APPENDIX C
AIR QUALITY EMISSIONS INVENTORY, CLIMATE, AND GHG SOCIAL COST

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C.1 CONSTRUCTION EMISSION INVENTORY

The U.S. Environmental Protection Agency (USEPA) sets National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The USEPA identifies the following seven criteria air pollutants for which NAAQS are applicable: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). The USEPA[1] describes these pollutants as "criteria" air pollutants because the agency regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels.

According to the USEPA, Bexar County is classified as in "attainment" for all criteria pollutants excluding 8-Hour Ozone (2015).[2] Bexar County is in Moderate classification for 8-Hour Ozone (2015), which is comprised of nitrogen oxide (NO_x) and volatile organic compounds (VOCs). All construction activity would occur in the EA's Project Study Area which is also an "attainment" area for all NAAQS excluding 8-Hour Ozone (2015).

This construction emission inventory (CEI) assessment was prepared for informational purposes to disclose the Proposed Project's potential construction-related air emissions. Construction of the Proposed Project is anticipated to occur in 2024 through 2027.

C.1.1 Construction Emissions Inventory Approach

Construction of the Proposed Project would include earthwork, grading, leveling, construction equipment storage, and movement activities that are sources of off-road, on-road, and fugitive dust emissions.

Non-road Emission Sources

Non-road sources associated with the Proposed Project's construction include exhaust from heavy construction equipment (e.g., cranes, dozers, and pavers) and fugitive dust emissions.

On-road Emission Sources

On-road emission sources associated with the Proposed Project's construction include material delivery vehicles (e.g., trucks carrying concrete or asphalt) and passenger vehicles transporting construction personnel to and from the job site.

[1] U.S. Environmental Protection Agency. Criteria Air Pollutants. Retrieved March 2024 from https://www.epa.gov/criteria-air-pollutants

[2] U.S. Environmental Protection Agency. Green Book: Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Retrieved March 2024 from https://www3.epa.gov/airquality/greenbook/anayo_tx.html

Fugitive Emissions

Paving or dust emission sources associated with the Proposed Project's construction include asphalt storage, material movement on paved and unpaved roads, soil handling, un-stabilized land, and wind erosion. Paving or dust emissions were based on the number of months for construction.

Construction emissions are estimated based on these factors: construction schedule; the number of construction vehicles and/or equipment; the types of construction vehicles and/or equipment; types of fuel used to power the equipment and vehicles; vehicle and equipment hourly activity/vehicle miles traveled; construction materials used and their quantities; and the duration of construction.

C.1.2 MOVES3/TexN2.2

The CEI used the EPA MOtor Vehicle Emissions Simulator 3 (MOVES3.1) to analyze the Proposed Project's potential on-road construction emissions and the Texas Commission on Environmental Quality (TCEQ) TexN2.2 to analyze the Proposed Project's potential non-road construction emissions.

C.1.2.1 Construction Emissions Inventory Inputs

The Proposed Project's construction components are shown in **Table C-1**. The Proposed Project's cost estimates and typical construction practices were used to develop the CEI inputs displayed in **Table C-2**, **Table C-3, Table C-4,** and **Table C-5**. Inputs were coordinated with construction management engineers and are based on engineering judgment and past experience with airport construction projects. These equipment types and hours were used in TexN2.2 to develop non-road emission factors for construction related equipment. MOVES3.1 emission factors and load factors were developed to determine the on-road emissions from the construction of the Proposed Project.

TABLE C-1: SAT TERMINAL C CONSTRUCTION COMPONENTS

Component Name	Project Type	Year	Months
D-1	Demolition of Existing ID Office	2025	5
D-2	Demolition of Hangar 4	2025	5
D-3	Demolition of Police Building	2025	5
D-4	Hangar 6	2025	5
D-5	Airside Operations Building	2025	5
D-6	FlightSafety International Facility	2025	5
A-2	Relocation of Remain Overnight (RON) Aircraft Parking (North Only)	2024-2025	13
A-1	Construction of Commercial Aircraft Apron	2024-2025	7
T-1	Construction of New Terminal/ TA-TB Connector	2024-2027	36
R-1	Airport Access Roadway Improvements	2026-2027	17
R-2	Terminal Curbside Roadway Improvements	2025-2027	23

S-1	New Public Safety Building	2024	6
S-2	Fuel Hydrant System and Transmission Lines	2025-2026	11
S-3	New Parking Structure and Ground Transportation Control (GTC)	2025-2027	20
S-4/U-1	New Tritulator/Central Utility Plant (CUP) Upgrades	2025-2026	17
S-5	Office Support Building	2024	6
S-7	Expansion of Economy Parking Lot	2024	6
U-2	Utility Corridor Upgrades	2025-2026	18

TABLE C-2: 2024 NON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
40 Ton Crane	Cranes	Diesel	300	240.0
Air Compressor	Other Construction Equipment	Diesel	100	439.1
Asphalt Paver	Pavers	Diesel	175	30.2
Backhoe	Tractors/Loaders/Backhoes	Diesel	100	2,244.39
Chain Saw	Concrete/Industrial Saw	Diesel	11	450.0
Chipper/Stump Grinder	Other Construction Equipment	Diesel	100	450.0
Concrete Ready-Mix Trucks	Off-Highway Trucks	Diesel	600	420.71
Concrete Saws	Concrete/Industrial Saw	Diesel	40	439.1
Concrete Truck	Off-Highway Trucks	Diesel	600	1,900.5
Curb/Gutter Paver	Pavers	Diesel	175	15.6
Dozer	Crawler Tractor/Dozers	Diesel	175	3,018
Dump Truck	Off-Highway Trucks	Diesel	600	716.4
Dump Truck (12 cy)	Off-Highway Trucks	Diesel	600	5,525.3
Excavator	Excavators	Diesel	175	670.5
Flatbed Truck	Off-Highway Trucks	Diesel	600	4.8
Fork Truck	Rough Terrian Forklifts	Diesel	100	6,644.49
Grader	Graders	Diesel	300	180.4
High Lift	Rough Terrian Forklifts	Diesel	100	1,360.1
Loader	Tractors/Loaders/Backhoes	Diesel	150	175.4
Man Lift	Rough Terrian Forklifts	Diesel	75	4,200.0
Man Lift (Fascia Construction)	Rough Terrian Forklifts	Diesel	75	144
Material Deliveries	Off-Highway Trucks	Diesel	600	68.0
Other General Equipment	Other Construction Equipment	Diesel	175	1284.6
Pickup Truck	Off-Highway Trucks	Diesel	600	4,805.0
Pumps	Other Construction Equipment	Diesel	11	150
Roller	Rollers	Diesel	100	1,691.1
Rubber Tired Loader	Tractors/Loaders/Backhoes	Diesel	175	439.1
Scraper	Scrapers	Diesel	600	731.3
Skid Steer Loader	Skid Steer Loaders	Diesel	75	44.6
Slip Form Paver	Pavers	Diesel	175	439.1
Surfacing Equipment (Grooving)	Other Construction Equipment	Diesel	25	477.8
Survey Crew Trucks	Off-Highway Trucks	Diesel	600	168.39
Tool Truck	Off-Highway Trucks	Diesel	600	1,543.65

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
Tractor Trailer- Material Delivery	Off-Highway Trucks	Diesel	600	1,077.59
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	Diesel	600	55.9
Tractor Trailers Temp Fac.	Off-Highway Trucks	Diesel	600	66.4
Tractors/Loader/Backhoe	Tractors/Loaders/Backhoes	Diesel	100	271
Vibratory Compactor	Plate Compactors	Diesel	6	31.1
Water Truck	Off-Highway Trucks	Diesel	600	2,880.0
Generator	Other Construction Equipment	Diesel	40	300
90 Ton Crane	Cranes	Diesel	300	320.1
Concrete Pump	Other Construction Equipment	Diesel	11	12.0
Trowel Machine	Other Construction Equipment	Diesel	600	12.0
			Total	**46,137.72**

Source: RS&H 2024.

TABLE C-3: 2025 NON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
40 Ton Crane	Cranes	Diesel	300	240.0
40 Ton Rough Terrain Crane	Cranes	Diesel	300	120.0
90 Ton Crane	Cranes	Diesel	300	4,801.27
Air Compressor	Other Construction Equipment	Diesel	100	66.7
Asphalt Paver	Pavers	Diesel	175	2.7
Backhoe	Tractors/Loaders/Backhoe	Diesel	100	3,917.77
Bob Cat	Tractors/Loaders/Backhoe	Diesel	75	3,572.2
Caisson Drilling Rig	Bore/Drill Rigs	Diesel	600	120.0
Chain Saw	Concrete/Industrial Saw	Diesel	11	1.2
Chipper/Stump Grinder	Other Construction Equipment	Diesel	100	1.2
Concrete Pump	Other Construction Equipment	Diesel	11	269.99
Concrete Ready Mix Trucks	Off-Highway Trucks	Diesel	600	959.25
Concrete Saws	Concrete/Industrial Saw	Diesel	40	66.7
Concrete Truck	Off-Highway Trucks	Diesel	600	661.38
Curb/Gutter Paver	Pavers	Diesel	175	7.8
Distributing Tanker	Off-Highway Trucks	Diesel	600	403.5
Dozer	Crawler Tractor/Dozers	Diesel	175	877.1
Dump Truck	Off-Highway Trucks	Diesel	600	4,749.9
Dump Truck (12 cy)	Off-Highway Trucks	Diesel	600	39.2
Excavator	Excavators	Diesel	175	1,245.2
Excavator with Bucket	Excavators	Diesel	175	1,786.1
Flatbed Truck	Off-Highway Trucks	Diesel	600	3,160.6
Fork Truck	Rough Terrian Forklifts	Diesel	100	18,196.2
Front Loader	Tractors/Loaders/Backhoe	Diesel	175	278.4
Generator	Other Construction Equipment	Diesel	40	4,499.78
Generator Sets	Other Construction Equipment	Diesel	40	1,786.1
Grader	Graders	Diesel	300	0.6
High Lift	Rough Terrian Forklifts	Diesel	100	1,799.91

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
Hydroseeder	Other Construction Equipment	Diesel	600	125.4
Loader	Tractors/Loaders/Backhoe	Diesel	150	915.6
Man Lift	Rough Terrian Forklifts	Diesel	75	8,999.56
Man Lift (Fascia Construction)	Rough Terrian Forklifts	Diesel	75	359.98
Material Deliveries	Off-Highway Trucks	Diesel	600	899.96
Off-Road Truck	Off-Highway Trucks	Diesel	600	125.4
Other General Equipment	Other Construction Equipment	Diesel	175	5,106.8
Pickup Truck	Off-Highway Trucks	Diesel	600	6,966.7
Pumps	Other Construction Equipment	Diesel	11	27.6
Roller	Rollers	Diesel	100	866.8
Rubber Tired Loader	Tractors/Loaders/Backhoe	Diesel	175	66.7
Scraper	Scrapers	Diesel	600	1.8
Skid Steer Loader	Skid Steer Loaders	Diesel	75	52.6
Slip Form Paver	Pavers	Diesel	175	66.7
Surfacing Equipment (Grooving)	Other Construction Equipment	Diesel	25	70.2
Survey Crew Trucks	Off-Highway Trucks	Diesel	600	19.6
Tool Truck	Off-Highway Trucks	Diesel	600	3,470.67
Tractor Trailer- Material Delivery	Off-Highway Trucks	Diesel	600	3,523.85
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	Diesel	600	614.47
Tractor Trailer- Stone Delivery	Off-Highway Trucks	Diesel	600	199.2
Tractor Trailer with Boom Hoist- Curbs Del & Place	Off-Highway Trucks	Diesel	600	40.8
Tractor Trailers Temp Fac.	Off-Highway Trucks	Diesel	600	8.8
Tractors/Loader/Backhoe	Tractors/Loaders/Backhoe	Diesel	100	102.1
Trencher for U/G Piping	Trenchers	Diesel	75	199.2
Trowel Machine	Other Construction Equipment	Diesel	600	179.99
Truck for Topsoil & Seed Del&Spread	Off-Highway Trucks	Diesel	600	40.8
Vibratory Compactor	Plate Compactors	Diesel	6	15.5
Water Truck	Off-Highway Trucks	Diesel	600	2,160.0
			Total	**88,857.53**

Source: RS&H 2024.

TABLE C-4: 2026 NON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
40 Ton Rough Terrain Crane	Cranes	Diesel	300	120
90 Ton Crane	Cranes	Diesel	300	480
Air Compressor	Other Construction Equipment	Diesel	100	17.4
Asphalt Paver	Pavers	Diesel	175	143.8
Backhoe	Tractor/Loaders/Backhoe	Diesel	100	400.8
Caisson Drilling Rig	Bore/Drill Rigs	Diesel	600	120
Chain Saw	Concrete/Industrial Saw	Diesel	11	34.8
Chipper/Stump Grinder	Other Construction Equipment	Diesel	100	34.8
Concrete Boom Pump	Off-Highway Trucks	Diesel	600	360.0
Concrete Pump	Other Construction Equipment	Diesel	11	90.0
Concrete Ready Mix Trucks	Off-highway Trucks	Diesel	600	660
Concrete Saws	Concrete/Industrial Saw	Diesel	40	17.4
Concrete Truck	Off-Highway Trucks	Diesel	600	638.5
Curb/Gutter Paver	Pavers	Diesel	175	186.2
Dozer	Crawler Tractor/Dozers	Diesel	175	2061.3
Dump Truck	Off-Highway Trucks	Diesel	600	2,574.1
Dump Truck (12 cy)	Off-Highway Trucks	Diesel	600	977.6
Excavator	Excavators	Diesel	175	1,968.3
Flatbed Truck	Off-Highway Trucks	Diesel	600	1,063.6
Fork Truck	Rough Terrian Forklifts	Diesel	100	33,641.61
Front Loader	Tractor/Loaders/Backhoe	Diesel	150	278.4
Front Loader for Subgrade Materials	Tractor/Loaders/Backhoe	Diesel	150	79.2
Grader	Graders	Diesel	300	14.3
High Lift	Rough Terrian Forklifts	Diesel	100	440
Hydroseeder	Other Construction Equipment	Diesel	600	11.9
Loader	Tractor/Loaders/Backhoe	Diesel	150	1,909.7
Man Lift	Rough Terrian Forklifts	Diesel	75	19,528.23
Man Lift (Fascia Construction)	Rough Terrian Forklifts	Diesel	75	120.0
Material Deliveries	Off-Highway Trucks	Diesel	600	8.0
Off-Road Truck	Off-Highway Trucks	Diesel	600	11.9
Other General Equipment	Other Construction Equipment	Diesel	175	3,404.8
Pickup Truck	Off-highway Trucks	Diesel	600	4,078.9
Pumps	Other Construction Equipment	Diesel	11	51.2
Roller	Rollers	Diesel	100	2,025.1
Rubber Tired Loader	Tractor/Loaders/Backhoe	Diesel	175	17.4
Scraper	Scrapers	Diesel	600	53.1
Skid Steer Loader	Skid Steer loaders	Diesel	75	218.7
Slip Form Paver	Pavers	Diesel	175	17.4
Surfacing Equipment (Grooving)	Other Construction Equipment	Diesel	25	100.1
Survey Crew Trucks	Off-Highway Trucks	Diesel	600	9.6
Ten Wheelers- Material Delivery	Off-Highway Trucks	Diesel	600	60.0

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
Tool Truck	Off-Highway Trucks	Diesel	600	360.8
Tractor Trailer- Material Delivery	Off-Highway Trucks	Diesel	600	355.2
Tractor Trailer- Steel Deliveries	Off-Highway Trucks		600	240
Tractor Trailer- Stone Delivery	Off-Highway Trucks	Diesel	600	199.2
Tractor Trailer with Boom Hoist- Curbs Del & Place	Off-Highway Trucks	Diesel	600	40.8
Tractor Trailers Temp Fac.	Off-Highway Trucks	Diesel	600	4.8
Tractors/Loader/Backhoe	Tractor/Loaders/Backhoe	Diesel	100	598.4
Trencher for U/G Piping	Trenchers	Diesel	75	199.2
Trowel Machines (4) machines	Other Construction Equipment	Diesel	600	240
Truck for Topsoil & Seed Del & Spread	Off-Highway Trucks	Diesel	600	40.8
Vibratory Compactor	Plate Compactors	Diesel	6	372.3
Water Truck	Off-highway Trucks	Diesel	600	12,000.0
			Total	**92,679.64**

Source: RS&H 2024.

TABLE C-5: 2027 NON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
40 Ton Rough Terrain	Cranes	Diesel	300	160.8
90 Ton Crane	Cranes	Diesel	300	480
Air Compressor	Other Construction Equipment	Diesel	100	14.5
Asphalt Paver	Pavers	Diesel	175	73.1
Chain Saw	Concrete/Industrial Saw	Diesel	11	42.0
Chipper/Stump Grinder	Other Construction Equipment	Diesel	100	42.0
Concrete Boom Pump	Off-Highway Trucks	Diesel	600	360.0
Concrete Ready Mix Trucks	Off-Highway Trucks	Diesel	600	360.0
Concrete Saws	Concrete/Industrial Saw	Diesel	40	14.5
Concrete Truck	Off-Highway Trucks	Diesel	600	706.5
Curb/Gutter Paver	Pavers	Diesel	175	210.2
Dozer	Crawler Tractor/Dozers	Diesel	175	381.3
Dump Truck	Off-Highway Trucks	Diesel	600	980.1
Dump Truck (12 cy)	Off-Highway Trucks	Diesel	600	1,116.8
Excavator	Excavators	Diesel	175	94.6
Flatbed Truck	Off-Highway Trucks	Diesel	600	1,202.2
Fork Truck	Rough Terrian Forklifts	Diesel	100	160.8
Forklift	Rough Terrian Forklifts	Diesel	100	240
Grader	Graders	Diesel	300	16.9
High Lift	Rough Terrian Forklifts	Diesel	100	12,401.71
Hydroseeder	Other Construction Equipment	Diesel	600	10.8
Loader	Tractors/Loaders/Backhoe	Diesel	150	209.3

Equipment Type	TexN2.2	Fuel Type	Horse-power	Operating Hours
Man Lift	Rough Terrian Forklifts	Diesel	75	17,670.01
Off-Road Truck	Off-Highway Trucks	Diesel	600	10.8
Other General Equipment	Other Construction Equipment	Diesel	175	1,911.1
Pickup Truck	Off-Highway Trucks	Diesel	600	2,667.5
Pumps	Other Construction Equipment	Diesel	11	54
Roller	Rollers	Diesel	100	343
Rubber Tired Loader	Tractors/Loaders/Backhoe	Diesel	175	14.5
Scraper	Scrapers	Diesel	600	63
Skid Steer Loader	Skid Steer Loaders	Diesel	75	274.2
Slip Form Paver	Pavers	Diesel	175	14.5
Surfacing Equipment (Grooving)	Other Construction Equipment	Diesel	25	107.9
Tool Truck	Off-Highway Trucks	Diesel	600	7,661.93
Tractor Trailer- Material Delivery	Off-Highway Trucks	Diesel	600	9,239.56
Tractor Trailer- Steel Deliveries	Off-Highway Trucks	Diesel	600	240.0
Tractors/Loader/Backhoe	Tractors/Loaders/Backhoe	Diesel	100	700.5
Trencher	Trenchers	Diesel	75	120.0
Trowel Machines (4) machines	Other Construction Equipment	Diesel	600	240.0
Vibratory Compactor	Plate Compactors	Diesel	6	420.9
Water Truck	Off-Highway Trucks	Diesel	600	12,000.0
			Total	**73,031.51**

Source: RS&H 2024.

The development of Vehicle Miles Traveled (VMT) is based on engineering judgment and past experience with airport construction projects. The calculation of VMT is developed by using the number of construction employees and the number of expected equipment types during the construction of the Proposed Project. It is assumed that each individual piece of equipment estimated to be used during the construction of the Proposed Project would require three employees (one operator and two supporting general labor employees). Based on engineering experience, the actual number of employees is closer to two, but three employees were used to calculate a conservative analysis. The distance traveled by employees and material deliveries for the Proposed Project are based on a 30-mile round trip per passenger car and a 40-mile round trip per material delivery that would originate from the greater San Antonio area. The round-trip distance is applied to each passenger and material delivery vehicle and multiplied by each day of construction to develop the total VMT used for MOVES3.1. On-road construction emissions for 2024 to 2027 are shown in **Table C-6**, **Table C-7**, **Table C-8**, and **Table C-9**.

TABLE C-6: 2024 ON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment	Fuel Type	VMT*
Single Unit Short-haul Truck	Diesel	533,482.3
Combination Short-haul Truck	Diesel	3,547.8
Passenger Car	Gasoline	2,275,110.0

Note – VMT = vehicle miles traveled.
Source: MOVES3.1, RS&H 2024.

TABLE C-7: 2025 ON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment	Fuel Type	VMT*
Single Unit Short-haul Truck	Diesel	666,657.5
Combination Short-haul Truck	Diesel	3,229.0
Passenger Car	Gasoline	3,374,436.2

Note – VMT = vehicle miles traveled.
Source: MOVES3.1, RS&H 2024

TABLE C-8: 2026 ON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment	Fuel Type	VMT*
Single Unit Short-haul Truck	Diesel	262,701.5
Combination Short-haul Truck	Diesel	9,779.0
Passenger Car	Gasoline	6,570,900.0

Note – VMT = vehicle miles traveled.
Source: MOVES3.1, RS&H 2024

TABLE C-9: 2027 ON-ROAD CONSTRUCTION EMISSIONS INVENTORY INPUTS

Equipment	Fuel Type	VMT*
Single Unit Short-haul Truck	Diesel	254,357.2
Combination Short-haul Truck	Diesel	10,758.2
Passenger Car	Gasoline	6,362,640.0

Note – VMT = vehicle miles traveled.
Source: MOVES3.1, RS&H 2024

C.1.2.2 Construction Emissions Inventory Results

For informational purposes, **Table C-11**, **Table C-12**, and **Table C-13** shows the criteria pollutants, as well as the, greenhouse gas GHG emissions in tons per year during the Proposed Project's construction. The primary greenhouse gas emissions are Carbon Dioxide (CO_2), Methane (CH_4), and Nitrous Oxide (N_2O). These resulting GHG emissions in tons per year during the Proposed Project's construction are used to analyze the potential Social Cost of GHG emissions in Section C.2.

TABLE C-10: PROPOSED PROJECT MOVES3 RESULTS FOR 2024 (TONS PER YEAR)

							GHGs		
2024	**CO**	**VOC**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SOx**	**CO_2**	**CH_4**	**N_2O**
NONROAD (TexN2.2)	4.22	0.61	9.98	0.71	0.69	0.02	5,188.53	N/A	N/A
ONROAD (MOVES 3.1)	9.60	0.23	1.68	0.08	0.07	0.01	1,216.56	0.03	0.00
FUGITIVE	0.53	8.10	0.03	2.70	N/A	0.01	N/A	N/A	N/A
TOTAL	14.35	8.94	11.69	3.49	0.76	0.03	6,405.09	0.03	0.00
De Minimis Levels	N/A	100	100	N/A	N/A	N/A	N/A	N/A	N/A

Note – N/A = not applicable. Totals may not sum due to rounding.
Source: MOVES3.1, RS&H 2024.

TABLE C-11: PROPOSED PROJECT MOVES3 RESULTS FOR 2025 (TONS PER YEAR)

							GHGs		
2025	**CO**	**VOC**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SOx**	**CO_2**	**CH_4**	**N_2O**
NONROAD (TexN2.2)	5.24	0.78	13.53	0.90	0.87	0.03	8,260.85	N/A	N/A
ONROAD (MOVES 3.1)	13.35	0.28	1.96	0.09	0.08	0.01	1,645.03	0.04	0.01
FUGITIVE	0.05	0.72	0.00	1.86	N/A	0.00	N/A	N/A	N/A
TOTAL	18.63	1.78	15.49	2.85	0.96	0.04	9,905.88	0.04	0.01
De Minimis Levels	N/A	100	100	N/A	N/A	N/A	N/A	N/A	N/A

Note – N/A = not applicable. Totals may not sum due to rounding.
Source: MOVES3.1, RS&H 2024.

TABLE C-12: PROPOSED PROJECT MOVES3 RESULTS FOR 2026 (TONS PER YEAR)

							GHGs		
2026	**CO**	**VOC**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SOx**	**CO_2**	**CH_4**	**N_2O**
NONROAD (TexN2.2)	4.84	0.68	12.57	0.81	0.79	0.02	7,619.90	N/A	N/A
ONROAD (MOVES 3.1)	23.22	0.24	1.18	0.05	0.04	0.01	2,147.62	0.07	0.01
FUGITIVE	1.13	26.20	0.07	2.06	N/A	0.01	N/A	N/A	N/A
TOTAL	29.19	27.12	13.83	2.92	0.83	0.05	9,767.52	0.07	0.01
De Minimis Levels	N/A	100	100	N/A	N/A	N/A	N/A	N/A	N/A

Note – N/A = not applicable. Totals may not sum due to rounding.
Source: MOVES3.1, RS&H 2024.

TABLE C-13: PROPOSED PROJECT MOVES3 RESULTS FOR 2027 (TONS PER YEAR)

							GHGs		
2027	**CO**	**VOC**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SOx**	**CO_2**	**CH_4**	**N_2O**
NONROAD (TexN2.2)	3.46	0.54	10.02	0.60	0.59	0.03	8,984.45	N/A	N/A
ONROAD (MOVES 3.1)	21.44	0.21	1.04	0.04	0.04	0.01	2,035.77	0.06	0.01
FUGITIVE	1.27	19.55	0.08	0.75	N/A	0.01	N/A	N/A	N/A
TOTAL	26.18	20.30	11.15	1.40	0.62	0.05	11,020.22	0.06	0.01
De Minimis Levels	N/A	100	100	N/A	N/A	N/A	N/A	N/A	N/A

Note – N/A = not applicable. Totals may not sum due to rounding.
Source: MOVES3.1, RS&H 2024.

C.2 CLIMATE AND GHG SOCIAL COSTS

In 2024, the Council on Environmental Quality (CEQ) issued revised draft guidance, *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change,*[3] to assist agencies in analyzing GHG emissions and climate change effects of a Proposed Project under the National Environmental Policy Act (NEPA). The FAA has not established a significance threshold for Climate impacts. As such, this section quantifies and discloses the potential GHG emissions from the Proposed Project and provides context by monetizing the results using social cost of carbon estimates.

The CEQ identified Social Cost-Greenhouse Gases (SC-GHG) as the metric for assessing potential climate impacts and represents the monetary estimate of the effect associated with each additional metric ton of carbon dioxide released into the air.[4] The three GHGs[5] that are analyzed are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which represent more than 97% of U.S. GHG emissions. To calculate SC-GHG, the carbon dioxide equivalent CO_2e[6] must be calculated first. CO_2e is calculated using the Global Warming Potential (GWP) metric to compare the impact a gas has on the global climate concerning CO_2. GWP values are based on the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6).[7] For example, CH_4 has 28 times the GWP of CO_2 and absorbs 28 times more energy in the atmosphere when compared to CO_2.

Table C-14 shows the CO_2e values for construction years 2024 through 2027 using the CEI results from **Table C-10**, **Table C-11**, **Table C-12**, and **Table C-13**. In the context of global and U.S. Greenhouse Gas emissions, the construction of the Proposed Project's emissions would not be significant.

[3] Council on Environmental Quality. 2024. Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas and the Effects of Climate Change in NEPA Reviews. Retrieved March 2024 https://energy.gov/sites/prod/files/2014/12/f19/CEQ%20Guidance%20on%20Greenhouse%20Gas%20Emissions%20-%20Revised%20Draft%20for%20Public%20Comment2014-30035.pdf

[4] Interagency Working Group. 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates under Executive Order 13990. Retrieved March 2024 from https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

[5] These three GHGs are identified in the CEQ's National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change.

[6] CO_2e: Number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas.

[7] Intergovernmental Panel on Climate Change. 2023. Climate Change 2023 Synthesis Report. Retrieved March 2024 from https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

TABLE C-14: PROPOSED PROJECT CO_2E

Year	Pollutant	Emissions Quantity (Tons) Construction Emissions	AR6 GWP	CO_2e
2024	CO_2	6,405.093	1	6,405.09
	CH_4	0.033	28	0.92
	N_2O	0.004	265	1.11
			Total	*6,407.13*
2025	CO_2	9,905.881	1	9,905.88
	CH_4	0.044	28	1.24
	N_2O	0.005	265	1.44
			Total	*9,908.57*
2026	CO_2	9,767.516	1	9,767.52
	CH_4	0.067	28	1.86
	N_2O	0.008	265	2.12
			Total	*9,771.50*
2027	CO_2	11,020.220	1	11,020.22
	CH_4	0.061	28	1.70
	N_2O	0.008	265	2.03
			Total	*11,023.95*

Note: Totals may not sum due to rounding.
Sources: TexN2.2, MOVES 3.1; Interagency Working Group, 2021, IPCC Sixth Assessment 2023.

The Interagency Working Group (IWG) developed average discount rates to assess climate impacts over time. The higher the discount rate, the lower the social climate cost (SCC) for future generations. Three integrated assessment models were used to develop discount rates that were used by the IWG:[8] William Nordhaus' DICE model (Yale University), Richard Tol's FUND model (Sussex University), and Chris Hope's PAGE model (Cambridge University). The IWG average discount rates are 5 percent, 3 percent, 2.5 percent, and the 95th percentile estimate at the 3 percent discount rate, which represents the potential for low-probability catastrophic climate impacts. The IWG average discount rates represent a range of possible climate impacts to future generations. For example, the 5 percent average rate represents a situation where future generations are best suited to manage potential climate impacts from the Proposed Project, leading to a minimal social cost impact. The IWG determined the social cost of CO_2 (SC-CO_2) through 2050 and assigned a monetary value[9] for each additional metric ton of CO_2 produced. SC-CO_2 is equivalent to SC-GHGs and represents the social costs of the total greenhouse

[8] Interagency Working Group. 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates under Executive Order 13990. Retrieved March 2024 from https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

[9] These monetary values are based on the results from three economic models used by the IWG: William Nordhaus' DICE model (Yale University), Richard Tol's FUND model (Sussex University), and Chris Hope's PAGE model (Cambridge University).

gases converted to the CO_2e equivalent. The SC-CO_2 helps weigh the benefits of climate mitigation against its costs.

Table C-15 shows the monetary value of each additional metric ton of CO_2 from construction emissions. The SC-CO_2 models the project's future cost of each additional ton of CO_2.[10] **Table C-16** shows the Social Cost of Carbon Dioxide (SC-CO_2) for the Proposed Project. The construction emissions inventory's CO_2e (see **Table C-14**) was multiplied by the average discount rates (see **Table C-15**) to determine the monetary impact for 2024-2027.

TABLE C-15: ANNUAL SC-CO_2 PER METRIC TON OF CO_2 (IN 2020 DOLLARS)

Emissions year	Average Estimate at 5% Discount Rate	Average Estimate at 3% Discount Rate	Average Estimate at 2.5% Discount Rate	95th Percentile Estimate at 3.0% Discount Rate
Construction Emissions				
2024	$16	$55	$82	$166
2025	$17	$56	$83	$169
2026	$17	$57	$84	$173
2027	$18	$59	$86	$176

Note: Discount Rates from IWG 2021 represent the monetary value of each additional metric ton of CO_2 produced for 2026. These monetary values are based on the results from three economic models used by the IWG: William Nordhaus' DICE model (Yale University), Richard Tol's FUND model (Sussex University), and Chris Hope's PAGE model (Cambridge University). The model projects the future cost of each additional metric ton of CO_2.
Sources: Interagency Working Group, 2021, IPCC Sixth Assessment 2023, RS&H, 2024.

The calculated social costs are estimates only and subject to change depending on various factors (e.g., energy supply, advancements in technology).[11] These calculations are for information purposes only and represent the potential social costs from construction emissions through 2024 to 2027. The social cost calculations represent a range of possibilities and are not guaranteed to occur. As shown in **Table C-16**, the range of potential social costs for 2024 to 2027 from construction emissions is approximately $102,500 to $1,100,600 for 2024, $168,500 to $1,675,000 for 2025, $166,000 to $1,690,500 for 2026, and $198,450 to $1,950,000 for 2027. This cost range represents the potential social costs of adding GHGs to the atmosphere in a given year. It includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk natural disasters, disruption of energy systems, risk of conflict, environmental

[10] Institute for Policy Integrity. 2017. The Social Cost of Greenhouse Gases and State Policy: A Frequently Asked Questions Guide. Retrieved March 2024 from https://policyintegrity.org/files/publications/SCC_State_Guidance.pdf

[11] Institute for Policy Integration et al. 2014, Omitted Damages: What's Missing from the Social Cost of Carbon. Retrieved March 2024 from https://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf

migration, and the value of ecosystem services.[12] It is important to note that this climate analysis does not include positive impacts from the Proposed Project (e.g., to meet the existing and future needs of the greater San Antonio area and provide facilities that would accommodate forecasted increases in enplanements and airport operations at an adequate level of service).

TABLE C-16: SOCIAL COST - CARBON DIOXIDE FOR THE PROPOSED PROJECT

Year	Proposed Project CO_2e	Average Estimate at 5% Discount Rate	Average Estimate at 3% Discount Rate	Average Estimate at 2.5% Discount Rate	95th Percentile Estimate at 3.0% Discount Rate
		Construction	Emissions		
2024	6,407.13	$102,514.06	$352,392.07	$525,384.55	$1,063,583.35
2025	9,908.57	$168,445.62	$554,879.68	$822,410.96	$1,674,547.62
2026	9,771.50	$166,115.53	$556,975.61	$820,806.16	$1,690,469.84
2027	11,023.95	$198,431.01	$650,412.76	$948,059.28	$1,940,214.34

Note: Per the 2023 IPCC Sixth Assessment Report, CO_2e equivalent for SC-GHG were calculated using the Interagency Working Group[13] average discount rates: 5 percent, 3 percent, 2.5 percent, and the 95th percentile estimate applying the 3 percent discount rate. CO_2e Values are multiplied by the discount rate to calculate SC-CO_2. Per the 2023 IPCC[14] Sixth Assessment Report, the CO_2 equivalent for N_2O is calculated by multiplying the N_2O emissions by the GWP of 265. The CO_2 equivalent for CH_4 is calculated by multiplying the CH_4 emissions by the GWP of 28. For example, the 2024 Average Estimate at a 5% Discount Rate was calculated using the 2024 CO2e value of 6407.13 multiplied by 2024's $16 determined value for the 5% Discount Rate.
Sources: Interagency Working Group, 2021, IPCC Sixth Assessment 2023, RS&H, 2024.

In considering the impact of climate change on the Proposed Project, the foreseeable state of the environment is not expected to change significantly over the limited construction duration of the Proposed Project, which spans four (4) years, since effects are typically felt on decadal time scales. For example, the Airport Cooperative Research Program (ACRP) guidance on Climate Change Adaptation Planning: Risk Assessment for Airports[15] provides short-term and long-term forecasts for the year 2030 and 2060 and recommends a re-evaluation of climate change risks to airports every 3-5 years. Therefore, the proposed project is anticipated to have no significant impact on climate.

[12] Interagency Working Group. 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates under Executive Order 13990. Retrieved March 2024 from https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

[13] Interagency Working Group. 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates under Executive Order 13990. Retrieved March 2024 from https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

[14] Intergovernmental Panel on Climate Change. 2023. Climate Change 2023 Synthesis Report. Retrieved March 2024 from https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

[15] Airport Cooperative Research Program. 2015. Climate Change Adaptation Planning: Risk Assessment for Airports. ACRP Report 147. Retrieved March 2024 from https://www.trb.org/Publications/Blurbs/173554.aspx