
FRTC Modernization EIS

Supporting Study

Air Quality Calculations

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FRTC Modernization Air Quality Calculations
Summary Tables

Range	Alternative 1 Emissions (Tons)					
	CO	Nox	ROG	Sox	PM10	PM2.5
B-16	0.047114027	0.129206623	0.022424662	0.000332986	3.324483868	0.337041082
B-17	0.07509538	0.157377617	0.036506707	0.000505814	6.259405699	0.632999036
B-20	0.099347419	0.18654843	0.043028736	0.000683117	7.523028963	0.760645171
DVTA	0.000369493	0.000773703	0.000194219	3.06362E-06	0.584837078	0.058517644
Alt 1 Total	0.221926319	0.473906372	0.102154324	0.001524981	17.69175561	1.789202933
Range	Alternative 2 Emissions (Tons)					
B-16	0.047114027	0.129206623	0.022424662	0.000332986	3.324483868	0.337041082
B-17	0.07509538	0.157377617	0.036506707	0.000505814	6.253631338	0.632231238
B-20	0.099347419	0.18654843	0.043028736	0.000683117	7.523028963	0.760645171
DVTA	0.000369493	0.000773703	0.000194219	3.06362E-06	0.584837078	0.058517644
Alt 2 Total	0.221926319	0.473906372	0.102154324	0.001524981	17.68598125	1.788435136
Range	Alternative 3 Emissions (Tons)					
B-16	0.047114027	0.129206623	0.022424662	0.000332986	3.324483868	0.337041082
B-17	0.07509538	0.157377617	0.036506707	0.000505814	6.253631338	0.632231238
B-20	0.099347419	0.18654843	0.043028736	0.000683117	7.523028963	0.760645171
DVTA	0.000369493	0.000773703	0.000194219	3.06362E-06	0.584837078	0.058517644
Alt 3 Total	0.221926319	0.473906372	0.102154324	0.001524981	17.68598125	1.788435136

FRTC Modernization Air Quality Calculations
Criteria Pollutants - Fencing

Equipment Used	Emission Category (MOVES 2014a)	Year	HP	HP Bin	Number	Length of Project (days)	Days in Use	Hours per day	Emissions (lbs)						Emissions (tons)					
									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
B-16									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
Skid Steer Loader	Crawler Tractors	2022	61	50-75	1	136.4	140	6	13.12	69.85	3.84	0.07	0.97	0.94	0.01	0.03	0.00	0.00	0.00	0.00
Backhoe	Tractors/Loaders/Backhoes	2022	90	75-100	1	136.4	140	4	33.55	24.93	5.56	0.04	4.35	4.22	0.02	0.01	0.00	0.00	0.00	0.00
General truck	Off-Highway Trucks	2022	300	175-300	1	136.4	2	4	13.71	32.52	19.68	0.29	1.20	1.16	0.01	0.02	0.01	0.00	0.00	0.00
Personal Vehicle Trips	Passenger Truck - Gasoline	2022		hours is mile	3	136.4	140	60	1.00	0.25	0.06	0.06	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	Off-Highway Trucks	2022	300	175-300	1	136.4	140	1	3.43	8.13	4.92	0.07	0.30	0.29	0.00	0.00	0.00	0.00	0.00	0.00
															0.0324	0.0678	0.0170	0.0003	0.0034	0.0033
assumes approximately 1,200' per crew per day																				
B-17 Alternative 1									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
Skid Steer Loader	Crawler Tractors	2022	61	50-75	2	165	95	6	31.74	169.00	9.30	0.17	2.35	2.28	0.02	0.08	0.00	0.00	0.00	0.00
Backhoe	Tractors/Loaders/Backhoes	2022	90	75-100	2	165	95	4	81.16	60.32	13.45	0.09	10.53	10.22	0.04	0.03	0.01	0.00	0.01	0.01
General truck	Off-Highway Trucks	2022	300	175-300	2	165	1	4	33.16	78.67	47.61	0.71	2.91	2.82	0.02	0.04	0.02	0.00	0.00	0.00
Personal Vehicle Trips	Passenger Truck - Gasoline	2022		hours is mile	6	165	95	60	2.41	0.60	0.14	0.15	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	Off-Highway Trucks	2022	300	175-300	1	165	70	1	4.15	9.83	5.95	0.09	0.36	0.35	0.00	0.00	0.00	0.00	0.00	0.00
															0.0730	0.1540	0.0352	0.0005	0.0079	0.0077
B-20									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
Skid Steer Loader	Crawler Tractors	2022	61	50-75	2	198	95	6	38.09	202.80	11.15	0.20	2.82	2.73	0.02	0.10	0.01	0.00	0.00	0.00
Backhoe	Tractors/Loaders/Backhoes	2022	90	75-100	2	198	95	4	97.39	72.38	16.14	0.11	12.64	12.26	0.05	0.04	0.01	0.00	0.01	0.01
General truck	Off-Highway Trucks	2022	300	175-300	2	198	1	4	39.80	94.41	57.14	0.85	3.49	3.38	0.02	0.05	0.03	0.00	0.00	0.00
Personal Vehicle Trips	Passenger Truck - Gasoline	2022		hours is mile	6	198	95	60	2.89	0.71	0.16	0.18	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	Off-Highway Trucks	2022	300	175-300	1	198	70	1	4.97	11.80	7.14	0.11	0.44	0.42	0.00	0.01	0.00	0.00	0.00	0.00
															0.0876	0.1848	0.0422	0.0006	0.0095	0.0092
B-17 Alternative 3									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
Skid Steer Loader	Crawler Tractors	2022	61	50-75	2	165	95	6	31.74	169.00	9.30	0.17	2.35	2.28	0.02	0.08	0.00	0.00	0.00	0.00
Backhoe	Tractors/Loaders/Backhoes	2022	90	75-100	2	165	95	4	81.16	60.32	13.45	0.09	10.53	10.22	0.04	0.03	0.01	0.00	0.01	0.01
General truck	Off-Highway Trucks	2022	300	175-300	2	165	1	4	33.16	78.67	47.61	0.71	2.91	2.82	0.02	0.04	0.02	0.00	0.00	0.00
Personal Vehicle Trips	Passenger Truck - Gasoline	2022		hours is mile	6	165	95	60	2.41	0.60	0.14	0.15	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	Off-Highway Trucks	2022	300	175-300	1	165	70	1	4.15	9.83	5.95	0.09	0.36	0.35	0.00	0.00	0.00	0.00	0.00	0.00
															0.0730	0.1540	0.0352	0.0005	0.0079	0.0077
DVTA Electronic Warfare Sights									CO	Nox	ROG	Sox	PM10	PM2.5	CO	Nox	ROG	Sox	PM10	PM2.5
Skid Steer Loader	Crawler Tractors	2022	61	50-75	1	1.555633333	2	6	0.15	0.80	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	Tractors/Loaders/Backhoes	2022	90	75-100	1	1.555633333	2	4	0.38	0.28	0.06	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00
General truck	Off-Highway Trucks	2022	300	175-300	1	1.555633333	2	4	0.16	0.37	0.22	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Personal Vehicle Trips	Passenger Truck - Gasoline	2022		hours is mile	3	1.555633333	2	60	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Truck	Off-Highway Trucks	2022	300	175-300	1	1.555633333	2	1	0.04	0.09	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
															0.0004	0.0008	0.0002	0.0000	0.0000	0.0000

FRTC Modernization Air Quality Calculations
GHG Emissions - Fencing

Equipment Used	Type	Emission Category (MOVES 2014a)	Year	HP	HP Bin	Number	Length of Project (days)	Hours per day	Emissions factors (g/day)		Emissions (Kg)			Emissions (metric tons)		
									CO2	CH4	CO2	CH4	CO2e	CO2	CH4	CO2e
B-16																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	2022	61	51-120	1	136.4	6	60954.3441	1.37123586	6235.63	0.14	6238.58	6.23563	0.00014	6.23858
Backhoe	CASE 580 SuperM Series 2 4WD 90	Tractors/Loaders/Backh	2022	90	51-120	1	136.4	4	46110.5329	1.82170614	3144.74	0.12	3147.35	3.14474	0.00012	3.14735
General truck	Cat 730 Dump truck	Off-Highway Trucks	2022	300	251-500	1	136.4	4	405451.212	9.79577271	27651.77	0.67	27665.80	27.65177	0.00067	27.66580
Fuel truck		Off-Highway Trucks	2022	300	251-500	1	136.4	1	928.312549	0	15.83	0.00	15.83	0.01583	0.00000	0.01583
													37.03214	0.00093	37.05172	
B-17																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	2022	61	51-120	2	165	6	60954.3441	1.37123586	15086.20	0.34	15093.33	15.08620	0.00034	15.09333
Backhoe	CASE 580 SuperM Series 2 4WD 90	Tractors/Loaders/Backh	2022	90	51-120	2	165	4	46110.5329	1.82170614	7608.24	0.30	7614.55	7.60824	0.00030	7.61455
General truck	Cat 730 Dump truck	Off-Highway Trucks	2022	300	251-500	2	165	4	405451.212	9.79577271	66899.45	1.62	66933.39	66.89945	0.00162	66.93339
													89.59389	0.00226	89.64127	
B-20																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	2022	61	51-120	2	198	6	60954.3441	1.37123586	18103.44	0.41	18111.99	18.10344	0.00041	18.11199
Backhoe	CASE 580 SuperM Series 2 4WD 90	Tractors/Loaders/Backh	2022	90	51-120	2	198	4	46110.5329	1.82170614	9129.89	0.36	9137.46	9.12989	0.00036	9.13746
General truck	Cat 730 Dump truck	Off-Highway Trucks	2022	300	251-500	2	198	4	405451.212	9.79577271	80279.34	1.94	80320.07	80.27934	0.00194	80.32007
													107.51267	0.00271	107.56952	
B-17 Alternative 3																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	2022	61	51-120	2	171.6	6	60954.3441	1.37123586	15689.65	0.35	15697.06	15.68965	0.00035	15.69706
Backhoe	CASE 580 SuperM Series 2 4WD 90	Tractors/Loaders/Backh	2022	90	51-120	2	171.6	4	46110.5329	1.82170614	7912.57	0.31	7919.13	7.91257	0.00031	7.91913
General truck	Cat 730 Dump truck	Off-Highway Trucks	2022	300	251-500	2	171.6	4	405451.212	9.79577271	69575.43	1.68	69610.73	69.57543	0.00168	69.61073
													93.17764	0.00235	93.22692	
Electronic Warfare Sites																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	2022	61	51-120	1	1.55558333	6	60954.3441	1.37123586	71.11	0.00	71.15	0.07111	0.00000	0.07115
Backhoe	CASE 580 SuperM Series 2 4WD 90	Tractors/Loaders/Backh	2022	90	51-120	1	1.55558333	4	46110.5329	1.82170614	35.86	0.00	35.89	0.03586	0.00000	0.03589
General truck	Cat 730 Dump truck	Off-Highway Trucks	2022	300	251-500	1	1.55558333	4	405451.212	9.79577271	315.35	0.01	315.51	0.31535	0.00001	0.31551
													0.42233	0.00001	0.42255	

FRTC Modernization Air Quality Calculations
Fugitive Dust - Fencing

Equipment Used	Type	Emission Category (MOVES 2014a)	Weight (lbs)	Length of road	Number	Length of Project (days)	Days Without Rain	PM2.5/ PM10 ratio	s-silt content (%)	W--vehicle weight (tons)	Control Measure	Control Application/ Frequency	Control Efficiency	Reference	PM10 (tons/yr)	PM2.5 (tons/yr)
B-16																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	7557.4	1	1	136.4	115.94	0.1	11	3.7787	Watering	Twice daily	0.55	MRI, 2001	0.040141804	0.00401418
Backhoe	CASE 580 SuperM Series 2 4WD 90 HP-1CY Dig 17' 6"	Tractors/Loaders/Backhoes	16589	1	1	136.4	115.94	0.1	11	8.2945	Watering	Twice daily	0.55	MRI, 2001	0.057180559	0.005718056
General truck	Cat 730 Dump truck	Off-Highway Trucks	112369	10	1	136.4	115.94	0.1	11	56.1845	Drive Slow	n/a	0.44	MRI, 2001	1.68304509	0.168304509
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	10	3	136.4	115.94	0.1	11	1	Drive Slow	n/a	0.44	MRI, 2001	0.823928588	0.082392859
Fuel Truck		Off-Highway Trucks	50000	10	1	136.4	115.94	0.1	11	25	Drive Slow	n/a	0.44	MRI, 2001	1.169072167	0.116907217
															3.051287774	0.305128777
assumes approximately 1,200' per crew per day																
B-17 Alternative 1																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	7557.4	1	2	165	140.25	0.1	11	3.7787	Watering	Twice daily	0.55	MRI, 2001	0.097117269	0.009711727
Backhoe	CASE 580 SuperM Series 2 4WD 90 HP-1CY Dig 17' 6"	Tractors/Loaders/Backhoes	16589	1	2	165	140.25	0.1	11	8.2945	Watering	Twice daily	0.55	MRI, 2001	0.138340063	0.013834006
General truck	Cat 730 Dump truck	Off-Highway Trucks	112369	10	2	165	140.25	0.1	11	56.1845	Watering	Twice daily	0.55	MRI, 2001	3.272049066	0.327204907
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	10	6	165	140.25	0.1	11	1	Watering	Twice daily	0.55	MRI, 2001	1.601819691	0.160181969
Fuel Truck		Off-Highway Trucks	50000	10	1	165	140.25	0.1	11	25	Watering	Twice daily	0.55	MRI, 2001	1.136410876	0.113641088
															6.245736964	0.624573696
B-20																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	7557.4	1	2	198	168.3	0.1	11	3.7787	Watering	Twice daily	0.55	MRI, 2001	0.116540722	0.011654072
Backhoe	CASE 580 SuperM Series 2 4WD 90 HP-1CY Dig 17' 6"	Tractors/Loaders/Backhoes	16589	1	2	198	168.3	0.1	11	8.2945	Watering	Twice daily	0.55	MRI, 2001	0.166008075	0.016600808
General truck	Cat 730 Dump truck	Off-Highway Trucks	112369	10	2	198	168.3	0.1	11	56.1845	Watering	Twice daily	0.55	MRI, 2001	3.926458879	0.392645888
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	10	6	198	168.3	0.1	11	1	Watering	Twice daily	0.55	MRI, 2001	1.922183629	0.192218363
Fuel Truck		Off-Highway Trucks	50000	10	1	198	168.3	0.1	11	25	Watering	Twice daily	0.55	MRI, 2001	1.363693051	0.136369305
															7.494884357	0.749488436
B-17 Alternative 3																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	7557.4	1	2	171.6	145.86	0.1	11	3.7787	Watering	Twice daily	0.55	MRI, 2001	0.101001959	0.010100196
Backhoe	CASE 580 SuperM Series 2 4WD 90 HP-1CY Dig 17' 6"	Tractors/Loaders/Backhoes	16589	1	2	171.6	145.86	0.1	11	8.2945	Watering	Twice daily	0.55	MRI, 2001	0.143873665	0.014387367
General truck	Cat 730 Dump truck	Off-Highway Trucks	112369	10	2	171.6	145.86	0.1	11	56.1845	Watering	Twice daily	0.55	MRI, 2001	3.402931028	0.340293103
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	10	6	171.6	145.86	0.1	11	1	Watering	Twice daily	0.55	MRI, 2001	1.665892478	0.166589248
Fuel Truck		Off-Highway Trucks	50000	10	1	171.6	145.86	0.1	11	25	Watering	Twice daily	0.55	MRI, 2001	1.181867311	0.118186731
															6.495566443	0.649556644
Elecetric Warfare Sites																
Skid Steer Loader	Cat 257B Multi Terrain Loader	Crawler Tractors	7557.4	1	1	1.555558333	1.322224583	0.1	11	3.7787	Watering	Twice daily	0.55	MRI, 2001	0.000457793	4.57793E-05
Backhoe	CASE 580 SuperM Series 2 4WD 90 HP-1CY Dig 17' 6"	Tractors/Loaders/Backhoes	16589	1	1	1.555558333	1.322224583	0.1	11	8.2945	Watering	Twice daily	0.55	MRI, 2001	0.000652109	6.52109E-05
General truck	Cat 730 Dump truck	Off-Highway Trucks	112369	10	1	1.555558333	1.322224583	0.1	11	56.1845	Watering	Twice daily	0.55	MRI, 2001	0.015423828	0.001542383
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	10	3	1.555558333	1.322224583	0.1	11	1	Watering	Twice daily	0.55	MRI, 2001	0.007550679	0.000755068
Fuel Truck		Off-Highway Trucks	50000	10	1	1.555558333	1.322224583	0.1	11	25	Watering	Twice daily	0.55	MRI, 2001	0.010713657	0.001071366
															0.034798065	0.003479807

FRTC Modernization Air Quality Calculations
Criteria Pollutants - PEB Sites

Equipment Used	Type	Emission Category (MOVES 2014a)	Year	HP	HP Bin	Number	Length of Project (days)	Days in Use	Hours per day	Emissions Factors (g/DAY)								Emissions (lbs)					Emissions (tons)											
B-17																																		
Soil Compactor / Roller	Ferguson 5-8B 9 TON	Roller	2022	80	75-100	1	10	10	8	92.45134656	95.5610081	22.82584283	0.363036621	8.256199396	8.008520475	72349.77293	1.688199126	2.04	2.11	0.50	0.01	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00					
Excavator	Caterpillar 320C L 1.25 cy 138 hp	Excavator	2022	138	100-175	1	10	4	8	49.85559656	108.3361008	49.45099978	0.740566341	5.796619616	5.622729077	151965.1402	3.709965893	0.44	0.96	0.44	0.01	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00					
Grader	Caterpillar 120H 12' 125hp	Grader	2022	120	100-175	1	10	10	8	51.96658615	113.7920227	44.95654723	0.67285518	7.273791995	7.055579396	136986.1347	3.375455622	1.15	2.51	0.99	0.01	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00					
Water truck		Off-Highway Trucks	2022	300	175-300	1	10	10	2	91.16536271	216.2795666	130.8911676	1.956690001	7.986747587	7.747137053	405451.212	9.795772712	0.50	1.19	0.72	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00					
Fuel Truck		Off-Highway Trucks	2022	300	175-300	1	10	10	1	91.16536271	216.2795666	130.8911676	1.956690001	7.986747587	7.747137053	405451.212	9.795772712		0.25	0.60	0.36	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00					
																		0.0021	0.0034	0.0013	0.0000	0.0002	0.0002	0.0002										
B-20																																		
Soil Compactor / Roller	Ferguson 5-8B 9 TON	Roller	2022	80	75-100	1	5	5	8	92.45134656	95.5610081	22.82584283	0.363036621	8.256199396	8.008520475	72349.77293	1.688199126	1.02	1.05	0.25	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00					
Excavator	Caterpillar 320C L 1.25 cy 138 hp	Excavator	2022	138	100-175	1	5	2	8	49.85559656	108.3361008	49.45099978	0.740566341	5.796619616	5.622729077	151965.1402	3.709965893	0.22	0.48	0.22	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00					
Grader	Caterpillar 120H 12' 125hp	Grader	2022	120	100-175	1	5	5	8	51.96658615	113.7920227	44.95654723	0.67285518	7.273791995	7.055579396	136986.1347	3.375455622	0.57	1.25	0.50	0.01	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00					
Fuel Truck		Off-Highway Trucks	2022	300	175-300	1	5	5	1	91.16536271	216.2795666	130.8911676	1.956690001	7.986747587	7.747137053	405451.212	9.795772712		0.13	0.30	0.18	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00					
Water truck		Off-Highway Trucks	2022	300	175-300	1	5	5	2	91.16536271	216.2795666	130.8911676	1.956690001	7.986747587	7.747137053	405451.212	9.795772712	0.25	0.60	0.36	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00					
																		0.0117	0.0018	0.0008	0.0001	0.0001	0.0001	0.0001										

FRTC Modernization Air Quality Calculations
GHG Emissions - PEB Sites

Equipment Used	Emission Category (MOVES 2014a)	Year	HP	HP Bin	Number	Length of Project (days)	Days in Use	Hours per day	Emissions Factors (g/DAY)			Emissions (Kg)			Emissions (metric tons)				
B-16																			
Soil Compactor / Roller	Roller	2022	80	75-100	1	30	30	8	72349.77293	1.688199126	-	2170.49	0.05	7.00	4257.56	2.17049	0.00005	0.00350	4.25756
Excavator	Excavator	2022	138	100-175	1	30	30	8	151965.1402	3.709965893	-	4558.95	0.11	8.00	6945.29	4.55895	0.00011	0.00400	6.94529
Grader	Grader	2022	120	100-175	1	30	30	8	136986.1347	3.375455622	-	4109.58	0.10	9.00	6793.71	4.10958	0.00010	0.00450	6.79371
Chipper	Crushing/Proc. Equipment	2022	99	75-100	1	30	30	8	68879.51551	1.649560177	-	2066.39	0.05	10.00	5047.42	2.06639	0.00005	0.00500	5.04742
Water truck	Off-Highway Trucks	2022	300	175-300	1	30	30	8	405451.212	9.795772712	-	12163.54	0.29	11.00	15447.71	12.16354	0.00029	0.00550	15.44771
																25.06895	0.00061	0.02250	38.49169
B-17																			
Soil Compactor / Roller	Roller	2022	80	75-100	1	10	10	8	72349.77293	1.688199126	-	723.50	0.02	9.00	3405.85	0.72350	0.00002	0.00450	3.40585
Excavator	Excavator	2022	138	100-175	1	10	4	8	151965.1402	3.709965893	-	607.86	0.01	10.00	3588.17	0.60786	0.00001	0.00500	3.58817
Grader	Grader	2022	120	100-175	1	10	10	8	136986.1347	3.375455622	-	1369.86	0.03	11.00	4648.57	1.36986	0.00003	0.00550	4.64857
Water truck	Off-Highway Trucks	2022	300	175-300	1	10	10	8	405451.212	9.795772712	-	4054.51	0.10	12.00	7632.57	4.05451	0.00010	0.00600	7.63257
																6.75573	0.00016	0.02100	19.27516
B-20																			
Soil Compactor / Roller	Roller	2022	80	75-100	1	5	5	8	72349.77293	1.688199126	-	361.75	0.01	9.00	3043.93	0.36175	0.00001	0.00450	3.04393
Excavator	Excavator	2022	138	100-175	1	5	2	8	151965.1402	3.709965893	-	303.93	0.01	10.00	3284.09	0.30393	0.00001	0.00500	3.28409
Grader	Grader	2022	120	100-175	1	5	5	8	136986.1347	3.375455622	-	684.93	0.02	11.00	3963.29	0.68493	0.00002	0.00550	3.96329
Water truck	Off-Highway Trucks	2022	300	175-300	1	5	5	8	405451.212	9.795772712	-	2027.26	0.05	12.00	5604.28	2.02726	0.00005	0.00600	5.60428
																3.37787	0.00008	0.02100	15.89558

FRTC Modernization Air Quality Calculations
Fugitive Dust - PEB Sites

Equipment Used	Site Length (feet)	Site Width (feet)	Site Area (sq ft)	Site Area (Acres)	Project Length (days)	Project Length (months)	Level 1 Emission Factor (ton/acre-month)	PM10 (tons/yr)	PM2.5 (tons/yr)	
B-17										
PEB Site 1	60	100	6000	0.137741	5	0.1666667	0.11	0.00253	0.00	
PEB Site 2	60	100	6000	0.137741	6	0.2	0.11	0.00303	0.00	
								0.0056	0.0006	
B-20										
PEB Site 1	210	210	44100	1.0123967	5	0.1666667	0.11	0.01856	0.00	
								0.0186	0.0019	
DVTA										
EW Site 1					5	10	0.3333333	0.11	0.18333	0.02
EW Site 2					5	10	0.3333333	0.11	0.18333	0.02
EW Site 3					5	10	0.3333333	0.11	0.18333	0.02
								0.5500	0.0550	

FRTC Modernization Air Quality Calculations
Criteria Pollutants and Fugitive Dust - Combat Village Construction

Equipment Used	Type	Emission Category (MOVES)	Year	HP	HP Bin	Number	Length of Project (days)	Days in Use	Hours per day	Emissions factors (g/day)								Emissions (tons/year)					Emissions (Metric tons/year)			
										CO	Nox	ROG	SO2	PM10	PM2.5	CO2	CH4	CO	Nox	ROG	SO2	PM10	PM2.5	CO2	CH4	CO2e
Flatbed Truck		Off Highway Truck	2022	750	750-1000	1	18	13	8	971.42346	4201.948616	350.433972	4.09318428	123.7377613	120.0257209	784722.7007	24.02785632	0.013920401	0.060213503	0.005021684	5.86549E-05	0.00177315	0.001719957	10.20139511	0.000312362	10.20920416
Soil Compactor / Roller	Ferguson 5-8B 9 TON	Roller	2022	80	75-100	1	18	5	8	92.45134656	95.5610081	22.82584283	0.363036621	8.256199396	8.008520475	72349.77293	1.688199126	0.000509546	0.000526684	0.000125805	2.00088E-06	4.5504E-05	4.4139E-05	0.361748865	8.441E-06	0.36195989
Grader	Caterpillar 120H 12' 125hp	Grader	2022	120	100-175	1	18	5	8	51.96658615	113.7920227	44.95654723	0.67285518	7.273791995	7.055579396	136986.1347	3.375455622	0.000286414	0.000627165	0.000247778	3.70844E-06	4.00895E-05	3.88868E-05	0.684930673	1.68773E-05	0.685352605
Total:																		0.01471636	0.061367353	0.005395266	6.43642E-05	0.001858743	0.001802982	11.24807465	0.00033768	11.25651666

Assume 50 boxes to be delivered, 1 trip will deliver 1 box, and there would be about 4 trips per day to the combat village.

Equipment Used	Type	Emission Category (MOVES 2014a)	Weight (lbs)	Length of road	Number	Length of Project (days)	Days Without Rain	PM10 Emission Factor Equation (lb/VMT)	Reference for PM10 EF Equation	PM2.5/ PM10 ratio	s-silt content (%)	W-vehicle weight (tons)	Control Measure	Control Application/ Frequency	Control Efficiency	Reference	Uncontrolled Emissions		Controlled Emissions	
																	PM10 (tons/yr)	PM2.5 (tons/yr)	PM10 (tons/yr)	PM2.5 (tons/yr)
General truck		Off-Highway Trucks	112369	100	1	13	11.05	$E = 1.5 (s/12)^{0.9} (W/3)^{0.45}$	AP-42	0.1	11	56.1845	Drive Slow	n/a	0.44	MRI, 2001	0.259223535	0.025922353	0.145165179	0.014516518
Soil Compactor / Roller			20000	23	1	5	4.25	$E = 1.5 (s/12)^{0.9} (W/3)^{0.45}$	AP-43	0.1	11	10	Drive Slow	n/a	0.44	MRI, 2001	0.027420466	0.002742047	0.015355461	0.001535546
Grader			45000	23	1	5	4.25	$E = 1.5 (s/12)^{0.9} (W/3)^{0.45}$	AP-44	0.1	11	22.5	Drive Slow	n/a	0.44	MRI, 2001	0.03949635	0.003949635	0.022117956	0.002211796
Personal Vehicle Trips		Passenger Truck - Gasoline	2000	180	2	18	15.3	$E = 1.5 (s/12)^{0.9} (W/3)^{0.45}$	AP-42	0.1	11	1	Drive Slow	n/a	0.44	MRI, 2001	0.152282324	0.015228232	0.085278101	0.00852781
Total:																	0.478422674	0.047842267	0.267916698	0.02679167