Attachment F: Air Quality Technical Report

1.0 Introduction

The DesertXpress Enterprises, LLC XpressWest High-Speed Train Project (Project) entails construction and operation of a high-speed passenger train system between Apple Valley, California, and Las Vegas, Nevada. The Project was originally evaluated in the following documents (collectively referenced as the DesertXpress Environmental Impact Statement [EIS]):

- March 2009 *Draft Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train* (DesertXpress DEIS)
- April 2010 *Supplemental Draft Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train* (DesertXpress SEIS)
- March 2011 *Final Environmental Impact Statement and 4(f) Evaluation for the proposed DesertXpress High-Speed Passenger Train Victorville, California to Las Vegas, Nevada* (DesertXpress FEIS)

The Federal Railroad Administration (FRA) issued the Record of Decision DesertXpress High-Speed Passenger Train (DesertXpress ROD) in July 2011.

This technical report describes the potential changes to air pollutant and greenhouse gas (GHG) emission impacts with the modified Project.

2.0 Regulatory Updates

Section 3.11.1.1 of the DesertXpress DEIS and Section 3.11.1.2 of the DesertXpress FEIS include a discussion of regulatory framework related to air quality and GHG emissions. Regulations described in the DesertXpress EIS are the same as those evaluated in this Reevaluation, except for the discussion of the National Ambient Air Quality Standards (NAAQS) under the Clean Air Act (CAA). Revisions to the NAAQS are discussed below, as well as additional regulations that have been adopted or revised since publication of the DesertXpress EIS that are relevant to the air quality and GHG emissions impact analysis for this Reevaluation.

2.1 FEDERAL

No changes to the following Federal regulations have been identified that would alter the discussion from the DesertXpress EIS. The information from the DesertXpress EIS on these regulations is therefore incorporated by reference:

- CAA
  - Transportation Conformity Rule
  - General Conformity Rule
  - Final Conformity Rule 40 Code of Federal Regulations (CFR) Parts 51 and 93
- National Park Service Air Quality Management Policy 2006

The following plans, policies, and regulations have been adopted or updated since publication of the DesertXpress EIS.

CLEAN AIR ACT OF 1970, AMENDMENTS OF 1990

Since the publication of the DesertXpress EIS, the United States Environmental Protection Agency (EPA) revised the Federal 8-hour ozone standard from 0.075 parts per million (ppm) to 0.070 ppm in 2015. The Federal annual standard for particulate matter that have a diameter of less than 2.5 micrometers ($PM_{2.5}$) was revised from 15 micrograms per cubic meter ($\mu g/m^3$) to 12.0 $\mu g/m^3$, also in 2015. Finally, the Federal primary[1] annual and 24-hour sulfur dioxide (SO_2) standards were revoked and replaced by a 1-hour standard of 75 parts per billion (ppb). Each of these Federal standard revisions have resulted in more health protective standards. Table 2.1-1 summarizes the current NAAQS and corresponding state standards for California and Nevada. New and/or changes to applicable state regulations are discussed later in this memorandum.

Table 2.1-1 Federal and State Ambient Air Quality Standards

		State Standards		NAAQS[1]	
Criteria Pollutant	**Average Time**	**California**	**Nevada**	**Primary**	**Secondary**
Ozone	1-hour	0.09 ppm	None	None[2]	None[2]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm	0.070 ppm
Respirable Particulate Matter (PM_{10})	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
	Annual mean	20 $\mu g/m^3$	None	None	None
Fine Particulate Matter ($PM_{2.5}$)	24-hour	None	35 $\mu g/m^3$	35 $\mu g/m^3$	35 $\mu g/m^3$
	Annual mean	12$\mu g/m^3$	12$\mu g/m^3$	12.0 $\mu g/m^3$	15 $\mu g/m^3$
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	35 ppm	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	0.100 ppm	None
Sulfur Dioxide[3]	Annual mean	None	None	0.030 ppm	None
	24-hour	0.04 ppm	None	0.014 ppm	None
	3-hour	None	0.5 ppm	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	0.075 ppm	None
Lead	30-day Average	1.5 $\mu g/m^3$	None	None	None
	Calendar quarter	None	None	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
	3-month average	None	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$

[1] Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Criteria Pollutant	Average Time	State Standards		NAAQS[1]	
		California	Nevada	Primary	Secondary
Sulfates	24-hour	25 µg/m^3	None	None	None
Visibility-Reducing Particles	8-hour	--[4]	None	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None	None

Source: CARB 2016; NDEP 2019.
[1] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.
[2] The Federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.
[3] The annual and 24-hour NAAQS for SO_2 only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.
[4] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.
ppm= parts per million; µg/m^3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards

FEDERAL GREENHOUSE GAS EMISSIONS LEGISLATION

As of 2020, no Federal overarching law specifically related to climate change or the reduction of GHG emissions exists. Under the Obama Administration, EPA had been developing regulations under the CAA pursuant to EPA's authority under the act.[2] There have also been settlement agreements between EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as the EPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding." EPA has also adopted a Mandatory Reporting Rule and Affordable Clean Energy Rule (ACE). Under the ACE, EPA establishes emission guidelines for states to use when developing plans to limit carbon dioxide (CO_2) emissions at their coal-fired electric generating units.

In addition, the Council on Environmental Quality (CEQ) has published draft guidance on how to address GHG emissions in National Environmental Policy Act analyses and documentation. Original guidance entitled *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* was issued by CEQ on August 1, 2016. However, this guidance was withdrawn via Executive Order (EO) 13783, *Promoting Energy Independence and Economic Growth*, which was issued on March 28, 2017. CEQ published revised guidance in June 2019, which would replace the original guidance, if adopted.

2.2 STATE OF CALIFORNIA

No changes to the following California state regulations have been identified that would alter the discussion from the DesertXpress EIS. The information from the DesertXpress EIS on these regulations is therefore incorporated by reference.

- California Clean Air Act (1998)
- EO S-3-05 (2005)
- Assembly Bill (AB) 32 (2006)
- EO S-01-07 (2007)

[2] In *Coalition for Responsible Regulation, Inc., et al. v. EPA*, the United States Court of Appeals upheld EPA's authority to regulate GHG emissions under the Clean Power Plan.

The following plans, policies, and regulations have been adopted or updated since publication of the DesertXpress EIS.

ADVANCED CLEAN CAR PROGRAM (2012)

In 2012, the California Air Resources Board (CARB) adopted a set of regulations to control emissions from passenger vehicles, collectively called Advanced Clean Cars. Advanced Clean Cars, developed in coordination with the EPA and National Highway Traffic Safety Administration (NHTSA), combined the control of smog-causing criteria pollutants and GHG emissions into a single coordinated package of regulations: the Low-Emission Vehicle III regulation for criteria (LEV III Criteria) and GHG (LEV III GHG) emissions, and a technology forcing mandate for zero-emission vehicles (ZEV).

EXECUTIVE ORDER B-16-12 (2012)

EO B-16-12 orders State entities under the direction of the Governor, including CARB, the California Energy Commission (CEC), and the California Public Utilities Commission (CPUC), to support the rapid commercialization of zero-emission vehicles. It directs these entities to achieve various benchmarks related to zero-emission vehicles.

SENATE BILL 350 (2015)

Senate Bill (SB) 350 (De León, also known as the "Clean Energy and Pollution Reduction Act of 2015") was approved by the California legislature in September 2015 and signed by Governor Brown in October 2015. Its key provisions are to require the following by 2030: (1) a Renewable Portfolio Standard (RPS) of 50 percent and (2) a doubling of efficiency for existing buildings.

SENATE BILL 32, CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006: EMISSIONS LIMIT, AND ASSEMBLY BILL 197, STATE AIR RESOURCES BOARD, GREENHOUSE GASES, REGULATIONS (2016)

SB 32 (Pavley) bill requires CARB to ensure that statewide GHG emissions are reduced to at least 40 percent below the 1990 level by 2030, consistent with the target set forth in EO B-30-15. The bill specifies that SB 32 would only become operative with the passage AB 197 on or before January 1, 2017. Passed in 2016, AB 197 creates requirements to form the Joint Legislative Committee on Climate Change Policies; requires CARB to prioritize direct emission reductions from stationary sources, mobile sources, and other sources and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit; requires CARB to prepare reports on sources of GHGs, criteria air pollutants, and toxic air contaminants; establishes 6-year terms for voting members of CARB; and adds two legislators as non-voting members of CARB.

CARB approved the *2017 Climate Change Scoping Plan Update* (CARB 2017) in December 2017, which builds on the programs set in place as part of the previous Scoping Plan that was drafted to meet the 2020 reduction targets per AB 32. The 2017 Scoping Plan proposes meeting the 2030 goal by accelerating the focus on zero and near-zero technologies for moving freight, continued investment in renewables, greater use of low-carbon fuels including electricity and hydrogen, stronger efforts to reduce emissions of short-lived climate pollutants (methane [CH_4], black carbon, and fluorinated gases), further efforts to create walkable communities with expanded mass transit and other alternatives to traveling by car, continuing the cap-and-trade program, and ensuring that natural lands become carbon sinks to provide additional emissions reductions and flexibility in meeting the target. The Scoping Plan Update also recommends that local governments aim to achieve community-wide efficiency of 6 $MTCO_2e$ per capita by 2030 and 2 $MTCO_2e$ per capita by 2050 to be used in local climate action planning.

These efficiency targets would replace the "15 percent from 2008 levels by 2020" approach recommended in the initial Scoping Plan.

SENATE BILL 100 (2018)

SB 100 (De León, also known as the "California Renewables Portfolio Standard Program: emissions of greenhouse gases") was approved by the California legislature and signed by Governor Brown in September 2018. The bill increases the RPS requirement in 2030 from 50 percent to 60 percent and establishes a goal of 100 percent RPS by 2045.

EXECUTIVE ORDER B-55-18 (2018)

EO B-55-18 was approved by the California legislature and signed by Governor Brown in September 2018. The order establishes a statewide goal to achieve carbon neutrality no later than 2045, and to achieve and maintain net negative emissions thereafter. While this EO has not been codified in law, the EO directs CARB to ensure future climate change scoping plans identify and recommend measures to achieve the carbon neutrality goal.

2.3 STATE OF NEVADA

No changes to the following Nevada state regulations have been identified that would alter the discussion from the DesertXpress EIS. The information from the DesertXpress EIS on these regulations is therefore incorporated by reference.

- SB 324
- Nevada Greenhouse Gas Emission and Climate Change Regulations (2007)

2.4 LOCAL

No changes to the following local regulations have been identified that would alter the discussion from the DesertXpress EIS. The information from the DesertXpress EIS on these regulations is therefore incorporated by reference.

- Mojave Desert Air Quality Management District: Rule 403.2
- Clark County Department of Air Quality and Environmental Management: Section 94 of Clark County Air Quality Guidelines

3.0 Affected Environment

Section 3.11.1.1 of the DesertXpress FEIS, and Section 3.11.1.3 of the DesertXpress DEIS include a discussion of affected environment related to air quality and GHG emissions. As with the Project design evaluated in the DesertXpress EIS, the modified Project would be located in both the Mojave Desert Air Quality Management District (MDAQMD) in California and the Clark County Department of Environment and Sustainability (DES) (formerly the Clark County Department of Air Quality and Environmental Management district in Nevada. Most affected environment information on these two air basins is consistent with what was originally provided in the DesertXpress EIS, except for updates to basin ambient air quality and Federal attainment status. Below is a summary of the relevant changes that have occurred in the air basins since adoption of the DesertXpress EIS.

The nearest ambient air monitoring station to the Dale Evans Station and Operations Maintenance and Storage Facility (OMSF) site is the MDAQMD Victorville Monitoring Station at Park Avenue (CARB Site

36306). Table 3.1-1 outlines the ambient air quality conditions at the Dale Evans Station and OMSF site for the last three years of available data.

Table 3.1-1 Summary of Air Quality Data at Victorville, Park Avenue Station

Pollutant	2016	2017	2018
8-Hour Ozone (O_3)			
State Maximum Concentration (ppm)	*	*	*
National Maximum Concentration (ppm)	0.085	0.081	0.096
National 4th Highest Concentration (ppm)	0.081	0.079	0.087
Number of days standard exceeded			
NAAQS 8-hour (>0.070 ppm)	33	17	55
Carbon Monoxide (CO)			
Maximum Concentration 8-hour Period (ppm)	2.6	1.2	1.1
Number of days standard exceeded			
NAAQS 8-hour (≥9 ppm)	0.0	0.0	0
Nitrogen Dioxide (NO_2)			
Maximum 1-hour Concentration (ppm)	0.097	0.057	0.051
Annual Average Concentration (ppm)	0.010	0.012	0.011
Number of Days Standard Exceeded			
NAAQS 1-Hour (>0.100 ppm)	0.0	0.0	0
Respirable Particulate Matter (PM_{10})			
National Maximum 24-hour Concentration	226.5	182.5	165.2
State Annual Average Concentration (CAAQS = 20 µg/m³)	*	*	*
Number of Days Standard Exceeded			
NAAQS 24-hour (>150 µg/m³)–*Estimated Days*	1.9	1.0	1.0
Fine Particulate Matter ($PM_{2.5}$)			
National Maximum 24-hour Concentration (µg/m³)	41.5	27.2	32.7
24-hour Standard 98th Percentile (µg/m³)	18.4	19.6	17.0
National Annual Average Concentration (NAAQS = 12 µg/m³)	7.4	8.7	7.9
Number of Days Standard Exceeded			
NAAQS 24-Hour (>35 µg/m³)	1	0	0
Sulfur Dioxide (SO_2)			
Maximum 1-hour Concentration (ppb)	5.7	28.3	9.9
Annual Average Concentration (ppb)	0.58	0.73	1.12
Number of Days Standard Exceeded			
NAAQS 1-Hour (>75 ppb)	0.0	0.0	0

Sources: CARB 2019; EPA 2019a. Data compiled by ICF.
Note: an exceedance does not necessarily equal a violation.
ppm= parts per million; µg/m³ = micrograms per cubic meter; * = insufficient data.

The nearest ambient air monitoring station to the Warm Springs Station site is the Ducharme Avenue Monitoring Station (EPA site 32-003-0071). Because the Ducharme station does not collect data for all criteria pollutants, the Sunrise Acres and Sunrise Monitoring Stations were used to supplement the ambient air quality data (EPA sites 32-003-0561, and 32-003-0540, respectively). Table 3.1-1 outlines the ambient air quality conditions near the Warm Springs Station site for the last 3 years of available data.

Table 3.1-2 Summary of Air Quality Data at Clark County-Ducharme Avenue Monitoring Station, Sunrise Acres Monitoring Station, and Sunrise Manor Monitoring Station (EPA sites 32-003-0071, 32-003-0561, and 32-003-0540)

Pollutant	2016	2017	2018	2019
1-Hour Ozone (O_3) Ducharme				
Maximum Concentration (ppm)	0.094	0.095	0.09	0.087
8-Hour Ozone (O_3) Ducharme				
National Maximum Concentration (ppm)	0.077	0.087	0.079	0.077
National 4th Highest Concentration (ppm)	0.073	0.075	0.076	0.068
Number of days standard exceeded				
NAAQS 8-hour (>0.070 ppm)	7	13	21	1
Carbon Monoxide (CO) Sunrise Acres				
Maximum Concentration 8-hour Period (ppm)	2.5	2.8	3.6	2.5
Number of days standard exceeded				
NAAQS 8-hour (≥9 ppm)	3	0	0	0
Nitrogen Dioxide (NO_2) Sunrise Acres				
Maximum 1-hour Concentration (ppm)	0.057	0.065	0.069	0.064
Annual Average Concentration (ppm)	0.015	0.018	0.018	0.016
Number of Days Standard Exceeded				
NAAQS 1-Hour (>0.100 ppm)	0	0	0	0
Respirable Particulate Matter (PM_{10}) Sunrise Acres				
National Maximum 24-hour Concentration	330	83	133	98
Number of Days Standard Exceeded				
NAAQS 24-hour (>150 μg/m³)–*Estimated Days*	1	0	0	0
Fine Particulate Matter ($PM_{2.5}$) Sunrise Acres				
National Maximum 24-hour Concentration (μg/m³)	59.7	46.6	39	25.7
24-hour Standard 98th Percentile (μg/m³)	23	19	26	23
National Annual Average Concentration (NAAQS = 12 μg/m³)	10.7	8.5	8.9	7.1
Number of Days Standard Exceeded				
NAAQS 24-Hour (>35 μg/m³)	*	*	*	*

Pollutant	2016	2017	2018	2019
Sulfur Dioxide (SO_2) Sunrise Manor				
Maximum 1-hour Concentration (ppb)	6.4	6.3	6.2	5.3
Annual Average Concentration (ppb)	0.75	0.77	0.70	0.49
Number of Days Standard Exceeded				
NAAQS 1-Hour (>75 ppb)	0	0	0	0

Sources: EPA 2019b. Data compiled by ICF.
Note: an exceedance does not necessarily equal a violation.
ppm= parts per million; $\mu g/m^3$ = micrograms per cubic meter; * = insufficient data.

Since the publication of the DesertXpress EIS, PM_{10} has been updated for Clark County from Nonattainment, Serious to Attainment, Maintenance. Currently, both the Mojave Desert Air Basin (MDAB) and Clark County Area are designated Federal non-attainment for O_3, and the MDAB is also designated non-attainment for PM_{10}. Table 3.1-3 outlines the current attainment statuses for the MDAB and Clark County.

Table 3.1-3 Federal (NAAQS) Attainment Status for Mojave Desert Air Basin and Clark County

Pollutants	Mojave Desert Air Basin	Clark County
Ozone (O_3) – 8-hour standard	Nonattainment, Moderate	Nonattainment, Marginal
Inhalable Particulates (PM_{10})	Nonattainment, Moderate	Attainment, Maintenance*
Fine Particulates ($PM_{2.5}$)	Attainment/Unclassified	Attainment
Carbon Monoxide (CO)	Attainment/Unclassified	Attainment, Maintenance
Nitrogen Dioxide (NO_2)	Attainment/Unclassified	Attainment
Sulfur Dioxide (SO_2)	Attainment/Unclassified	Attainment

Source: MDAQMD 2019; EPA 2019a.
* indicates status that has been updated since the FEIS

The threshold values outlined in Table 3.1-4 are still current and would establish levels above which a significant impact would occur pertaining to air quality.

Table 3.1-4 Threshold Values Used to Determine Impact Significance

Pollutant	Area's Attainment Status	Conformity Rule *De Minimis* Levels in Tons (Metric Tons)/Year
O_3 (VOCs or NOx)	Nonattainment—serious	50 (45)
	Nonattainment—severe	25 (23)
	Nonattainment—extreme	10 (9)
	Nonattainment—outside an O_3 transport region	100 (91)
	Nonattainment—moderate/marginal inside an O_3 transport region	50/100 (45/91) (VOC/NOx)
	NOx maintenance	100 (91)
	VOC maintenance—outside O_3 transport region	100 (91)
	VOC maintenance—inside O_3 transport region	50 (45)

Pollutant	Area's Attainment Status	Conformity Rule *De Minimis* Levels in Tons (Metric Tons)/Year
CO	Nonattainment—all	100 (91)
	Maintenance	100 (91)
$PM_{10}/PM_{2.5}$	Nonattainment—moderate	100 (91) / 100 (91)
	Nonattainment—serious	70 (64) / 100 (91)
	Maintenance	100 (91) / 100 (91)

4.0 Impact Evaluation Methodology

4.1.1 CONSTRUCTION

As determined in the DesertXpress EIS, construction of the Project would generate emissions of air quality pollutants including VOC, NO_2, CO, SO_2, and particulate matters (PM_{10} and $PM_{2.5}$); as well as the GHG pollutants that include CO_2, CH_4, and nitrous oxide (N_2O). Temporary construction effects related to air quality and GHG emissions would result from use of off-road equipment used for structure demolition, site clearing, asphalt paving, and application of architectural coatings, as well as mobile emissions from haul truck trips and worker commute trips.

In the DesertXpress EIS analysis, temporary effects from air quality and GHG emissions during construction were estimated using CalEEMod[3] (version 2011.1) software model, which uses OFFROAD2007 emission factors. Construction was apportioned into the three alignment profiles: at-grade, on-structure (e.g. bridges or viaducts), and tunnels. At-grade construction would require clearing grub, selecting fill, ballast delivery and placement, and track laying. On-structure construction would involve piling drilling, beam fabrication, pile cap excavation, column pouring, pile cap pouring, column crosspiece, and beam placement. Construction activities required for tunneling include portal excavation, tunnel boring, ring installation, and portal shoring.

It was assumed that construction would begin in 2010, would last approximately 3 years, and would be completed no later than 2013. To provide a conservative estimate of construction emissions, it was assumed that construction of both terminus stations and track installation would occur concurrently. Emissions were estimated assuming implementation of fugitive dust control measures as outlined in MDAQMD Rule 403.2, and Section 94 of the Clark County Air Quality Guidelines.

Because construction of the modified Project is expected to be less intense than the assumptions from the DesertXpress EIS (as discussed in Section 5.1.2, Summary of Effects from the Project Modifications), the air quality and GHG emissions impacts were evaluated by assessing the magnitude of change in construction assumptions as a result of the modified Project.

4.1.2 OPERATIONS

Similar to the Preferred Alternative evaluated in the DesertXpress EIS, the Project modifications would adopt fully electric locomotive technology for passenger train propulsion. While the Project

[3] The California Emissions Estimator Model® (CalEEMod) is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas emissions associated with both construction and operations from a variety of land use projects. The model was developed for the California Air Pollution Officers Association in collaboration with the California Air Districts.

modifications would result in a shorter alignment than the Project evaluated in the DesertXpress EIS (shown in Table 5.1-1), the Project modifications include an updated operations plan with a revised schedule of daily train trips. Electricity to power trains would be drawn from the existing electric utility power grid, and the natural gas fired power plants used to electrify the grid would generate criteria pollutant and GHG emissions off site. Criteria pollutant and GHG emissions related to electricity demand under the modified Project were calculated and compared to the energy demand-related criteria pollutant and GHG emissions determined in the DesertXpress EIS.

Similar to the Preferred Alternative that was evaluated in the DesertXpress EIS, mode-shift from passenger vehicles to XpressWest train travel is anticipated, which would divert automobile trips along the I-15 freeway between the southern California region and Las Vegas. As such, vehicle miles traveled (VMT) and related criteria pollutant and GHG emissions would be reduced from implementation of the modified Project. This is consistent with the conclusion of the DesertXpress EIS.

With respect to localized toxic air contaminant (TAC) emissions and human health risks, there would be no new TAC emissions sources under the modified Project. Electric power demands would be met using the existing electricity power grid. This is consistent with the conclusion outlined in the DesertXpress EIS.

The DesertXpress EIS evaluated the potential for CO hotspots at congested intersection locations. This is because the highest CO concentrations are generally found close to congested intersection locations. Under typical meteorological conditions, CO concentrations tend to decrease as the distance from the emissions source (i.e., congested intersection) increases. The CO hotspot analysis presented in the DesertXpress EIS concluded that Project-related traffic volumes associated with ingress/egress to the passenger stations in Apple Valley and Las Vegas would not have the potential to create local area CO concentrations that exceed NAAQS (i.e., lead to the formation of CO hotspots). The comparison of CO concentrations presented in the DesertXpress EIS to current CO concentrations is provided below.

5.0 Effects Analysis for Air Quality

Below is a summary of the air quality and GHG emission effects related to construction of the modified Project compared to the analysis conducted in the DesertXpress EIS.

5.1.1 SUMMARY OF PREVIOUS FINDINGS

CONSTRUCTION

Temporary construction activities related to the Preferred Alternative were estimated for the approximately 3-year construction period and were compared to the General Conformity *de minimis* thresholds for the MDAB and Clark County. Before mitigation, construction in the MDAB would have exceeded *de minimis* thresholds for VOC, NOx, and PM_{10}, and construction in Clark County would have exceeded *de minimis* thresholds for NOx and CO. As a result, mitigation measures were prescribed to reduce construction period criteria air pollutant emissions to below the general conformity *de minimis* thresholds. These measures, which are listed in Section 6.0, Mitigation Measures*,* would require adherence to regional fugitive dust (PM_{10}) control measures, use of off-road construction equipment that meet EPA Tier 4 standards, and use of paints and solvents that produce low levels of volatile organic compounds.

After applying the emission reductions from the Project-specific mitigation measures, temporary construction period emissions were found to be below General Conformity *de minimis* thresholds and

therefore, the temporary effects from the Preferred Alternative were found to be less than significant with no residual impact.

5.1.2 SUMMARY OF EFFECTS FROM THE PROJECT MODIFICATIONS

CONSTRUCTION

The modified Project would substantially reduce the amount of elevated track and eliminate the need for tunneling. Table 5.1-1 outlines the rail alignment design, including length of each section type, for both the Project as evaluated in the DesertXpress EIS and the modified Project.

Table 5.1-1 Summary of Track Components for Previous Design and Modified Project (miles)

Project Component	Assumptions	
	DesertXpress EIS Preferred Alternative	Project Modifications
At-Grade Track Length	117 miles	167.5 miles
Elevated Track Length	57 miles	1.5 miles
Tunnel Length	2.3 miles	0 miles
Double Track Length	176.3 miles	150.0 miles
Single Track Length	0.0 mile	19.0 miles
Total Track Length	176.3 miles	169.0 miles

As shown in Table 5.1-1, the total rail alignment length for the modified Project is 7.3 miles less than what was proposed for the DesertXpress EIS design. In addition, there would be a 55.5-mile reduction in elevated track length, an elimination of tunneling, and a 26.3-mile reduction in double track length. These reductions would substantially reduce the level of construction effort and intensity needed to construct the modified Project when compared to the Project evaluated in the DesertXpress EIS.

The modified Project is still anticipated to take approximately three years to construct. Although the anticipated construction timeframe has not changed, the reduced level of construction activity and intensity would result in fewer air pollutants and GHG emissions generated during the construction period relative to the Preferred Alternative analyzed in the DesertXpress EIS. Consistent with the finding in the DesertXpress EIS, emissions from the modified Project would not exceed General Conformity *de minimis* levels in either air basin.

As with the construction of the Project under the DesertXpress EIS's assumptions, the emissions associated with the modified Project would be temporary (i.e. limited to the construction period) and would cease when construction activities are complete. However, because the emissions intensity of equipment and trucks varies by year and trend down over time due to fleet turnover (i.e., emission factors for construction equipment were higher in 2011 than current emissions expected in 2020), it is expected that emissions from individual pieces of off-road equipment, passenger vehicles, and trucks would be cleaner and emit fewer criteria pollutants and GHGs during construction of the modified Project than construction under 2011 conditions assumed in the DesertXpress EIS.

Finally, as outlined above in Section 2.0, Regulatory Requirements, several Federal and state plans, policies, regulations, and EOs have been introduced that clarify new, or expand upon previous air quality and GHG emission reduction goals. The benefits of these regulations and policies to the emissions

generated during modified Project construction would be realized throughout the construction period. This represents an additional emission reduction from the emissions estimated in the DesertXpress EIS. Thus, the Project modifications would not result in substantial changes in the evaluation of construction-period air quality impacts of the DesertXpress EIS.

OPERATIONS

As discussed above in Section 4.1.2, impacts related to TAC emissions would be similar for the Project modifications when compared to the Preferred Alternative as outlined in the DesertXpress EIS. As such, this evaluation focuses on the criteria pollutant and GHG emissions related to the modified Project's energy demand, and the potential for CO hotspot formation.

Energy Demand Emissions

Passenger train operation would require approximately 9,100 kilowatt hours (kWh) per round trip. Under the modified Project, service would start with 25 round trips per day but would escalate to a maximum of 49 round trips per day by the modified Project buildout year in 2042. Based on the modified Project buildout level of train activity, annual electricity demand would be approximately 162,753,500 kWh. The criteria pollutant and GHG emissions related to this level of electricity generation were calculated using emissions factors from the EPA's Emissions and Generation Resource Integrated Database (eGRID). Emissions estimates are presented below in Table 5.1-2.

Table 5.1-2 Comparison of DesertXpress EIS and Modified Project Emissions at Build Out

	Tons per Year Emissions		
	CO_2e	NO_X	SO_2
DesertXpress EIS Project Electricity Generation Emissions	75,122	118	12
Modified Project Electricity Generation Emissions	38,208	39	5
Net Change	(36,914)	(79)	(7)

As shown in Table 5.1-2, criteria pollutant and GHG emissions under the modified Project would be reduced when compared to the emissions evaluated in the DesertXpress EIS. This reduction is primarily the result of the higher contribution that renewable energy sources contribute to electricity grid electrification under current conditions, when compared to years past. Project modifications would not result in substantial changes in the evaluation of operational air quality impacts of the DesertXpress EIS.

Carbon Monoxide Concentrations

Local CO concentrations are a function of three variables: mobile-source emissions factors, ambient background CO concentrations, and intersection level of service (LOS).[4] Over the past several decades, mobile-source CO emissions have decreased considerably for two reasons. First, new vehicles are required to meet more stringent Federal CO emissions standards; and second, older more polluting vehicles retire from the vehicle fleet over time. As mobile source emissions rates decrease over time, as does ambient background CO concentrations. This is because automobile exhaust is the primary source of urban area CO emissions.

[4] CO concentrations worsen as intersection LOS deteriorates from LOS A to LOS F.

Table 5.1-3 provides a summary of CO concentrations as evaluated in the DesertXpress EIS, as well as past and current ambient background CO concentrations. Shown therein, the worst-case with Project 1-hour and 8-hour CO concentrations did not exceed their applicable NAAQS.

Table 5.1-3 Summary of Project CO Concentrations in Parts per Million

	Victorville		Las Vegas	
	1 Hour	8 Hour	1 Hour	8 Hour
DesertXpress EIS Project Concentration	4.3	2.8	9.5	6.1
NAAQS	35.0	9.0	35.0	9.0
Concentration Percent of NAAQS	12 percent	31 percent	27 percent	68 percent
DesertXpress EIS Background Concentration	2.6	1.6	7.0	4.2
2018 Background Concentration	1.4	1.1	4.4	3.6
Percent Change	-46 percent	-31 percent	-37 percent	-14 percent

As shown in Table 5.1-3, there has been a reduction in the worst-case 1-hour and 8-hour CO ambient background concentrations of 37 percent and 14 percent, respectively, since publication of the DesertXpress EIS. This is relevant because ambient background CO concentrations account for 60 to 70 percent of total CO concentrations. The ambient background CO concentration reductions have occurred in light of local VMT and congestion increases.

The DesertXpress EIS evaluated localized CO emissions at intersections surrounding the proposed Victorville and Las Vegas stations based on the concern that increased automobile trips associated with the Project could result in increased CO emissions. The DesertXpress EIS determined that, with implementation of the Project, intersections surrounding the proposed station locations would operate at LOS A to E. Even with intersection operations at LOS E, the DesertXpress EIS concluded that no exceedance of localized 1-hour or 8-hour CO standards would occur. The Project modifications proposes new station locations in Apple Valley and Las Vegas that would affect previously unevaluated intersections. Two intersections providing access to the Dale Evans Station and OMSF site from the I-15 freeway are identical to the intersections modeled in the DesertXpress EIS analysis. However, four new intersections would provide access to the Dale Evans Station and OMSF, and were not evaluated in the DesertXpress EIS. These four new intersections would operate at LOS B or C, which is commensurate with the LOS anticipated at the six original intersections that provided access to the previous Victorville Station site evaluated in the DesertXpress EIS.[5]

The Las Vegas intersection locations adjacent to the Warm Springs Station site are different from those evaluated in the DesertXpress EIS. However, the Las Vegas intersections evaluated in the DesertXpress EIS analysis would operate at LOS E and F, which is commensurate with the intersection LOS anticipated at the proposed Warm Springs Station site.

Overall, congestion at local intersections surrounding the Dale Evans Station and OMSF site and Warm Springs Station site would be similar or below estimated congestion associated with the original

[5] Of the six Victorville station access intersections evaluated in the DesertXpress EIS, two intersections operated at LOS A, two intersections operated at LOS B, one intersection operated at LOS C, and one intersection operated at LOS E.

Victorville and Las Vegas station locations. Thus, the modified station locations would not result in increased CO emissions relative to the DesertXpress analysis. Since traffic on local streets resulting from the modified station sites would not result in substantially worse congestion that conditions evaluated in the DesertXpress EIS, and CO emissions factors and ambient background CO concentrations have decreased since the DesertXpress EIS assessment, the Project modifications would not result in operational CO hotspot formation conditions. This condition is consistent with DesertXpress EIS determination.

6.0 Mitigation Measures

6.1 CONSTRUCTION

Given that construction-period emissions are likely to result from similar sources as those analyzed in the DesertXpress EIS, the regulatory requirements and mitigation measures proposed in the DesertXpress EIS are still applicable to the modified Project. The Project-specific mitigation measures outlined below from the DesertXpress EIS do not require modification and shall be carried forward into the Project modifications to ensure feasible measures to address criteria air pollutants are implemented.

Mitigation Measures AQ-2 and AQ-4 from the DesertXpress EIS are not applicable to the Project modifications because these measures were specific to a diesel locomotion technology alternative that is no longer part of the modified Project.

Mitigation Measure AQ-1: Fugitive Dust Control Plan during Construction to Meet MDAQMD Rule 403.2 Requirements

Consistent with the MDAQMD Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), the following control measures shall be implemented by ~~the Applicant~~ DesertXpress Enterprises, LLC:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
- Take actions sufficient to prevent Project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Clean up Project-related trackout or spills on publicly maintained paved surfaces within 24 hours; and
- Reduce nonessential earth-moving activity under high wind conditions. A reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

Alternatively, DesertXpress Enterprises, LLC can elect to apply for and obtain an MDAQMD-approved Alternative PM10 Control Plan that incorporates emission reducing measures other than those defined above, as long as it generates equivalent emission reductions and is obtained pursuant to the requirements outlined in MDAQMD Rule 403.2.

Mitigation Measure AQ-3: Fugitive Dust Control Plan during Construction to Meet Clark County ~~DAQEM~~ DES Requirements

Consistent with Section 94 of Clark County Air Quality Guidelines, ~~the Applicant~~ DesertXpress Enterprises, LLC shall compile a Dust Mitigation Plan that is consistent with measures identified in the ~~DAQEM~~ DES Construction Activities Dust Control Handbook (included by reference in Section 94 of the Clark County Air Quality Regulations) and Desert Tortoise protective measures, and a Dust Control Permit shall be secured from the ~~DAQEM~~ DES. The Dust Control Plan may include the following measures, among other measures:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions;
- Take actions sufficient to prevent Project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Clean up Project-related trackout or spills on publicly maintained paved surfaces within 24 hours; and
- Reduce nonessential earth-moving activity under high wind conditions.

Mitigation Measure AQ-5: Utilize additional means to reduce construction period emissions of air pollutants.

~~The Applicant shall integrate the following control measures into approved design-build plans:~~ DesertXpress Enterprises, LLC shall demonstrate that construction-period emissions of criteria air pollutants will not exceed General Conformity *de minimis* thresholds by integrating control measures into approved design-build plans. Examples of control measures include the following:

- All off-road internal-combustion engine construction equipment shall be EPA Tier-4 certified.
- All signal boards shall be solar-powered.
- All architectural coatings products shall contain no more than 250 grams of VOC per liter of coating (2.08 pounds per gallon).
- For all work conducted within Clark County, only the following fuels shall be used to power off-road equipment:
    - A composite fuel blend consisting of at least 20 percent biodiesel.

6.2 OPERATIONS

The DesertXpress EIS identified no operational mitigation measures, as potential impacts were demonstrated to be less than significant under the fully electric technology option. Given that operational impacts for the Project as currently modified would be similar to the impacts determined in the DesertXpress EIS, no mitigation measures would be applied during Project operation.

7.0 References

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