                         | 3.38                          | 4.16                          | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    | 0.45                          |
| S-Stack                  | 56.10                         | 56.10                         | 3.83                          | 4.77                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 0.67                          |
| Z-Z Trains               | 56.10                         | 56.10                         | 9.92                          | 7.86                          | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    | 0.35                          |
| NIM-Other Non-Intermodal | 56.10                         | 56.10                         | 5.02                          | 5.64                          | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    | 3.48                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                     | 669.51                      |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                     | 818.95                      |
| S-Stack                  | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                     | 616.75                      |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                     | 772.47                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.031                                                                             | 0.030 | 0.058 | 1.482 | 0.374 | 0.001 | 128.4                                                                     | 0.0              | 0.0             | 129.6             |
| Affected Trains     | 0.023                                                                             | 0.023 | 0.044 | 1.124 | 0.283 | 0.001 | 97.4                                                                      | 0.0              | 0.0             | 98.3              |
| Total               | 0.054                                                                             | 0.053 | 0.102 | 2.606 | 0.657 | 0.002 | 225.8                                                                     | 0.0              | 0.0             | 228.0             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.006 | 0.012 | 0.319 | 0.080 | 0.000 | 26.6                                                                  | 0.0              | 0.0             | 26.9              |
| Westbound           | 0.020                                                                                        | 0.020 | 0.038 | 0.973 | 0.245 | 0.001 | 85.4                                                                  | 0.0              | 0.0             | 86.2              |
| Total               | 0.027                                                                                        | 0.026 | 0.051 | 1.292 | 0.326 | 0.001 | 112.0                                                                 | 0.0              | 0.0             | 113.0             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.251 | 0.063 | 0.000 | 20.9                                                              | 0.0              | 0.0             | 21.1              |
| Westbound           | 0.015                                                                                    | 0.015 | 0.029 | 0.739 | 0.186 | 0.001 | 64.8                                                              | 0.0              | 0.0             | 65.5              |
| Total               | 0.021                                                                                    | 0.020 | 0.039 | 0.990 | 0.249 | 0.001 | 85.7                                                              | 0.0              | 0.0             | 86.6              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.05E-04                                                                 | 3.93E-04 | 7.64E-04 | 1.95E-02 | 4.92E-03 | 1.75E-05 | 1.7                                                            | 0.0              | 0.0             | 1.7               |
| Affected Trains     | 1.06E-04                                                                 | 1.02E-04 | 1.99E-04 | 5.09E-03 | 1.28E-03 | 4.56E-06 | 0.4                                                            | 0.0              | 0.0             | 0.4               |
| Total               | 5.11E-04                                                                 | 4.96E-04 | 9.63E-04 | 2.46E-02 | 6.20E-03 | 2.21E-05 | 2.1                                                            | 0.0              | 0.0             | 2.1               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 1137                              | 26.48%                                | 1.10                                                            | 1.07        | 1.93        | 36.91         | 7.05         | 0.02        |  | 2704.12                  | 0.07             | 0.21            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.01%                                | 0.62                                                            | 0.60        | 1.21        | 38.11         | 9.85         | 0.03        |  | 3779.10                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 27.91%                                | 0.46                                                            | 0.45        | 0.91        | 28.73         | 7.43         | 0.03        |  | 2849.19                  | 0.07             | 0.22            |
| Tier 4                               | 369                               | 8.60%                                 | 0.03                                                            | 0.03        | 0.09        | 1.79          | 2.29         | 0.01        |  | 877.59                   | 0.02             | 0.07            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.21</b>                                                     | <b>2.14</b> | <b>4.14</b> | <b>105.54</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,293</b>                      | <b>100%</b>                           | <b>2.14</b>                                                     | <b>2.08</b> | <b>4.05</b> | <b>104.26</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable In State = 10% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 167.40                        | 167.40                        | 0.55                          | 1.88                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    | 0.52                          |
| Q-Guaranteed             | 167.40                        | 167.40                        | 7.73                          | 7.99                          | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    | 0.92                          |
| S-Stack                  | 167.40                        | 167.40                        | 3.91                          | 4.80                          | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    | 1.16                          |
| Z-Z Trains               | 167.40                        | 167.40                        | 12.27                         | 10.86                         | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    | 0.94                          |
| NIM-Other Non-Intermodal | 167.40                        | 167.40                        | 6.81                          | 7.75                          | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   | 2.69                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                      | 594.45                      |
| Q-Guaranteed             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                      | 729.83                      |
| S-Stack                  | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                      | 654.95                      |
| Z-Z Trains               | 3.10                                 | 3.10                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                      | 541.73                      |
| NIM-Other Non-Intermodal | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                      | 705.39                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.



# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.280                                                                             | 0.271 | 0.527 | 13.504 | 3.400 | 0.012 | 1152.1                                                                    | 0.0              | 0.1             | 1163.1            |
| Affected Trains     | 0.196                                                                             | 0.190 | 0.369 | 9.455  | 2.380 | 0.008 | 804.3                                                                     | 0.0              | 0.1             | 812.0             |
| Total               | 0.475                                                                             | 0.461 | 0.896 | 22.959 | 5.780 | 0.021 | 1956.5                                                                    | 0.0              | 0.2             | 1975.1            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.135                                                                                        | 0.131 | 0.256 | 6.580  | 1.654 | 0.006 | 548.3                                                                 | 0.0              | 0.0             | 553.5             |
| Westbound           | 0.112                                                                                        | 0.108 | 0.210 | 5.339  | 1.347 | 0.005 | 468.6                                                                 | 0.0              | 0.0             | 473.1             |
| Total               | 0.247                                                                                        | 0.239 | 0.465 | 11.919 | 3.001 | 0.011 | 1016.9                                                                | 0.0              | 0.1             | 1026.6            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.104                                                                                    | 0.101 | 0.197 | 5.078 | 1.277 | 0.005 | 423.2                                                             | 0.0              | 0.0             | 427.2             |
| Westbound           | 0.069                                                                                    | 0.067 | 0.129 | 3.278 | 0.827 | 0.003 | 287.7                                                             | 0.0              | 0.0             | 290.4             |
| Total               | 0.173                                                                                    | 0.168 | 0.326 | 8.356 | 2.103 | 0.007 | 710.8                                                             | 0.0              | 0.1             | 717.6             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 6.55E-04                                                                 | 6.35E-04 | 1.23E-03 | 3.16E-02 | 7.95E-03 | 2.83E-05 | 2.7                                                            | 0.0              | 0.0             | 2.7               |
| Affected Trains     | 2.35E-04                                                                 | 2.28E-04 | 4.43E-04 | 1.13E-02 | 2.85E-03 | 1.01E-05 | 1.0                                                            | 0.0              | 0.0             | 1.0               |
| Total               | 8.90E-04                                                                 | 8.63E-04 | 1.68E-03 | 4.29E-02 | 1.08E-02 | 3.84E-05 | 3.7                                                            | 0.0              | 0.0             | 3.7               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 26                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

- Locomotive Inventory based on 2023 CARB 98 MOU.
- GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).
- Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                                   |      |
|-----------------------------------|------|
| Proposed Project<br>Analysis Year | 2028 |
|-----------------------------------|------|

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units      | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| S-BAR6     | 86.20                               | 86.20                               | 1.45                             | 1.79                             | 5.60                       | 3.49                       | 1271.07                             | 792.43                              | 9854.98                       | 7679.92                       | 1.26                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units      | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| S-BAR6     | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                         | 1218.87                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year 2028

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                                             | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.001                                                                             | 0.001 | 0.004 | 0.084 | 0.108 | 0.000 | 36.2                                                                      | 0.0              | 0.0             | 36.6              |
| Total               | 0.001                                                                             | 0.001 | 0.004 | 0.084 | 0.108 | 0.000 | 36.2                                                                      | 0.0              | 0.0             | 36.6              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.001                                                                                    | 0.001 | 0.002 | 0.049 | 0.063 | 0.000 | 20.9                                                              | 0.0              | 0.0             | 21.1              |
| Westbound           | 0.000                                                                                    | 0.000 | 0.001 | 0.025 | 0.031 | 0.000 | 11.0                                                              | 0.0              | 0.0             | 11.1              |
| Total               | 0.001                                                                                    | 0.001 | 0.004 | 0.074 | 0.095 | 0.000 | 31.9                                                              | 0.0              | 0.0             | 32.2              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                                 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                                            | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 7.35E-06                                                                 | 7.13E-06 | 2.38E-05 | 4.94E-04 | 6.32E-04 | 2.25E-06 | 0.2                                                            | 0.0              | 0.0             | 0.2               |
| Total               | 7.35E-06                                                                 | 7.13E-06 | 2.38E-05 | 4.94E-04 | 6.32E-04 | 2.25E-06 | 0.2                                                            | 0.0              | 0.0             | 0.2               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |      | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |      | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 26                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |      | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |      | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |      | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 25.20                         | 25.20                         | 1.43                          | 1.78                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 1.26                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |

CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

Notes:  
1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                                |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 0.001                                                               | 0.001 | 0.003 | 0.054 | 0.069 | 0.000 | 22.8                                                 | 0.0              | 0.0             | 23.0                           |
| Total               | 0.001                                                               | 0.001 | 0.003 | 0.054 | 0.069 | 0.000 | 22.8                                                 | 0.0              | 0.0             | 23.0                           |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.001                                                                      | 0.001 | 0.002 | 0.046 | 0.058 | 0.000 | 19.4                                         | 0.0              | 0.0             | 19.6                           |
| Westbound           | 0.000                                                                      | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.5                                          | 0.0              | 0.0             | 0.5                            |
| Total               | 0.001                                                                      | 0.001 | 0.002 | 0.047 | 0.060 | 0.000 | 19.9                                         | 0.0              | 0.0             | 20.1                           |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 7.39E-06                                                   | 7.17E-06 | 2.39E-05 | 4.97E-04 | 6.35E-04 | 2.26E-06 | 0.2                                       | 0.0              | 0.0             | 0.2                            |
| Total               | 7.39E-06                                                   | 7.17E-06 | 2.39E-05 | 4.97E-04 | 6.35E-04 | 2.26E-06 | 0.2                                       | 0.0              | 0.0             | 0.2                            |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |      | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |      | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00 | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 26                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |      | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |      | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>26</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |      | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 56.10                         | 56.10                         | 1.43                          | 1.78                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 0.67                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |



CORRIDOR EMISSION CALCULATIONS

|                  |      |
|------------------|------|
| Proposed Project |      |
| Analysis Year    | 2028 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

Notes:  
1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project  
Analysis Year

2028

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                   |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.001                                                               | 0.001 | 0.002 | 0.043 | 0.055 | 0.000 | 19.0                                                 | 0.0              | 0.0             | 19.1              |
| Total               | 0.001                                                               | 0.001 | 0.002 | 0.043 | 0.055 | 0.000 | 19.0                                                 | 0.0              | 0.0             | 19.1              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                      | 0.000 | 0.001 | 0.011 | 0.014 | 0.000 | 4.5                                          | 0.0              | 0.0             | 4.6               |
| Westbound           | 0.000                                                                      | 0.000 | 0.001 | 0.027 | 0.035 | 0.000 | 12.2                                         | 0.0              | 0.0             | 12.3              |
| Total               | 0.001                                                                      | 0.001 | 0.002 | 0.038 | 0.049 | 0.000 | 16.7                                         | 0.0              | 0.0             | 16.8              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 3.92E-06                                                   | 3.80E-06 | 1.27E-05 | 2.64E-04 | 3.37E-04 | 1.20E-06 | 0.1                                       | 0.0              | 0.0             | 0.1               |
| Total               | 3.92E-06                                                   | 3.80E-06 | 1.27E-05 | 2.64E-04 | 3.37E-04 | 1.20E-06 | 0.1                                       | 0.0              | 0.0             | 0.1               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.04</b>                                                     | <b>1.98</b> | <b>3.87</b> | <b>100.60</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 65.49                               | 66.85                               | 0.39                             | 2.11                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2456.63                       | 2586.85                       | 0.35                                 |
| Q-Guaranteed             | 67.77                               | 65.65                               | 3.33                             | 3.87                             | 3.32                       | 2.38                       | 754.64                              | 541.38                              | 5850.98                       | 5246.88                       | 0.33                                 |
| S-Stack                  | 86.20                               | 86.20                               | 4.06                             | 5.03                             | 5.60                       | 3.49                       | 1271.07                             | 792.43                              | 9854.98                       | 7679.92                       | 0.78                                 |
| Z-Z Trains               | 65.08                               | 65.23                               | 6.48                             | 5.15                             | 3.86                       | 3.17                       | 875.71                              | 720.03                              | 5473.26                       | 4605.37                       | 0.86                                 |
| NIM-Other Non-Intermodal | 56.95                               | 58.84                               | 3.49                             | 4.12                             | 3.32                       | 3.37                       | 753.03                              | 764.03                              | 5838.46                       | 7404.69                       | 3.02                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                         | 1196.11                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                         | 1468.25                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                         | 1218.87                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                         | 1105.13                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                         | 1424.61                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.022                                                                             | 0.021 | 0.041 | 1.064 | 0.281 | 0.001 | 97.6                                                                      | 0.0              | 0.0             | 98.5              |
| Affected Trains     | 0.031                                                                             | 0.030 | 0.059 | 1.523 | 0.402 | 0.001 | 139.6                                                                     | 0.0              | 0.0             | 140.9             |
| Total               | 0.053                                                                             | 0.051 | 0.100 | 2.587 | 0.684 | 0.002 | 237.2                                                                     | 0.0              | 0.0             | 239.4             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.011 | 0.021 | 0.548 | 0.145 | 0.001 | 50.1                                                                  | 0.0              | 0.0             | 50.6              |
| Westbound           | 0.008                                                                                        | 0.007 | 0.015 | 0.379 | 0.100 | 0.000 | 34.8                                                                  | 0.0              | 0.0             | 35.2              |
| Total               | 0.019                                                                                        | 0.018 | 0.036 | 0.927 | 0.245 | 0.001 | 85.0                                                                  | 0.0              | 0.0             | 85.8              |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.017                                                                                    | 0.016 | 0.032 | 0.825 | 0.218 | 0.001 | 75.5                                                              | 0.0              | 0.0             | 76.2              |
| Westbound           | 0.011                                                                                    | 0.010 | 0.020 | 0.518 | 0.137 | 0.000 | 47.6                                                              | 0.0              | 0.0             | 48.0              |
| Total               | 0.027                                                                                    | 0.026 | 0.052 | 1.342 | 0.355 | 0.001 | 123.0                                                             | 0.0              | 0.0             | 124.2             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.04E-04                                                                 | 2.95E-04 | 5.77E-04 | 1.50E-02 | 3.96E-03 | 1.40E-05 | 1.4                                                            | 0.0              | 0.0             | 1.4               |
| Affected Trains     | 1.08E-04                                                                 | 1.05E-04 | 2.05E-04 | 5.33E-03 | 1.41E-03 | 4.97E-06 | 0.5                                                            | 0.0              | 0.0             | 0.5               |
| Total               | 4.13E-04                                                                 | 4.00E-04 | 7.82E-04 | 2.03E-02 | 5.37E-03 | 1.90E-05 | 1.9                                                            | 0.0              | 0.0             | 1.9               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.04</b>                                                     | <b>1.98</b> | <b>3.87</b> | <b>100.60</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 25.20                               | 25.20                               | 0.71                             | 2.86                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2344.22                       | 2684.37                       | 0.35                                 |
| Q-Guaranteed             | 25.20                               | 25.20                               | 4.05                             | 4.98                             | 3.35                       | 2.47                       | 759.41                              | 561.52                              | 5887.94                       | 5442.03                       | 0.33                                 |
| S-Stack                  | 25.20                               | 25.20                               | 4.03                             | 5.01                             | 5.56                       | 3.62                       | 1262.58                             | 821.83                              | 9789.19                       | 7964.85                       | 0.78                                 |
| Z-Z Trains               | 25.20                               | 25.20                               | 11.22                            | 8.90                             | 3.94                       | 3.45                       | 894.77                              | 782.51                              | 5592.40                       | 5005.04                       | 0.86                                 |
| NIM-Other Non-Intermodal | 25.20                               | 25.20                               | 5.18                             | 5.79                             | 2.95                       | 3.40                       | 670.10                              | 772.67                              | 5195.49                       | 7488.44                       | 3.02                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                         | 6731.05                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                         | 8232.62                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                         | 7414.45                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                         | 6200.32                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                         | 7769.06                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                                |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.035                                                                             | 0.034 | 0.066 | 1.727 | 0.456 | 0.002 | 158.0                                                                     | 0.0              | 0.0             | 159.5                          |
| Affected Trains     | 0.027                                                                             | 0.026 | 0.051 | 1.338 | 0.353 | 0.001 | 122.4                                                                     | 0.0              | 0.0             | 123.6                          |
| Total               | 0.062                                                                             | 0.060 | 0.118 | 3.064 | 0.810 | 0.003 | 280.4                                                                     | 0.0              | 0.0             | 283.1                          |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                                |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.030                                                                                        | 0.029 | 0.056 | 1.460 | 0.386 | 0.001 | 133.6                                                                 | 0.0              | 0.0             | 134.9                          |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.045 | 0.012 | 0.000 | 4.1                                                                   | 0.0              | 0.0             | 4.2                            |
| Total               | 0.031                                                                                        | 0.030 | 0.058 | 1.505 | 0.398 | 0.001 | 137.8                                                                 | 0.0              | 0.0             | 139.1                          |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                                |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.023                                                                                    | 0.022 | 0.044 | 1.143 | 0.302 | 0.001 | 104.6                                                             | 0.0              | 0.0             | 105.6                          |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.034 | 0.009 | 0.000 | 3.2                                                               | 0.0              | 0.0             | 3.2                            |
| Total               | 0.024                                                                                    | 0.023 | 0.045 | 1.178 | 0.311 | 0.001 | 107.8                                                             | 0.0              | 0.0             | 108.8                          |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                                |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 4.61E-04                                                                 | 4.47E-04 | 8.73E-04 | 2.27E-02 | 6.00E-03 | 2.12E-05 | 2.1                                                            | 0.0              | 0.0             | 2.1                            |
| Affected Trains     | 1.16E-04                                                                 | 1.12E-04 | 2.19E-04 | 5.70E-03 | 1.51E-03 | 5.32E-06 | 0.5                                                            | 0.0              | 0.0             | 0.5                            |
| Total               | 5.76E-04                                                                 | 5.59E-04 | 1.09E-03 | 2.84E-02 | 7.50E-03 | 2.65E-05 | 2.6                                                            | 0.0              | 0.0             | 2.6                            |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.04</b>                                                     | <b>1.98</b> | <b>3.87</b> | <b>100.60</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 56.10                               | 56.10                               | 0.70                             | 2.85                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2307.42                       | 2681.37                       | 0.14                                 |
| Q-Guaranteed             | 56.10                               | 56.10                               | 4.05                             | 4.98                             | 3.35                       | 2.48                       | 759.40                              | 562.39                              | 5887.87                       | 5450.50                       | 1.03                                 |
| S-Stack                  | 56.10                               | 56.10                               | 4.03                             | 5.01                             | 5.56                       | 3.62                       | 1263.07                             | 821.52                              | 9792.95                       | 7961.87                       | 0.61                                 |
| Z-Z Trains               | 56.10                               | 56.10                               | 11.22                            | 8.90                             | 3.94                       | 3.45                       | 894.78                              | 782.87                              | 5592.45                       | 5007.35                       | 0.45                                 |
| NIM-Other Non-Intermodal | 56.10                               | 56.10                               | 5.02                             | 5.64                             | 2.93                       | 3.39                       | 665.23                              | 768.58                              | 5157.71                       | 7448.78                       | 3.43                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                        | 669.51                         |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                        | 818.95                         |
| S-Stack                  | 2.50                                          | 2.00                                          | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                        | 737.48                         |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                        | 616.75                         |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                        | 772.47                         |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.031                                                                             | 0.030 | 0.059 | 1.519 | 0.402 | 0.001 | 139.6                                                                     | 0.0              | 0.0             | 140.9             |
| Affected Trains     | 0.024                                                                             | 0.023 | 0.045 | 1.180 | 0.312 | 0.001 | 108.4                                                                     | 0.0              | 0.0             | 109.4             |
| Total               | 0.055                                                                             | 0.053 | 0.104 | 2.699 | 0.713 | 0.003 | 247.9                                                                     | 0.0              | 0.0             | 250.3             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.007 | 0.013 | 0.336 | 0.089 | 0.000 | 30.7                                                                  | 0.0              | 0.0             | 31.0              |
| Westbound           | 0.020                                                                                        | 0.019 | 0.038 | 0.989 | 0.261 | 0.001 | 90.9                                                                  | 0.0              | 0.0             | 91.8              |
| Total               | 0.027                                                                                        | 0.026 | 0.051 | 1.325 | 0.350 | 0.001 | 121.7                                                                 | 0.0              | 0.0             | 122.8             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.266 | 0.070 | 0.000 | 24.3                                                              | 0.0              | 0.0             | 24.6              |
| Westbound           | 0.016                                                                                    | 0.015 | 0.030 | 0.771 | 0.204 | 0.001 | 70.9                                                              | 0.0              | 0.0             | 71.6              |
| Total               | 0.021                                                                                    | 0.020 | 0.040 | 1.037 | 0.274 | 0.001 | 95.2                                                              | 0.0              | 0.0             | 96.2              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.06E-04                                                                 | 3.94E-04 | 7.70E-04 | 2.00E-02 | 5.29E-03 | 1.87E-05 | 1.8                                                            | 0.0              | 0.0             | 1.9               |
| Affected Trains     | 1.43E-04                                                                 | 1.38E-04 | 2.70E-04 | 7.02E-03 | 1.86E-03 | 6.55E-06 | 0.6                                                            | 0.0              | 0.0             | 0.7               |
| Total               | 5.49E-04                                                                 | 5.32E-04 | 1.04E-03 | 2.70E-02 | 7.14E-03 | 2.52E-05 | 2.5                                                            | 0.0              | 0.0             | 2.5               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.04</b>                                                     | <b>1.98</b> | <b>3.87</b> | <b>100.60</b> | <b>26.58</b> | <b>0.09</b> |  | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 167.40                              | 167.40                              | 0.55                             | 1.88                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2405.38                       | 2719.81                       | 0.19                                 |
| Q-Guaranteed             | 167.40                              | 167.40                              | 6.36                             | 6.58                             | 2.68                       | 2.66                       | 609.18                              | 603.96                              | 5903.96                       | 5853.32                       | 1.00                                 |
| S-Stack                  | 167.40                              | 167.40                              | 4.11                             | 5.04                             | 4.43                       | 3.65                       | 1006.08                             | 827.47                              | 9750.60                       | 8019.52                       | 1.29                                 |
| Z-Z Trains               | 167.40                              | 167.40                              | 13.88                            | 12.28                            | 3.78                       | 3.39                       | 857.67                              | 770.07                              | 5357.14                       | 4811.96                       | 0.83                                 |
| NIM-Other Non-Intermodal | 167.40                              | 167.40                              | 6.81                             | 7.75                             | 2.80                       | 4.67                       | 636.50                              | 1060.69                             | 6168.76                       | 10279.78                      | 2.63                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.00                                          | 2.00                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                         | 594.45                         |
| Q-Guaranteed             | 2.00                                          | 2.00                                          | 490            | 2117           | 167            | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                         | 729.83                         |
| S-Stack                  | 2.00                                          | 2.00                                          | 490            | 2117           | 167            | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                         | 654.95                         |
| Z-Z Trains               | 3.10                                          | 3.10                                          | 490            | 2117           | 167            | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                         | 541.73                         |
| NIM-Other Non-Intermodal | 2.00                                          | 2.00                                          | 490            | 2117           | 167            | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                         | 705.39                         |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.281                                                                             | 0.273 | 0.533 | 13.861 | 3.663 | 0.013 | 1271.1                                                                    | 0.0              | 0.1             | 1283.2            |
| Affected Trains     | 0.171                                                                             | 0.166 | 0.325 | 8.439  | 2.230 | 0.008 | 773.7                                                                     | 0.0              | 0.1             | 781.1             |
| Total               | 0.453                                                                             | 0.439 | 0.858 | 22.299 | 5.893 | 0.021 | 2044.7                                                                    | 0.1              | 0.2             | 2064.3            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.139                                                                                        | 0.135 | 0.264 | 6.868  | 1.815 | 0.006 | 628.4                                                                 | 0.0              | 0.0             | 634.4             |
| Westbound           | 0.109                                                                                        | 0.106 | 0.207 | 5.369  | 1.419 | 0.005 | 493.7                                                                 | 0.0              | 0.0             | 498.4             |
| Total               | 0.248                                                                                        | 0.241 | 0.471 | 12.236 | 3.234 | 0.011 | 1122.1                                                                | 0.0              | 0.1             | 1132.8            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.092                                                                                    | 0.089 | 0.175 | 4.547 | 1.201 | 0.004 | 416.0                                                             | 0.0              | 0.0             | 420.0             |
| Westbound           | 0.059                                                                                    | 0.057 | 0.112 | 2.910 | 0.769 | 0.003 | 267.6                                                             | 0.0              | 0.0             | 270.2             |
| Total               | 0.151                                                                                    | 0.147 | 0.287 | 7.457 | 1.971 | 0.007 | 683.6                                                             | 0.0              | 0.1             | 690.2             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 6.06E-04                                                                 | 5.88E-04 | 1.15E-03 | 2.99E-02 | 7.89E-03 | 2.79E-05 | 2.7                                                            | 0.0              | 0.0             | 2.8               |
| Affected Trains     | 2.24E-04                                                                 | 2.17E-04 | 4.25E-04 | 1.10E-02 | 2.92E-03 | 1.03E-05 | 1.0                                                            | 0.0              | 0.0             | 1.0               |
| Total               | 8.30E-04                                                                 | 8.05E-04 | 1.57E-03 | 4.09E-02 | 1.08E-02 | 3.82E-05 | 3.8                                                            | 0.0              | 0.0             | 3.8               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>1.98</b>                                                     | <b>1.92</b> | <b>3.79</b> | <b>99.50</b>  | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 65.49                               | 66.85                               | 0.39                             | 2.11                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2456.63                       | 2586.85                       | 0.35                                 |
| Q-Guaranteed             | 67.77                               | 65.65                               | 3.22                             | 3.35                             | 3.32                       | 2.38                       | 754.64                              | 541.38                              | 5850.98                       | 5246.88                       | 0.41                                 |
| S-Stack                  | 86.20                               | 86.20                               | 4.06                             | 5.03                             | 5.60                       | 3.49                       | 1271.07                             | 792.43                              | 9854.98                       | 7679.92                       | 1.26                                 |
| Z-Z Trains               | 65.08                               | 65.23                               | 6.48                             | 5.15                             | 3.86                       | 3.17                       | 875.71                              | 720.03                              | 5473.26                       | 4605.37                       | 0.89                                 |
| NIM-Other Non-Intermodal | 56.95                               | 58.84                               | 3.49                             | 4.12                             | 3.32                       | 3.37                       | 753.03                              | 764.03                              | 5838.46                       | 7404.69                       | 2.96                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                         | 1196.11                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                         | 1468.25                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                         | 1218.87                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                         | 1105.13                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                         | 1424.61                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.021                                                                             | 0.021 | 0.040 | 1.057 | 0.279 | 0.001 | 96.6                                                                      | 0.0              | 0.0             | 97.6              |
| Affected Trains     | 0.030                                                                             | 0.029 | 0.057 | 1.487 | 0.392 | 0.001 | 132.5                                                                     | 0.0              | 0.0             | 133.7             |
| Total               | 0.051                                                                             | 0.050 | 0.097 | 2.544 | 0.671 | 0.002 | 229.1                                                                     | 0.0              | 0.0             | 231.3             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.010 | 0.021 | 0.542 | 0.143 | 0.001 | 52.0                                                                  | 0.0              | 0.0             | 52.5              |
| Westbound           | 0.008                                                                                        | 0.007 | 0.015 | 0.379 | 0.100 | 0.000 | 32.2                                                                  | 0.0              | 0.0             | 32.5              |
| Total               | 0.019                                                                                        | 0.018 | 0.035 | 0.921 | 0.243 | 0.001 | 84.2                                                                  | 0.0              | 0.0             | 85.0              |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.016                                                                                    | 0.016 | 0.031 | 0.809 | 0.213 | 0.001 | 70.6                                                              | 0.0              | 0.0             | 71.3              |
| Westbound           | 0.010                                                                                    | 0.010 | 0.019 | 0.499 | 0.132 | 0.000 | 45.9                                                              | 0.0              | 0.0             | 46.4              |
| Total               | 0.026                                                                                    | 0.025 | 0.050 | 1.308 | 0.345 | 0.001 | 116.5                                                             | 0.0              | 0.0             | 117.6             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 2.99E-04                                                                 | 2.90E-04 | 5.70E-04 | 1.49E-02 | 3.92E-03 | 1.39E-05 | 1.3                                                            | 0.0              | 0.0             | 1.3               |
| Affected Trains     | 1.61E-04                                                                 | 1.56E-04 | 3.06E-04 | 7.98E-03 | 2.11E-03 | 7.49E-06 | 0.7                                                            | 0.0              | 0.0             | 0.7               |
| Total               | 4.60E-04                                                                 | 4.46E-04 | 8.76E-04 | 2.29E-02 | 6.03E-03 | 2.14E-05 | 2.0                                                            | 0.0              | 0.0             | 2.1               |

Notes:

4.57E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>1.98</b>                                                     | <b>1.92</b> | <b>3.79</b> | <b>99.50</b>  | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 25.20                               | 25.20                               | 0.71                             | 2.86                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2344.22                       | 2684.37                       | 0.35                                 |
| Q-Guaranteed             | 25.20                               | 25.20                               | 3.79                             | 4.65                             | 3.35                       | 2.47                       | 759.41                              | 561.52                              | 5887.94                       | 5442.03                       | 0.41                                 |
| S-Stack                  | 25.20                               | 25.20                               | 4.03                             | 5.01                             | 5.56                       | 3.62                       | 1262.58                             | 821.83                              | 9789.19                       | 7964.85                       | 1.26                                 |
| Z-Z Trains               | 25.20                               | 25.20                               | 11.22                            | 8.90                             | 3.94                       | 3.45                       | 894.77                              | 782.51                              | 5592.40                       | 5005.04                       | 0.89                                 |
| NIM-Other Non-Intermodal | 25.20                               | 25.20                               | 5.18                             | 5.79                             | 2.95                       | 3.40                       | 670.10                              | 772.67                              | 5195.49                       | 7488.44                       | 2.96                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                         | 6731.05                        |
| Q-Guaranteed             | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                         | 8232.62                        |
| S-Stack                  | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                         | 7414.45                        |
| Z-Z Trains               | 3.10                                          | 3.03                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                         | 6200.32                        |
| NIM-Other Non-Intermodal | 2.50                                          | 2.00                                          | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                         | 7769.06                        |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.034                                                                             | 0.033 | 0.065 | 1.708 | 0.450 | 0.002 | 163.4                                                                     | 0.0              | 0.0             | 164.9             |
| Affected Trains     | 0.026                                                                             | 0.025 | 0.049 | 1.295 | 0.341 | 0.001 | 113.3                                                                     | 0.0              | 0.0             | 114.3             |
| Total               | 0.060                                                                             | 0.058 | 0.115 | 3.003 | 0.791 | 0.003 | 276.6                                                                     | 0.0              | 0.0             | 279.3             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.029                                                                                        | 0.028 | 0.055 | 1.445 | 0.380 | 0.001 | 138.8                                                                 | 0.0              | 0.0             | 140.1             |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.045 | 0.012 | 0.000 | 3.8                                                                   | 0.0              | 0.0             | 3.8               |
| Total               | 0.030                                                                                        | 0.029 | 0.057 | 1.489 | 0.392 | 0.001 | 142.6                                                                 | 0.0              | 0.0             | 143.9             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.022                                                                                    | 0.021 | 0.042 | 1.104 | 0.291 | 0.001 | 96.4                                                              | 0.0              | 0.0             | 97.3              |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.034 | 0.009 | 0.000 | 3.1                                                               | 0.0              | 0.0             | 3.1               |
| Total               | 0.023                                                                                    | 0.022 | 0.043 | 1.138 | 0.300 | 0.001 | 99.5                                                              | 0.0              | 0.0             | 100.4             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.55E-04                                                                 | 4.41E-04 | 8.65E-04 | 2.26E-02 | 5.96E-03 | 2.12E-05 | 2.0                                                            | 0.0              | 0.0             | 2.0               |
| Affected Trains     | 1.69E-04                                                                 | 1.64E-04 | 3.23E-04 | 8.42E-03 | 2.22E-03 | 7.89E-06 | 0.8                                                            | 0.0              | 0.0             | 0.8               |
| Total               | 6.24E-04                                                                 | 6.05E-04 | 1.19E-03 | 3.10E-02 | 8.18E-03 | 2.91E-05 | 2.8                                                            | 0.0              | 0.0             | 2.8               |

Notes:

6.20E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>1.98</b>                                                     | <b>1.92</b> | <b>3.79</b> | <b>99.50</b>  | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 56.10                         | 56.10                         | 0.70                          | 2.85                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    | 0.15                          |
| Q-Guaranteed             | 56.10                         | 56.10                         | 3.79                          | 4.66                          | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    | 0.45                          |
| S-Stack                  | 56.10                         | 56.10                         | 4.03                          | 5.01                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 0.67                          |
| Z-Z Trains               | 56.10                         | 56.10                         | 11.22                         | 8.90                          | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    | 0.35                          |
| NIM-Other Non-Intermodal | 56.10                         | 56.10                         | 5.02                          | 5.64                          | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    | 3.48                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                     | 669.51                      |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                     | 818.95                      |
| S-Stack                  | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                     | 616.75                      |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                     | 772.47                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.

Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.031                                                                             | 0.030 | 0.058 | 1.514 | 0.400 | 0.001 | 137.5                                                                     | 0.0              | 0.0             | 138.8             |
| Affected Trains     | 0.023                                                                             | 0.022 | 0.044 | 1.147 | 0.303 | 0.001 | 104.1                                                                     | 0.0              | 0.0             | 105.1             |
| Total               | 0.054                                                                             | 0.052 | 0.102 | 2.661 | 0.703 | 0.002 | 241.6                                                                     | 0.0              | 0.0             | 243.9             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.006 | 0.013 | 0.332 | 0.088 | 0.000 | 29.0                                                                  | 0.0              | 0.0             | 29.3              |
| Westbound           | 0.020                                                                                        | 0.019 | 0.038 | 0.989 | 0.261 | 0.001 | 90.9                                                                  | 0.0              | 0.0             | 91.8              |
| Total               | 0.027                                                                                        | 0.026 | 0.051 | 1.321 | 0.349 | 0.001 | 119.9                                                                 | 0.0              | 0.0             | 121.1             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.257 | 0.068 | 0.000 | 22.4                                                              | 0.0              | 0.0             | 22.6              |
| Westbound           | 0.015                                                                                    | 0.015 | 0.029 | 0.753 | 0.199 | 0.001 | 69.2                                                              | 0.0              | 0.0             | 69.9              |
| Total               | 0.020                                                                                    | 0.020 | 0.039 | 1.010 | 0.267 | 0.001 | 91.7                                                              | 0.0              | 0.0             | 92.5              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.84E-04                                                                 | 3.72E-04 | 7.30E-04 | 1.90E-02 | 5.03E-03 | 1.79E-05 | 1.7                                                            | 0.0              | 0.0             | 1.7               |
| Affected Trains     | 1.05E-04                                                                 | 1.01E-04 | 1.99E-04 | 5.19E-03 | 1.37E-03 | 4.87E-06 | 0.5                                                            | 0.0              | 0.0             | 0.5               |
| Total               | 4.88E-04                                                                 | 4.73E-04 | 9.29E-04 | 2.42E-02 | 6.40E-03 | 2.27E-05 | 2.2                                                            | 0.0              | 0.0             | 2.2               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |               |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|---------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx           | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 943                               | 22.12%                                | 0.92                                                            | 0.89        | 1.61        | 30.82         | 5.89         | 0.02        |  | 2257.98                  | 0.06             | 0.18            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00          | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 37.27%                                | 0.62                                                            | 0.60        | 1.22        | 38.37         | 9.92         | 0.03        |  | 3804.81                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.10%                                | 0.47                                                            | 0.45        | 0.92        | 28.93         | 7.48         | 0.03        |  | 2868.57                  | 0.07             | 0.22            |
| Tier 4                               | 534                               | 12.52%                                | 0.04                                                            | 0.04        | 0.13        | 2.60          | 3.33         | 0.01        |  | 1278.64                  | 0.03             | 0.10            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>2.05</b>                                                     | <b>1.99</b> | <b>3.88</b> | <b>100.72</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,264</b>                      | <b>100%</b>                           | <b>1.98</b>                                                     | <b>1.92</b> | <b>3.79</b> | <b>99.50</b>  | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Locomotive Parameters

| Locomotive Parameters | Idling Power<br>Rating <sup>1</sup> | Brake Specific<br>Fuel<br>Consumption <sup>2</sup> | Weight of<br>Locomotive<br>Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|-------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|
| Units                 | bhp/loco                            | bhp-hr/gal                                         | tons/loco                                      | tons/loco                   |
| Value                 | 25                                  | 20.8                                               | 209                                            | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip<br>Length<br>(Eastbound) | Train-Trip<br>Length<br>(Westbound) | Daily Train Trips<br>(Eastbound) | Daily Train Trips<br>(Westbound) | Locomotives<br>(Eastbound) | Locomotives<br>(Westbound) | Locomotive<br>Weight<br>(Eastbound) | Locomotive<br>Weight<br>(Westbound) | Freight Weight<br>(Eastbound) | Freight Weight<br>(Westbound) | Idling Time<br>(Non-<br>Directional) |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|-------------------------------------|-------------------------------|-------------------------------|--------------------------------------|
| Units                    | miles/trip                          | miles/trip                          | train-trips/day                  | train-trips/day                  | loco/train                 | loco/train                 | tons/train                          | tons/train                          | tons/train                    | tons/train                    | hours/day                            |
| B-Bare Table             | 167.40                              | 167.40                              | 0.55                             | 1.88                             | 2.00                       | 2.00                       | 454.00                              | 454.00                              | 2405.38                       | 2719.81                       | 0.52                                 |
| Q-Guaranteed             | 167.40                              | 167.40                              | 9.10                             | 9.40                             | 2.68                       | 2.66                       | 609.18                              | 603.96                              | 5903.96                       | 5853.32                       | 0.92                                 |
| S-Stack                  | 167.40                              | 167.40                              | 4.11                             | 5.04                             | 4.43                       | 3.65                       | 1006.08                             | 827.47                              | 9750.60                       | 8019.52                       | 1.16                                 |
| Z-Z Trains               | 167.40                              | 167.40                              | 13.88                            | 12.28                            | 3.78                       | 3.39                       | 857.67                              | 770.07                              | 5357.14                       | 4811.96                       | 0.94                                 |
| NIM-Other Non-Intermodal | 167.40                              | 167.40                              | 6.81                             | 7.75                             | 2.80                       | 4.67                       | 636.50                              | 1060.69                             | 6168.76                       | 10279.78                      | 2.69                                 |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower<br>per Ton<br>(HPT)<br>(Eastbound) | Horsepower<br>per Ton<br>(HPT)<br>(Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency<br>(Eastbound) | Fuel Efficiency<br>(Westbound) |
|--------------------------|-----------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|--------------------------------|--------------------------------|
| Units                    | bhp/ton                                       | bhp/ton                                       | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal                  | ton-miles/gal                  |
| B-Bare Table             | 2.00                                          | 2.00                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                         | 594.45                         |
| Q-Guaranteed             | 2.00                                          | 2.00                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                         | 729.83                         |
| S-Stack                  | 2.00                                          | 2.00                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                         | 654.95                         |
| Z-Z Trains               | 3.10                                          | 3.10                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                         | 541.73                         |
| NIM-Other Non-Intermodal | 2.00                                          | 2.00                                          | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                         | 705.39                         |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.277                                                                             | 0.269 | 0.528 | 13.778 | 3.635 | 0.013 | 1231.3                                                                    | 0.0              | 0.1             | 1243.0            |
| Affected Trains     | 0.202                                                                             | 0.196 | 0.385 | 10.065 | 2.655 | 0.009 | 897.1                                                                     | 0.0              | 0.1             | 905.7             |
| Total               | 0.479                                                                             | 0.465 | 0.913 | 23.843 | 6.290 | 0.022 | 2128.4                                                                    | 0.1              | 0.2             | 2148.7            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.135                                                                                        | 0.131 | 0.259 | 6.793  | 1.789 | 0.006 | 593.1                                                                 | 0.0              | 0.0             | 598.8             |
| Westbound           | 0.109                                                                                        | 0.106 | 0.207 | 5.369  | 1.419 | 0.005 | 493.7                                                                 | 0.0              | 0.0             | 498.4             |
| Total               | 0.245                                                                                        | 0.237 | 0.466 | 12.161 | 3.208 | 0.011 | 1086.8                                                                | 0.0              | 0.1             | 1097.2            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.108                                                                                    | 0.105 | 0.207 | 5.415 | 1.426 | 0.005 | 472.8                                                             | 0.0              | 0.0             | 477.3             |
| Westbound           | 0.071                                                                                    | 0.069 | 0.134 | 3.480 | 0.920 | 0.003 | 320.0                                                             | 0.0              | 0.0             | 323.1             |
| Total               | 0.179                                                                                    | 0.173 | 0.341 | 8.895 | 2.346 | 0.008 | 792.8                                                             | 0.0              | 0.1             | 800.4             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 6.34E-04                                                                 | 6.15E-04 | 1.21E-03 | 3.15E-02 | 8.31E-03 | 2.95E-05 | 2.8                                                            | 0.0              | 0.0             | 2.9               |
| Affected Trains     | 2.42E-04                                                                 | 2.34E-04 | 4.60E-04 | 1.20E-02 | 3.17E-03 | 1.13E-05 | 1.1                                                            | 0.0              | 0.0             | 1.1               |
| Total               | 8.76E-04                                                                 | 8.49E-04 | 1.67E-03 | 4.35E-02 | 1.15E-02 | 4.08E-05 | 3.9                                                            | 0.0              | 0.0             | 3.9               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 32                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                           |      |
|---------------------------|------|
| Proposed Project Scenario |      |
| Analysis Year             | 2033 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 86.20                         | 86.20                         | 1.91                          | 2.37                          | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    | 1.26                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                      | 1218.87                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                                             | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.002                                                                             | 0.002 | 0.005 | 0.111 | 0.142 | 0.001 | 47.9                                                                      | 0.0              | 0.0             | 48.4              |
| Total               | 0.002                                                                             | 0.002 | 0.005 | 0.111 | 0.142 | 0.001 | 47.9                                                                      | 0.0              | 0.0             | 48.4              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.001                                                                                    | 0.001 | 0.003 | 0.065 | 0.083 | 0.000 | 27.6                                                              | 0.0              | 0.0             | 27.9              |
| Westbound           | 0.000                                                                                    | 0.000 | 0.002 | 0.033 | 0.042 | 0.000 | 14.5                                                              | 0.0              | 0.0             | 14.6              |
| Total               | 0.001                                                                                    | 0.001 | 0.005 | 0.098 | 0.125 | 0.000 | 42.1                                                              | 0.0              | 0.0             | 42.5              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                                 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                                            | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 9.72E-06                                                                 | 9.43E-06 | 3.15E-05 | 6.54E-04 | 8.36E-04 | 2.97E-06 | 0.3                                                            | 0.0              | 0.0             | 0.3               |
| Total               | 9.72E-06                                                                 | 9.43E-06 | 3.15E-05 | 6.54E-04 | 8.36E-04 | 2.97E-06 | 0.3                                                            | 0.0              | 0.0             | 0.3               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 32                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                           |      |
|---------------------------|------|
| Proposed Project Scenario |      |
| Analysis Year             | 2033 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 25.20                         | 25.20                         | 1.89                          | 2.36                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 1.26                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                   |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.001                                                               | 0.001 | 0.003 | 0.071 | 0.091 | 0.000 | 30.1                                                 | 0.0              | 0.0             | 30.4              |
| Total               | 0.001                                                               | 0.001 | 0.003 | 0.071 | 0.091 | 0.000 | 30.1                                                 | 0.0              | 0.0             | 30.4              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.001                                                                      | 0.001 | 0.003 | 0.061 | 0.077 | 0.000 | 25.6                                         | 0.0              | 0.0             | 25.9              |
| Westbound           | 0.000                                                                      | 0.000 | 0.000 | 0.002 | 0.002 | 0.000 | 0.7                                          | 0.0              | 0.0             | 0.7               |
| Total               | 0.001                                                                      | 0.001 | 0.003 | 0.062 | 0.079 | 0.000 | 26.4                                         | 0.0              | 0.0             | 26.6              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 9.77E-06                                                   | 9.48E-06 | 3.17E-05 | 6.58E-04 | 8.40E-04 | 2.99E-06 | 0.3                                       | 0.0              | 0.0             | 0.3               |
| Total               | 9.77E-06                                                   | 9.48E-06 | 3.17E-05 | 6.58E-04 | 8.40E-04 | 2.99E-06 | 0.3                                       | 0.0              | 0.0             | 0.3               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2033

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 32                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>32</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                           |      |
|---------------------------|------|
| Proposed Project Scenario |      |
| Analysis Year             | 2033 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.
2. US EPA 2009, Emission Factors for Locomotives, Table 3.
3. Provided by BNSF.

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 56.10                         | 56.10                         | 1.89                          | 2.36                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 0.67                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2033

#### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                   |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.001                                                               | 0.001 | 0.003 | 0.057 | 0.073 | 0.000 | 25.1                                                 | 0.0              | 0.0             | 25.3              |
| Total               | 0.001                                                               | 0.001 | 0.003 | 0.057 | 0.073 | 0.000 | 25.1                                                 | 0.0              | 0.0             | 25.3              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                      | 0.000 | 0.001 | 0.014 | 0.018 | 0.000 | 6.0                                          | 0.0              | 0.0             | 6.0               |
| Westbound           | 0.001                                                                      | 0.001 | 0.002 | 0.036 | 0.046 | 0.000 | 16.1                                         | 0.0              | 0.0             | 16.2              |
| Total               | 0.001                                                                      | 0.001 | 0.002 | 0.050 | 0.064 | 0.000 | 22.0                                         | 0.0              | 0.0             | 22.3              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                   |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 5.19E-06                                                   | 5.03E-06 | 1.68E-05 | 3.49E-04 | 4.46E-04 | 1.58E-06 | 0.2                                       | 0.0              | 0.0             | 0.2               |
| Total               | 5.19E-06                                                   | 5.03E-06 | 1.68E-05 | 3.49E-04 | 4.46E-04 | 1.58E-06 | 0.2                                       | 0.0              | 0.0             | 0.2               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.54</b>                                                     | <b>1.50</b> | <b>3.05</b> | <b>85.75</b> | <b>26.58</b> | <b>0.09</b> | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 1% RD Blend/Use  
Out-of-State = 0% Renewable In State = 1% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 65.49                         | 66.85                         | 0.39                          | 2.11                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    | 0.47                          |
| Q-Guaranteed             | 67.77                         | 65.65                         | 4.67                          | 5.43                          | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    | 0.96                          |
| S-Stack                  | 86.20                         | 86.20                         | 4.72                          | 5.84                          | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    | 1.29                          |
| Z-Z Trains               | 65.08                         | 65.23                         | 9.38                          | 7.46                          | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    | 1.43                          |
| NIM-Other Non-Intermodal | 56.95                         | 58.84                         | 3.49                          | 4.12                          | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    | 3.29                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                      | 1196.11                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                      | 1468.25                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                      | 1218.87                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                      | 1105.13                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                      | 1424.61                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.021                                                                             | 0.020 | 0.041 | 1.151 | 0.357 | 0.001 | 123.8                                                                     | 0.0              | 0.0             | 125.0             |
| Affected Trains     | 0.029                                                                             | 0.028 | 0.057 | 1.589 | 0.493 | 0.002 | 170.9                                                                     | 0.0              | 0.0             | 172.5             |
| Total               | 0.049                                                                             | 0.048 | 0.098 | 2.740 | 0.849 | 0.003 | 294.7                                                                     | 0.0              | 0.0             | 297.5             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.011 | 0.022 | 0.608 | 0.188 | 0.001 | 65.2                                                                  | 0.0              | 0.0             | 65.9              |
| Westbound           | 0.007                                                                                        | 0.007 | 0.014 | 0.392 | 0.121 | 0.000 | 42.2                                                                  | 0.0              | 0.0             | 42.6              |
| Total               | 0.018                                                                                        | 0.017 | 0.036 | 0.999 | 0.310 | 0.001 | 107.5                                                                 | 0.0              | 0.0             | 108.5             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.015                                                                                    | 0.015 | 0.031 | 0.861 | 0.267 | 0.001 | 92.4                                                              | 0.0              | 0.0             | 93.3              |
| Westbound           | 0.010                                                                                    | 0.009 | 0.019 | 0.535 | 0.166 | 0.001 | 57.7                                                              | 0.0              | 0.0             | 58.3              |
| Total               | 0.025                                                                                    | 0.024 | 0.050 | 1.396 | 0.433 | 0.002 | 150.1                                                             | 0.0              | 0.0             | 151.5             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.46E-04                                                                 | 3.36E-04 | 6.86E-04 | 1.92E-02 | 5.97E-03 | 2.11E-05 | 2.1                                                            | 0.0              | 0.0             | 2.1               |
| Affected Trains     | 1.84E-04                                                                 | 1.79E-04 | 3.65E-04 | 1.02E-02 | 3.18E-03 | 1.12E-05 | 1.1                                                            | 0.0              | 0.0             | 1.1               |
| Total               | 5.31E-04                                                                 | 5.15E-04 | 1.05E-03 | 2.95E-02 | 9.14E-03 | 3.23E-05 | 3.2                                                            | 0.0              | 0.0             | 3.2               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.54</b>                                                     | <b>1.50</b> | <b>3.05</b> | <b>85.75</b> | <b>26.58</b> | <b>0.09</b> | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 25.20                         | 25.20                         | 0.71                          | 2.86                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    | 0.47                          |
| Q-Guaranteed             | 25.20                         | 25.20                         | 5.72                          | 7.03                          | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    | 0.96                          |
| S-Stack                  | 25.20                         | 25.20                         | 4.67                          | 5.82                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 1.29                          |
| Z-Z Trains               | 25.20                         | 25.20                         | 16.25                         | 12.89                         | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    | 1.43                          |
| NIM-Other Non-Intermodal | 25.20                         | 25.20                         | 5.18                          | 5.79                          | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    | 3.29                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                      | 6731.05                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                      | 8232.62                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                      | 6200.32                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                      | 7769.06                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.



# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.035                                                                             | 0.034 | 0.069 | 1.940 | 0.601 | 0.002 | 208.2                                                                     | 0.0              | 0.0             | 210.2             |
| Affected Trains     | 0.026                                                                             | 0.025 | 0.051 | 1.429 | 0.443 | 0.002 | 153.4                                                                     | 0.0              | 0.0             | 154.8             |
| Total               | 0.061                                                                             | 0.059 | 0.120 | 3.368 | 1.044 | 0.004 | 361.6                                                                     | 0.0              | 0.0             | 365.1             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.029                                                                                        | 0.029 | 0.058 | 1.639 | 0.508 | 0.002 | 175.9                                                                 | 0.0              | 0.0             | 177.6             |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.047 | 0.015 | 0.000 | 5.1                                                                   | 0.0              | 0.0             | 5.1               |
| Total               | 0.030                                                                                        | 0.029 | 0.060 | 1.686 | 0.523 | 0.002 | 181.0                                                                 | 0.0              | 0.0             | 182.7             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.022                                                                                    | 0.021 | 0.043 | 1.217 | 0.377 | 0.001 | 130.6                                                             | 0.0              | 0.0             | 131.9             |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.036 | 0.011 | 0.000 | 3.9                                                               | 0.0              | 0.0             | 3.9               |
| Total               | 0.023                                                                                    | 0.022 | 0.045 | 1.253 | 0.388 | 0.001 | 134.5                                                             | 0.0              | 0.0             | 135.8             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 5.53E-04                                                                 | 5.36E-04 | 1.09E-03 | 3.07E-02 | 9.52E-03 | 3.36E-05 | 3.3                                                            | 0.0              | 0.0             | 3.3               |
| Affected Trains     | 2.03E-04                                                                 | 1.97E-04 | 4.02E-04 | 1.13E-02 | 3.50E-03 | 1.23E-05 | 1.2                                                            | 0.0              | 0.0             | 1.2               |
| Total               | 7.56E-04                                                                 | 7.33E-04 | 1.50E-03 | 4.20E-02 | 1.30E-02 | 4.60E-05 | 4.5                                                            | 0.0              | 0.0             | 4.6               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.54</b>                                                     | <b>1.50</b> | <b>3.05</b> | <b>85.75</b> | <b>26.58</b> | <b>0.09</b> | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 56.10                         | 56.10                         | 0.70                          | 2.85                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    | 0.21                          |
| Q-Guaranteed             | 56.10                         | 56.10                         | 5.72                          | 7.03                          | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    | 2.42                          |
| S-Stack                  | 56.10                         | 56.10                         | 4.67                          | 5.81                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 1.61                          |
| Z-Z Trains               | 56.10                         | 56.10                         | 16.25                         | 12.89                         | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    | 1.19                          |
| NIM-Other Non-Intermodal | 56.10                         | 56.10                         | 5.02                          | 5.64                          | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    | 5.08                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                     | 669.51                      |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                     | 818.95                      |
| S-Stack                  | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                     | 616.75                      |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                     | 772.47                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.030                                                                             | 0.029 | 0.059 | 1.643 | 0.509 | 0.002 | 177.0                                                                     | 0.0              | 0.0             | 178.7             |
| Affected Trains     | 0.023                                                                             | 0.022 | 0.045 | 1.258 | 0.390 | 0.001 | 135.5                                                                     | 0.0              | 0.0             | 136.8             |
| Total               | 0.052                                                                             | 0.051 | 0.103 | 2.900 | 0.899 | 0.003 | 312.5                                                                     | 0.0              | 0.0             | 315.5             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.007 | 0.013 | 0.378 | 0.117 | 0.000 | 40.6                                                                  | 0.0              | 0.0             | 41.0              |
| Westbound           | 0.019                                                                                        | 0.018 | 0.037 | 1.042 | 0.323 | 0.001 | 112.4                                                                 | 0.0              | 0.0             | 113.4             |
| Total               | 0.026                                                                                        | 0.025 | 0.051 | 1.420 | 0.440 | 0.002 | 152.9                                                                 | 0.0              | 0.0             | 154.4             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.283 | 0.088 | 0.000 | 30.4                                                              | 0.0              | 0.0             | 30.7              |
| Westbound           | 0.015                                                                                    | 0.014 | 0.029 | 0.811 | 0.252 | 0.001 | 87.5                                                              | 0.0              | 0.0             | 88.3              |
| Total               | 0.020                                                                                    | 0.019 | 0.039 | 1.094 | 0.339 | 0.001 | 117.9                                                             | 0.0              | 0.0             | 119.0             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 6.15E-04                                                                 | 5.97E-04 | 1.22E-03 | 3.42E-02 | 1.06E-02 | 3.74E-05 | 3.7                                                            | 0.0              | 0.0             | 3.7               |
| Affected Trains     | 3.38E-04                                                                 | 3.28E-04 | 6.70E-04 | 1.88E-02 | 5.83E-03 | 2.06E-05 | 2.0                                                            | 0.0              | 0.0             | 2.0               |
| Total               | 9.54E-04                                                                 | 9.25E-04 | 1.89E-03 | 5.30E-02 | 1.64E-02 | 5.80E-05 | 5.7                                                            | 0.0              | 0.0             | 5.8               |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.54</b>                                                     | <b>1.50</b> | <b>3.05</b> | <b>85.75</b> | <b>26.58</b> | <b>0.09</b> | <b>10147</b>             | <b>0.26</b>      | <b>0.80</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 167.40                        | 167.40                        | 0.55                          | 1.88                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    | 0.76                          |
| Q-Guaranteed             | 167.40                        | 167.40                        | 9.04                          | 9.34                          | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    | 3.53                          |
| S-Stack                  | 167.40                        | 167.40                        | 4.77                          | 5.86                          | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    | 4.25                          |
| Z-Z Trains               | 167.40                        | 167.40                        | 20.10                         | 17.79                         | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    | 2.64                          |
| NIM-Other Non-Intermodal | 167.40                        | 167.40                        | 6.81                          | 7.75                          | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   | 5.55                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                      | 594.45                      |
| Q-Guaranteed             | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                      | 729.83                      |
| S-Stack                  | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                      | 654.95                      |
| Z-Z Trains               | 3.10                                 | 3.10                                 | 490            | 2117           | 167            | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                      | 541.73                      |
| NIM-Other Non-Intermodal | 2.00                                 | 2.00                                 | 490            | 2117           | 167            | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                      | 705.39                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

No Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the No Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 1% RD Blend/Use

Out-of-State = 0% Renewable

In State = 1% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.267                                                                             | 0.259 | 0.528 | 14.816 | 4.594 | 0.016 | 1593.8                                                                    | 0.0              | 0.1             | 1609.1            |
| Affected Trains     | 0.166                                                                             | 0.161 | 0.328 | 9.214  | 2.857 | 0.010 | 991.0                                                                     | 0.0              | 0.1             | 1000.5            |
| Total               | 0.432                                                                             | 0.419 | 0.856 | 24.030 | 7.450 | 0.026 | 2584.8                                                                    | 0.1              | 0.2             | 2609.5            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.136                                                                                        | 0.132 | 0.269 | 7.561  | 2.344 | 0.008 | 811.7                                                                 | 0.0              | 0.1             | 819.4             |
| Westbound           | 0.099                                                                                        | 0.096 | 0.195 | 5.475  | 1.698 | 0.006 | 590.7                                                                 | 0.0              | 0.0             | 596.3             |
| Total               | 0.234                                                                                        | 0.227 | 0.465 | 13.036 | 4.042 | 0.014 | 1402.3                                                                | 0.0              | 0.1             | 1415.7            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.089                                                                                    | 0.087 | 0.177 | 4.966 | 1.539 | 0.005 | 533.0                                                             | 0.0              | 0.0             | 538.1             |
| Westbound           | 0.057                                                                                    | 0.055 | 0.112 | 3.147 | 0.976 | 0.003 | 339.6                                                             | 0.0              | 0.0             | 342.8             |
| Total               | 0.146                                                                                    | 0.142 | 0.289 | 8.113 | 2.515 | 0.009 | 872.6                                                             | 0.0              | 0.1             | 880.9             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 1.36E-03                                                                 | 1.32E-03 | 2.70E-03 | 7.58E-02 | 2.35E-02 | 8.29E-05 | 8.2                                                            | 0.0              | 0.0             | 8.2               |
| Affected Trains     | 7.32E-04                                                                 | 7.10E-04 | 1.45E-03 | 4.07E-02 | 1.26E-02 | 4.45E-05 | 4.4                                                            | 0.0              | 0.0             | 4.4               |
| Total               | 2.10E-03                                                                 | 2.03E-03 | 4.15E-03 | 1.16E-01 | 3.61E-02 | 1.27E-04 | 12.5                                                           | 0.0              | 0.0             | 12.7              |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        |  | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        |  | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        |  | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        |  | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.50</b>                                                     | <b>1.45</b> | <b>2.99</b> | <b>84.81</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 65.49                         | 66.85                         | 0.39                          | 2.11                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2456.63                    | 2586.85                    | 0.46                          |
| Q-Guaranteed             | 67.77                         | 65.65                         | 4.51                          | 5.25                          | 3.32                    | 2.38                    | 754.64                        | 541.38                        | 5850.98                    | 5246.88                    | 1.10                          |
| S-Stack                  | 86.20                         | 86.20                         | 4.72                          | 5.84                          | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    | 2.31                          |
| Z-Z Trains               | 65.08                         | 65.23                         | 9.38                          | 7.46                          | 3.86                    | 3.17                    | 875.71                        | 720.03                        | 5473.26                    | 4605.37                    | 1.48                          |
| NIM-Other Non-Intermodal | 56.95                         | 58.84                         | 3.49                          | 4.12                          | 3.32                    | 3.37                    | 753.03                        | 764.03                        | 5838.46                    | 7404.69                    | 3.46                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.022       | -0.067       | 734.03                      | 1196.11                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.122        | 0.109        | 902.30                      | 1468.25                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                      | 1218.87                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 1073           | 17             | 112            | 0.002     | -0.002    | 0.083        | -0.050       | 806.51                      | 1105.13                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.057       | 0.030        | 853.61                      | 1424.61                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.020                                                                             | 0.020 | 0.041 | 1.144 | 0.354 | 0.001 | 122.9                                                                     | 0.0              | 0.0             | 124.1             |
| Affected Trains     | 0.028                                                                             | 0.027 | 0.056 | 1.569 | 0.485 | 0.002 | 164.0                                                                     | 0.0              | 0.0             | 165.6             |
| Total               | 0.048                                                                             | 0.047 | 0.096 | 2.713 | 0.839 | 0.003 | 286.9                                                                     | 0.0              | 0.0             | 289.7             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.011                                                                                        | 0.010 | 0.021 | 0.601 | 0.186 | 0.001 | 67.7                                                                  | 0.0              | 0.0             | 68.3              |
| Westbound           | 0.007                                                                                        | 0.007 | 0.014 | 0.392 | 0.121 | 0.000 | 39.0                                                                  | 0.0              | 0.0             | 39.4              |
| Total               | 0.018                                                                                        | 0.017 | 0.035 | 0.993 | 0.307 | 0.001 | 106.7                                                                 | 0.0              | 0.0             | 107.7             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.015                                                                                    | 0.014 | 0.030 | 0.843 | 0.260 | 0.001 | 86.3                                                              | 0.0              | 0.0             | 87.2              |
| Westbound           | 0.010                                                                                    | 0.009 | 0.019 | 0.529 | 0.164 | 0.001 | 57.1                                                              | 0.0              | 0.0             | 57.7              |
| Total               | 0.024                                                                                    | 0.024 | 0.049 | 1.372 | 0.425 | 0.002 | 143.5                                                             | 0.0              | 0.0             | 144.8             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 3.57E-04                                                                 | 3.46E-04 | 7.09E-04 | 2.00E-02 | 6.19E-03 | 2.20E-05 | 2.1                                                            | 0.0              | 0.0             | 2.1               |
| Affected Trains     | 2.84E-04                                                                 | 2.75E-04 | 5.65E-04 | 1.59E-02 | 4.93E-03 | 1.75E-05 | 1.7                                                            | 0.0              | 0.0             | 1.7               |
| Total               | 6.41E-04                                                                 | 6.21E-04 | 1.27E-03 | 3.59E-02 | 1.11E-02 | 3.95E-05 | 3.8                                                            | 0.0              | 0.0             | 3.8               |

Notes:

7.18E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        |  | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        |  | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        |  | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        |  | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.50</b>                                                     | <b>1.45</b> | <b>2.99</b> | <b>84.81</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 25.20                         | 25.20                         | 0.71                          | 2.86                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2344.22                    | 2684.37                    | 0.46                          |
| Q-Guaranteed             | 25.20                         | 25.20                         | 5.33                          | 6.55                          | 3.35                    | 2.47                    | 759.41                        | 561.52                        | 5887.94                    | 5442.03                    | 1.10                          |
| S-Stack                  | 25.20                         | 25.20                         | 4.67                          | 5.82                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 2.31                          |
| Z-Z Trains               | 25.20                         | 25.20                         | 16.25                         | 12.89                         | 3.94                    | 3.45                    | 894.77                        | 782.51                        | 5592.40                    | 5005.04                    | 1.48                          |
| NIM-Other Non-Intermodal | 25.20                         | 25.20                         | 5.18                          | 5.79                          | 2.95                    | 3.40                    | 670.10                        | 772.67                        | 5195.49                    | 7488.44                    | 3.46                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.022       | -0.067       | 179.40                      | 6731.05                     |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.122        | 0.109        | 227.19                      | 8232.62                     |
| S-Stack                  | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | 0.083        | -0.050       | 197.37                      | 6200.32                     |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.057       | 0.030        | 186.40                      | 7769.06                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

#### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

|                |              |                 |            |               |                  |
|----------------|--------------|-----------------|------------|---------------|------------------|
| Out-of-State = | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State = | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.034                                                                             | 0.033 | 0.068 | 1.921 | 0.594 | 0.002 | 215.5                                                                     | 0.0              | 0.0             | 217.5             |
| Affected Trains     | 0.024                                                                             | 0.024 | 0.049 | 1.381 | 0.427 | 0.002 | 141.7                                                                     | 0.0              | 0.0             | 143.1             |
| Total               | 0.058                                                                             | 0.057 | 0.117 | 3.302 | 1.020 | 0.004 | 357.2                                                                     | 0.0              | 0.0             | 360.6             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.029                                                                                        | 0.028 | 0.057 | 1.621 | 0.501 | 0.002 | 182.7                                                                 | 0.0              | 0.0             | 184.4             |
| Westbound           | 0.001                                                                                        | 0.001 | 0.002 | 0.047 | 0.015 | 0.000 | 4.7                                                                   | 0.0              | 0.0             | 4.7               |
| Total               | 0.029                                                                                        | 0.029 | 0.059 | 1.668 | 0.515 | 0.002 | 187.3                                                                 | 0.0              | 0.0             | 189.1             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.021                                                                                    | 0.020 | 0.041 | 1.170 | 0.362 | 0.001 | 119.8                                                             | 0.0              | 0.0             | 121.0             |
| Westbound           | 0.001                                                                                    | 0.001 | 0.001 | 0.035 | 0.011 | 0.000 | 3.8                                                               | 0.0              | 0.0             | 3.8               |
| Total               | 0.021                                                                                    | 0.021 | 0.043 | 1.205 | 0.372 | 0.001 | 123.6                                                             | 0.0              | 0.0             | 124.8             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 5.69E-04                                                                 | 5.52E-04 | 1.13E-03 | 3.19E-02 | 9.87E-03 | 3.51E-05 | 3.4                                                            | 0.0              | 0.0             | 3.4               |
| Affected Trains     | 3.02E-04                                                                 | 2.93E-04 | 6.00E-04 | 1.69E-02 | 5.23E-03 | 1.86E-05 | 1.8                                                            | 0.0              | 0.0             | 1.8               |
| Total               | 8.70E-04                                                                 | 8.44E-04 | 1.73E-03 | 4.88E-02 | 1.51E-02 | 5.37E-05 | 5.1                                                            | 0.0              | 0.0             | 5.2               |

Notes:

9.75E+01

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        |  | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        |  | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        |  | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        |  | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.50</b>                                                     | <b>1.45</b> | <b>2.99</b> | <b>84.81</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 56.10                         | 56.10                         | 0.70                          | 2.85                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2307.42                    | 2681.37                    | 0.23                          |
| Q-Guaranteed             | 56.10                         | 56.10                         | 5.33                          | 6.56                          | 3.35                    | 2.48                    | 759.40                        | 562.39                        | 5887.87                    | 5450.50                    | 1.09                          |
| S-Stack                  | 56.10                         | 56.10                         | 4.67                          | 5.81                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 1.35                          |
| Z-Z Trains               | 56.10                         | 56.10                         | 16.25                         | 12.89                         | 3.94                    | 3.45                    | 894.78                        | 782.87                        | 5592.45                    | 5007.35                    | 0.68                          |
| NIM-Other Non-Intermodal | 56.10                         | 56.10                         | 5.02                          | 5.64                          | 2.93                    | 3.39                    | 665.23                        | 768.58                        | 5157.71                    | 7448.78                    | 4.72                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.022       | -0.067       | 1715.52                     | 669.51                      |
| Q-Guaranteed             | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.122        | 0.109        | 2174.46                     | 818.95                      |
| S-Stack                  | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |
| Z-Z Trains               | 3.10                                 | 3.03                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | 0.083        | -0.050       | 1889.07                     | 616.75                      |
| NIM-Other Non-Intermodal | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.057       | 0.030        | 1782.18                     | 772.47                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.

Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.029                                                                             | 0.028 | 0.058 | 1.629 | 0.505 | 0.002 | 173.4                                                                     | 0.0              | 0.0             | 175.0             |
| Affected Trains     | 0.022                                                                             | 0.021 | 0.043 | 1.212 | 0.375 | 0.001 | 129.0                                                                     | 0.0              | 0.0             | 130.2             |
| Total               | 0.051                                                                             | 0.049 | 0.101 | 2.841 | 0.880 | 0.003 | 302.4                                                                     | 0.0              | 0.0             | 305.3             |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.007                                                                                        | 0.006 | 0.013 | 0.374 | 0.116 | 0.000 | 38.3                                                                  | 0.0              | 0.0             | 38.7              |
| Westbound           | 0.019                                                                                        | 0.018 | 0.037 | 1.042 | 0.323 | 0.001 | 112.4                                                                 | 0.0              | 0.0             | 113.4             |
| Total               | 0.025                                                                                        | 0.025 | 0.050 | 1.415 | 0.439 | 0.002 | 150.7                                                                 | 0.0              | 0.0             | 152.1             |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.005                                                                                    | 0.005 | 0.010 | 0.272 | 0.084 | 0.000 | 27.9                                                              | 0.0              | 0.0             | 28.2              |
| Westbound           | 0.014                                                                                    | 0.014 | 0.028 | 0.789 | 0.245 | 0.001 | 85.1                                                              | 0.0              | 0.0             | 85.9              |
| Total               | 0.019                                                                                    | 0.018 | 0.038 | 1.061 | 0.329 | 0.001 | 113.0                                                             | 0.0              | 0.0             | 114.0             |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
|                     | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 4.71E-04                                                                 | 4.57E-04 | 9.37E-04 | 2.64E-02 | 8.18E-03 | 2.91E-05 | 2.8                                                            | 0.0              | 0.0             | 2.8               |
| Affected Trains     | 2.06E-04                                                                 | 2.00E-04 | 4.10E-04 | 1.15E-02 | 3.57E-03 | 1.27E-05 | 1.2                                                            | 0.0              | 0.0             | 1.2               |
| Total               | 6.77E-04                                                                 | 6.57E-04 | 1.35E-03 | 3.80E-02 | 1.18E-02 | 4.18E-05 | 4.0                                                            | 0.0              | 0.0             | 4.0               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 360                               | 8.62%                                 | 0.36                                                            | 0.35        | 0.63        | 12.01        | 2.30         | 0.01        |  | 880.17                   | 0.02             | 0.07            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 1589                              | 38.05%                                | 0.63                                                            | 0.61        | 1.24        | 39.18        | 10.13        | 0.04        |  | 3884.98                  | 0.10             | 0.30            |
| Tier 3                               | 1198                              | 28.69%                                | 0.48                                                            | 0.46        | 0.94        | 29.54        | 7.64         | 0.03        |  | 2929.02                  | 0.07             | 0.23            |
| Tier 4                               | 1029                              | 24.64%                                | 0.08                                                            | 0.07        | 0.25        | 5.13         | 6.56         | 0.02        |  | 2515.83                  | 0.06             | 0.20            |
| <b>Total - Westbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.55</b>                                                     | <b>1.50</b> | <b>3.06</b> | <b>85.85</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>4,176</b>                      | <b>100%</b>                           | <b>1.50</b>                                                     | <b>1.45</b> | <b>2.99</b> | <b>84.81</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type               | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units                    | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| B-Bare Table             | 167.40                        | 167.40                        | 0.55                          | 1.88                          | 2.00                    | 2.00                    | 454.00                        | 454.00                        | 2405.38                    | 2719.81                    | 1.24                          |
| Q-Guaranteed             | 167.40                        | 167.40                        | 12.18                         | 12.59                         | 2.68                    | 2.66                    | 609.18                        | 603.96                        | 5903.96                    | 5853.32                    | 2.01                          |
| S-Stack                  | 167.40                        | 167.40                        | 4.77                          | 5.86                          | 4.43                    | 3.65                    | 1006.08                       | 827.47                        | 9750.60                    | 8019.52                    | 2.06                          |
| Z-Z Trains               | 167.40                        | 167.40                        | 20.10                         | 17.79                         | 3.78                    | 3.39                    | 857.67                        | 770.07                        | 5357.14                    | 4811.96                    | 1.98                          |
| NIM-Other Non-Intermodal | 167.40                        | 167.40                        | 6.81                          | 7.75                          | 2.80                    | 4.67                    | 636.50                        | 1060.69                       | 6168.76                    | 10279.78                   | 5.02                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type               | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|--------------------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units                    | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| B-Bare Table             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.022       | -0.067       | 356.08                      | 594.45                      |
| Q-Guaranteed             | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.122        | 0.109        | 448.84                      | 729.83                      |
| S-Stack                  | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.126       | -0.022       | 387.65                      | 654.95                      |
| Z-Z Trains               | 3.10                                 | 3.10                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | 0.083        | -0.050       | 358.36                      | 541.73                      |
| NIM-Other Non-Intermodal | 2.00                                 | 2.00                                 | 490            | 2117           | 167.40         | -0.002    | 0.002     | -0.057       | 0.030        | 377.84                      | 705.39                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |        |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|--------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.262                                                                             | 0.254 | 0.521 | 14.707 | 4.552 | 0.016 | 1540.5                                                                    | 0.0              | 0.1             | 1555.2            |
| Affected Trains     | 0.192                                                                             | 0.186 | 0.382 | 10.783 | 3.337 | 0.012 | 1127.5                                                                    | 0.0              | 0.1             | 1138.2            |
| Total               | 0.454                                                                             | 0.440 | 0.904 | 25.490 | 7.888 | 0.028 | 2667.9                                                                    | 0.1              | 0.2             | 2693.4            |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |        |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|--------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx    | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.132                                                                                        | 0.128 | 0.264 | 7.479  | 2.311 | 0.008 | 766.1                                                                 | 0.0              | 0.1             | 773.4             |
| Westbound           | 0.099                                                                                        | 0.096 | 0.195 | 5.475  | 1.698 | 0.006 | 590.7                                                                 | 0.0              | 0.0             | 596.3             |
| Total               | 0.231                                                                                        | 0.224 | 0.459 | 12.954 | 4.009 | 0.014 | 1356.8                                                                | 0.0              | 0.1             | 1369.7            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.103                                                                                    | 0.100 | 0.205 | 5.811 | 1.796 | 0.006 | 595.2                                                             | 0.0              | 0.0             | 600.9             |
| Westbound           | 0.067                                                                                    | 0.065 | 0.132 | 3.706 | 1.149 | 0.004 | 399.8                                                             | 0.0              | 0.0             | 403.7             |
| Total               | 0.169                                                                                    | 0.164 | 0.337 | 9.517 | 2.945 | 0.010 | 995.1                                                             | 0.0              | 0.1             | 1004.6            |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 1.10E-03                                                                 | 1.07E-03 | 2.20E-03 | 6.19E-02 | 1.92E-02 | 6.81E-05 | 6.5                                                            | 0.0              | 0.0             | 6.6               |
| Affected Trains     | 4.57E-04                                                                 | 4.43E-04 | 9.08E-04 | 2.56E-02 | 7.92E-03 | 2.82E-05 | 2.7                                                            | 0.0              | 0.0             | 2.7               |
| Total               | 1.56E-03                                                                 | 1.51E-03 | 3.11E-03 | 8.75E-02 | 2.71E-02 | 9.63E-05 | 9.2                                                            | 0.0              | 0.0             | 9.3               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 36                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 86.20                         | 86.20                         | 2.20                          | 2.72                          | 5.60                    | 3.49                    | 1271.07                       | 792.43                        | 9854.98                    | 7679.92                    | 2.31                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 1073           | 17             | 112            | 0.002     | -0.002    | -0.126       | -0.022       | 634.97                      | 1218.87                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

# Appendix E

## CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

### Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

## Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup><br>(tons/day) |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup><br>(metric tons/day) |                  |                 |                   |
|---------------------|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                              | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                           | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                                             | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                       | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 0.002                                                                             | 0.002 | 0.006 | 0.129 | 0.164 | 0.001 | 55.4                                                                      | 0.0              | 0.0             | 55.9              |
| Total               | 0.002                                                                             | 0.002 | 0.006 | 0.129 | 0.164 | 0.001 | 55.4                                                                      | 0.0              | 0.0             | 55.9              |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-----------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                         | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                       | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Westbound           | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |
| Total               | 0.000                                                                                        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                                   | 0.0              | 0.0             | 0.0               |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                                     | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                                   | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Eastbound           | 0.001                                                                                    | 0.001 | 0.004 | 0.075 | 0.096 | 0.000 | 31.8                                                              | 0.0              | 0.0             | 32.1              |
| Westbound           | 0.001                                                                                    | 0.001 | 0.002 | 0.037 | 0.048 | 0.000 | 16.7                                                              | 0.0              | 0.0             | 16.8              |
| Total               | 0.002                                                                                    | 0.002 | 0.005 | 0.113 | 0.144 | 0.001 | 48.4                                                              | 0.0              | 0.0             | 48.9              |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions<br>(tons/day) |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions<br>(metric tons/day) |                  |                 |                   |
|---------------------|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------------------------------------------------------------|------------------|-----------------|-------------------|
| Pollutant           | PM10                                                                     | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                                                | N <sub>2</sub> O | CH <sub>4</sub> | CO2e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                                 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                                            | 0.0              | 0.0             | 0.0               |
| Affected Trains     | 2.05E-05                                                                 | 1.99E-05 | 6.66E-05 | 1.38E-03 | 1.77E-03 | 6.28E-06 | 0.6                                                            | 0.0              | 0.0             | 0.6               |
| Total               | 2.05E-05                                                                 | 1.99E-05 | 6.66E-05 | 1.38E-03 | 1.77E-03 | 6.28E-06 | 0.6                                                            | 0.0              | 0.0             | 0.6               |

### Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.
2. Global warming potentials for CO2e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart%20A%20of%20Part%2098)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 36                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                           |      |
|---------------------------|------|
| Proposed Project Scenario |      |
| Analysis Year             | 2048 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 25.20                         | 25.20                         | 2.18                          | 2.71                          | 5.56                    | 3.62                    | 1262.58                       | 821.83                        | 9789.19                    | 7964.85                    | 2.31                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 3775           | 1073           | 25             | 0.020     | -0.020    | -0.126       | -0.022       | 196.98                      | 7414.45                     |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.



## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                                |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 0.001                                                               | 0.001 | 0.004 | 0.082 | 0.105 | 0.000 | 34.9                                                 | 0.0              | 0.0             | 35.3                           |
| Total               | 0.001                                                               | 0.001 | 0.004 | 0.082 | 0.105 | 0.000 | 34.9                                                 | 0.0              | 0.0             | 35.3                           |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.001                                                                      | 0.001 | 0.003 | 0.070 | 0.089 | 0.000 | 29.5                                         | 0.0              | 0.0             | 29.8                           |
| Westbound           | 0.000                                                                      | 0.000 | 0.000 | 0.002 | 0.002 | 0.000 | 0.8                                          | 0.0              | 0.0             | 0.8                            |
| Total               | 0.001                                                                      | 0.001 | 0.003 | 0.072 | 0.091 | 0.000 | 30.3                                         | 0.0              | 0.0             | 30.6                           |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 2.06E-05                                                   | 2.00E-05 | 6.69E-05 | 1.39E-03 | 1.78E-03 | 6.31E-06 | 0.6                                       | 0.0              | 0.0             | 0.6                            |
| Total               | 2.06E-05                                                   | 2.00E-05 | 6.69E-05 | 1.39E-03 | 1.78E-03 | 6.31E-06 | 0.6                                       | 0.0              | 0.0             | 0.6                            |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year

2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.

A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.

Eastbound uses in state fuel blend.

Westbound uses out-of-state fuel blend.

Out-of-State = 100% 0% RD Blend/Use

In State = 100% 10% RD Blend/Use

Out-of-State = 0% Renewable

In State = 10% Renewable

### Scenario Fleet Parameters

| Tier                                 | Locomotive Inventory <sup>1</sup> | Locomotive Fleet Mix (%) <sup>1</sup> | Composite Line-Haul Criteria Pollutant Emission Factors (g/gal) |             |             |              |              |             |  | GHG (g/gal) <sup>2</sup> |                  |                 |
|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------|-------------|-------------|--------------|--------------|-------------|--|--------------------------|------------------|-----------------|
|                                      |                                   |                                       | PM10                                                            | PM2.5       | VOC         | NOx          | CO           | SOx         |  | CO <sub>2</sub>          | N <sub>2</sub> O | CH <sub>4</sub> |
| Uncontrolled                         | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 0+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 1+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 2+                              | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 3                               | 0                                 | 0.00%                                 | 0.00                                                            | 0.00        | 0.00        | 0.00         | 0.00         | 0.00        |  | 0.00                     | 0.00             | 0.00            |
| Tier 4                               | 36                                | 100.00%                               | 0.31                                                            | 0.30        | 1.01        | 20.80        | 26.62        | 0.09        |  | 10210.00                 | 0.26             | 0.80            |
| <b>Total - Westbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.31</b>                                                     | <b>0.30</b> | <b>1.01</b> | <b>20.80</b> | <b>26.62</b> | <b>0.09</b> |  | <b>10210</b>             | <b>0.26</b>      | <b>0.80</b>     |
| <b>Total - Eastbound<sup>3</sup></b> | <b>36</b>                         | <b>100%</b>                           | <b>0.30</b>                                                     | <b>0.29</b> | <b>0.98</b> | <b>20.55</b> | <b>26.21</b> | <b>0.09</b> |  | <b>9577</b>              | <b>0.24</b>      | <b>0.75</b>     |

Notes:

1. Locomotive Inventory based on 2023 CARB 98 MOU.

2. GHG emissions adjusted for 62% reduction for Carbon Intensity for any renewable diesel usage (CARB 2024).

3. Adjusted for alternative fuel blend.

### Locomotive Parameters

| Locomotive Parameters | Idling Power Rating <sup>1</sup> | Brake Specific Fuel Consumption <sup>2</sup> | Weight of Locomotive Engine <sup>3</sup> | Weight of Fuel <sup>3</sup> |
|-----------------------|----------------------------------|----------------------------------------------|------------------------------------------|-----------------------------|
| Units                 | bhp/loco                         | bhp-hr/gal                                   | tons/loco                                | tons/loco                   |
| Value                 | 25                               | 20.8                                         | 209                                      | 18                          |

Notes:

1. US EPA 1998, Locomotive Emission Standards, Appendix I. Peak idling power.

2. US EPA 2009, Emission Factors for Locomotives, Table 3.

3. Provided by BNSF.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

|                           |      |
|---------------------------|------|
| Proposed Project Scenario |      |
| Analysis Year             | 2048 |

Description:

|                                                                                                      |              |                 |            |               |                  |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|---------------|------------------|
| Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.     |              |                 |            |               |                  |
| A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors. |              |                 |            |               |                  |
| Corridor parameters are daily averages provided by BNSF.                                             |              |                 |            |               |                  |
| Eastbound uses in state fuel blend.                                                                  |              |                 |            |               |                  |
| Westbound uses out-of-state fuel blend.                                                              |              |                 |            |               |                  |
| Out-of-State =                                                                                       | 100%         | 0% RD Blend/Use | In State = | 100%          | 10% RD Blend/Use |
| Out-of-State =                                                                                       | 0% Renewable |                 | In State = | 10% Renewable |                  |

### Scenario Train Parameters<sup>1</sup>

| Train Type | Train-Trip Length (Eastbound) | Train-Trip Length (Westbound) | Daily Train Trips (Eastbound) | Daily Train Trips (Westbound) | Locomotives (Eastbound) | Locomotives (Westbound) | Locomotive Weight (Eastbound) | Locomotive Weight (Westbound) | Freight Weight (Eastbound) | Freight Weight (Westbound) | Idling Time (Non-Directional) |
|------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|
| Units      | miles/trip                    | miles/trip                    | train-trips/day               | train-trips/day               | loco/train              | loco/train              | tons/train                    | tons/train                    | tons/train                 | tons/train                 | hours/day                     |
| S-BAR6     | 56.10                         | 56.10                         | 2.18                          | 2.71                          | 5.56                    | 3.62                    | 1263.07                       | 821.52                        | 9792.95                    | 7961.87                    | 1.35                          |

Notes:

1. Provided By BNSF. Average daily values.

### Scenario Fuel Parameters<sup>1</sup>

| Train Type | Horsepower per Ton (HPT) (Eastbound) | Horsepower per Ton (HPT) (Westbound) | East Elevation | West Elevation | Segment Length | Grade     | Grade     | Train Factor | Train Factor | Fuel Efficiency (Eastbound) | Fuel Efficiency (Westbound) |
|------------|--------------------------------------|--------------------------------------|----------------|----------------|----------------|-----------|-----------|--------------|--------------|-----------------------------|-----------------------------|
| Units      | bhp/ton                              | bhp/ton                              | ft             | ft             | mi             | Eastbound | Westbound | Eastbound    | Westbound    | ton-miles/gal               | ton-miles/gal               |
| S-BAR6     | 2.50                                 | 2.00                                 | 2117           | 3775           | 56             | -0.006    | 0.006     | -0.126       | -0.022       | 1885.46                     | 737.48                      |

Notes:

1. Provided By BNSF. Fuel Efficiency based on regression model from 2023 train data.

## Appendix E

### CORRIDOR EMISSION CALCULATIONS

Proposed Project Scenario  
Analysis Year 2048

Description:

Analysis of the train movement Eastbound and Westbound for the Proposed Project Dedicated Fleet.  
A composite emission factor is calculated using the MOU reported fleet mix and EPA emission factors.  
Corridor parameters are daily averages provided by BNSF.  
Eastbound uses in state fuel blend.  
Westbound uses out-of-state fuel blend.  
Out-of-State = 100% 0% RD Blend/Use In State = 100% 10% RD Blend/Use  
Out-of-State = 0% Renewable In State = 10% Renewable

### Scenario Daily Emissions Summary

| Train Type          | Total Peak Daily Corridor Criteria Pollutant Emissions <sup>1</sup> |       |       |       |       |       | Total Peak Daily Corridor GHG Emissions <sup>1</sup> |                  |                 |                                |
|---------------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|------------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                      | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.000                                                               | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                                  | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 0.001                                                               | 0.001 | 0.003 | 0.066 | 0.085 | 0.000 | 29.0                                                 | 0.0              | 0.0             | 29.3                           |
| Total               | 0.001                                                               | 0.001 | 0.003 | 0.066 | 0.085 | 0.000 | 29.0                                                 | 0.0              | 0.0             | 29.3                           |

| Direction of Travel | Average Moving Non-Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Non-Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|--------------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                           | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                                  | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Westbound           | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |
| Total               | 0.000                                                                          | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0                                              | 0.0              | 0.0             | 0.0                            |

| Direction of Travel | Average Moving Affected Trains Daily Corridor Criteria Pollutant Emissions |       |       |       |       |       | Affected Trains Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|----------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                                       | PM2.5 | VOC   | NOx   | CO    | SOx   | CO <sub>2</sub>                              | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Eastbound           | 0.000                                                                      | 0.000 | 0.001 | 0.016 | 0.021 | 0.000 | 6.9                                          | 0.0              | 0.0             | 6.9                            |
| Westbound           | 0.001                                                                      | 0.001 | 0.002 | 0.042 | 0.053 | 0.000 | 18.5                                         | 0.0              | 0.0             | 18.7                           |
| Total               | 0.001                                                                      | 0.001 | 0.003 | 0.058 | 0.074 | 0.000 | 25.3                                         | 0.0              | 0.0             | 25.6                           |

| Train Type          | Average Idling Daily Corridor Criteria Pollutant Emissions |          |          |          |          |          | Total Idling Daily Corridor GHG Emissions |                  |                 |                                |
|---------------------|------------------------------------------------------------|----------|----------|----------|----------|----------|-------------------------------------------|------------------|-----------------|--------------------------------|
| Pollutant           | PM10                                                       | PM2.5    | VOC      | NOx      | CO       | SOx      | CO <sub>2</sub>                           | N <sub>2</sub> O | CH <sub>4</sub> | CO <sub>2</sub> e <sup>2</sup> |
| Non-Affected Trains | 0.00E+00                                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.0                                       | 0.0              | 0.0             | 0.0                            |
| Affected Trains     | 1.20E-05                                                   | 1.16E-05 | 3.89E-05 | 8.08E-04 | 1.03E-03 | 3.67E-06 | 0.4                                       | 0.0              | 0.0             | 0.4                            |
| Total               | 1.20E-05                                                   | 1.16E-05 | 3.89E-05 | 8.08E-04 | 1.03E-03 | 3.67E-06 | 0.4                                       | 0.0              | 0.0             | 0.4                            |

Notes:

1. Peak daily emissions based on 13% safety factor on average daily emissions.

2. Global warming potentials for CO<sub>2</sub>e based on Table A-1 to Subpart A of Part 98, Title 40. [https://www.ecfr.gov/current/title-40/part-98/appendix-Table A-1 to Subpart A of Part 98](https://www.ecfr.gov/current/title-40/part-98/appendix-Table-A-1%20to%20Subpart-A%20of%20Part-98)

## **APPENDIX 3.0-2**

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### **THRASHER ERRATA**



## MEMORANDUM

To: David Rankin, BNSF  
From: Rocks Biological Consulting  
Date: April 30, 2026  
Subject: BNSF Barstow International Gateway – LeConte’s Thrasher and Bendire’s Thrasher  
Regulatory Status Change Errata

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### Introduction

This memorandum documents a change in regulatory status for biological resources that occurred subsequent to DEIR circulation for the Barstow International Gateway Project (project) and confirms that the impact analysis and mitigation measures previously disclosed remain adequate under CEQA. At the time of DEIR circulation, LeConte’s thrasher (*Toxostoma lecontei*) was considered a CDFW Species of Special Concern (SSC) and USFWS Bird of Conservation Concern (BCC), and not protected under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA). On April 16, 2026, the California Fish and Game Commission accepted a petition to list LeConte’s thrasher, along with Bendire’s thrasher (*T. bendirei*), as endangered or threatened under CESA and issued findings that the species are candidates for listing under CESA. Accordingly, these species will receive the same protections as other species that are formally listed as threatened or endangered by the state while being evaluated as candidates. ‘Take’ of candidate species and their active nest sites is prohibited in the absence of a CESA Incidental Take Permit. **Any regulatory status references to LeConte’s or Bendire’s thrashers as SSC and BCC within the DEIR are hereby revised to ‘CESA Candidate’ species via this Biological Resources Errata Memo.**

### Findings

Bendire’s thrasher is not known from the vicinity of the site as discussed in the Biological Resources Technical Report and the DEIR accurately concluded no impacts on the species are anticipated as a result of the project. Therefore, Bendire’s thrasher is not discussed further in this memo.

LeConte’s thrasher was scantily observed during various biological surveys conducted on site from 2018-2025 as documented in the Biological Resources Technical Report (**Draft EIR Appendix 5.4 BIG-1**). Single individual LeConte’s thrashers were incidentally observed at two distinct locations (see Figure 4.6-8C), once in 2023 and once in 2024. Standard industry practice is such that all species incidentally observed are recorded, even those that are not the target, during focused survey efforts at project sites. Only two observations were made over the course of 59 different surveys spanning seven years and throughout both the breeding and non-breeding seasons. Based

on two observations over this timeframe and the overall biological survey intensity, LeConte's thrashers can be characterized as infrequently occurring on the site. Nesting was not observed although the species was identified as having potential to nest on site. Given their secretive nature<sup>1</sup>, the most suitable habitat within/around the site is likely dense tamarisk scrub associated with the Mojave River corridor. This area will be largely avoided by the project; the southwestern lead track extension occurs adjacent to the Mojave River corridor but will result in only minor impacts on tamarisk scrub (Table 14 and Figure 5.2-1 of Appendix 5.4 BIG-1 of the DEIR). Hinkley Road bridge improvements are required within a small portion of the river corridor and could temporarily disturb potential nesting habitat. BIG's direct and indirect impacts on the species from construction and operations/maintenance have been evaluated and are discussed in **Draft EIR Appendix 5.4 BIG-1 Section 6.0: Impact Analysis**. This analysis remains valid despite the change in regulatory status since DEIR circulation. Existing mitigation measures have been clarified for the species to ensure avoidance and increase protection of potential nest sites in compliance with CESA requirements as discussed below.

### Mitigation

In line with CEQA precedent, MM BIG BIO-18 outlines appropriate mitigation and avoidance measures for special-status nesting bird species which are legally protected under the MBTA and CFGC as individuals and at active nest sites. This measure also protects the LeConte's thrasher from impacts and nest disturbance. Per the requirements of MM BIO-18, a qualified biological monitor will establish a suitable non-disturbance buffer around any active nests identified during the required pre-construction nesting bird survey based on the level of construction activity within the vicinity and sensitivity of the species observed. Accordingly, if observed during pre-construction nesting bird surveys, the candidate status of LeConte's thrasher would be considered in determining the buffer necessary to ensure there is no impact on LeConte's thrasher individuals or their nests, which would be enforced by biological monitors during construction.

To address the increased level of protection under CESA, MM BIG BIO-17 has been revised as provided below and included in the FEIR Errata to ensure complete avoidance of take of LeConte's thrasher and require consultation with CDFW if take would reasonably occur as a result of the project. The measure requires additional species-specific pre-construction surveys and more restrictive construction noise mitigation and monitoring for listed and candidate avian species to ensure full take avoidance as will be required under CESA for LeConte's thrasher.

Thus, changes to MM BIG BIO-17 are made below (deletions are shown in ~~strikethrough~~ and insertions are underlined).

*Southwestern Willow Flycatcher, ~~and Western Yellow-billed Cuckoo,~~ and LeConte's Thrasher*  
*Construction Requirements*

"MM BIG BIO-17: Construction activities within suitable southwestern willow flycatcher, ~~and western yellow-billed cuckoo,~~ and LeConte's thrasher nesting habitat should occur outside of the

<sup>1</sup> DTWG, the Desert Thrasher Working Group. 2018. *Survey Protocol and Habitat Evaluation for LeConte's and Bendire's Thrashers*.

breeding season (generally May 1 through August 31 for southwestern willow flycatcher and western yellow-billed cuckoo and late January to early June for LeConte's thrasher) when feasible. If construction activities must occur within the breeding season, any nesting habitat shall be removed prior to the breeding season.

If construction activities must occur within 500 feet of suitable ~~riparian~~ nesting habitat (i.e., near the Mojave River) and within the nesting season for southwestern willow flycatcher ~~and western yellow-billed cuckoo, and LeConte's thrasher~~, pre-construction surveys shall be conducted prior to construction activities that occur within 500 feet of suitable habitat. Results shall be provided to the City. A Species-Specific BM shall conduct pre-construction surveys for southwestern willow flycatcher, ~~and western yellow-billed cuckoo, and LeConte's thrasher~~ within 30 days prior to start of construction activities that occur within 500 feet of suitable habitat. The Species-Specific BM shall hold a USFWS recovery permit and be authorized by the agency to conduct pre-construction southwestern willow flycatcher surveys and/or western yellow-billed cuckoo surveys. The Species-Specific BM shall also conduct the pre-construction LeConte's thrasher survey in general accordance with the guidelines provided by the Desert Thrasher Working Group (2018, 2024) or other acceptable survey methodology that allows for thorough detection of nests (if any).

If southwestern willow flycatcher, ~~or western yellow-billed cuckoo, or LeConte's thrasher~~ is documented nesting within the BIG footprint during pre-construction surveys, no work shall occur within a 500-foot buffer of the nest and consultation with USFWS and CDFW shall occur (as applicable to the species under their jurisdiction), and additional measures may be implemented to avoid take. Federal and state incidental take permits may be required for proposed actions that are determined to have adverse effects on southwestern willow flycatcher, ~~or western yellow-billed cuckoo, and/or LeConte's thrasher~~.

If southwestern willow flycatcher, ~~or western yellow-billed cuckoo, and/or LeConte's thrasher~~ nesting behavior and/or breeding territories are documented within 500 feet of construction activities during pre-construction surveys and construction activities must proceed during the nesting season, no work shall occur within a 500-foot buffer of the nest and construction noise shall be monitored and minimized per a Wildlife Noise Study and Monitoring Plan to be implemented with DB oversight. Prior to and during construction, noise monitoring shall be conducted within suitable ~~riparian~~ nesting habitat contiguous with occupied territories at the vegetation limit closest to impact area. Noise limits are only applicable to the occupied nest habitat and suitable contiguous ~~riparian~~ nesting vegetation determined to be part of the nesting territory. Noise monitoring shall be conducted by a qualified noise specialist on coordination with a Species-Specific BM. While conducting noise monitoring, the BM shall monitor the active nests to allow normal breeding behaviors to not be indirectly impacted by noise from construction activities.

Construction noise levels shall not exceed pre-construction ambient levels or a 70 dBA hourly average, whichever is greater, in habitat occupied by nesting southwestern willow flycatcher, ~~and western yellow-billed cuckoo, and LeConte's thrasher~~ unless authorized by the appropriate regulatory authorities (i.e., CDFW and/or USFWS). Construction activities that exceeded noise



limits in the nest territory would be adjusted to reduce noise to below pre-construction ambient levels, a 70dBA hourly average, or the agency-approved threshold. Alternatively, noise attenuation measures shall be implemented to reduce noise within occupied southwestern willow flycatcher, ~~and/or~~ western yellow-billed cuckoo, and/or LeConte's thrasher breeding territories to below the limit. Measures may include installation of sound barriers or walls, phasing of equipment use, changes in scheduling, and temporary avoidance of certain portions of the impact area. Noise monitoring shall be conducted when attenuation measures are implemented to document a successful or unsuccessful reduction in noise to below the established threshold. If such adjustments or measures are not feasible and noise levels are found to result in average hourly noise levels greater than 70 dBA or pre-construction ambient levels, whichever is greater, work would be postponed until after the breeding season or after the southwestern willow flycatcher, ~~and/or~~ western yellow-billed cuckoo, and/or LeConte's thrasher fledglings are no longer dependent on the affected breeding territory, as confirmed by a qualified biologist unless authorized by the appropriate regulatory authorities (i.e., CDFW and/or USFWS). A noise level verification report shall be submitted by the implementing entity to CDFW and/or USFWS every two weeks during work that required noise monitoring for listed or candidate species as described above."

## Conclusion

The Biological Resources Errata to the Barstow International Gateway (BIG) Draft EIR reflects minor technical refinements to the regulatory status of the species which changed during the period of environmental review. These revisions do not change the overall analytical methodology, significance determinations, or conclusions presented in the Draft EIR, but instead clarify regulatory changes that occurred after circulation of the environmental document for resources that were adequately analyzed and will be mitigated.

Collectively, these Errata revisions result in minor adjustments to mitigation measures but do not alter the scope of the analysis, the environmental impact conclusions, or the mitigation and compliance framework presented in the Draft EIR. The revisions constitute clarifications and technical updates to information already disclosed and analyzed, rather than the introduction of new project components, new biological resource impacts, or a new analytical approach. Accordingly, the Biological Resources Errata does not constitute "new information" under CEQA Guidelines §15088.5, as it does not show new significant impacts, substantially increase the severity of identified impacts, or identify new feasible mitigation measures previously unavailable.