

**Appendix D:
Energy Resources Supporting Information**

THIS PAGE INTENTIONALLY LEFT BLANK

Stonebridge Subdivision Project Summary Energy Use

Summary of Energy Use During Construction	(Annually)
Construction off-site vehicle fuel	29,582 gallons (gasoline, diesel)
Construction on-site equipment fuel	88,393 gallons (diesel)
Construction office electricity	32,885 kilowatt hours
Summary of Energy Use During Proposed Operations	(Annually)
Operation vehicle fuel	100,857 gallons (gasoline, diesel)
Operation natural gas	3,051,830 kilo-British Thermal Units
Operation electricity	849,510 kilowatt hours
Summary of Energy Use During Existing Operations	(Annually)
Operation vehicle fuel	830 gallons (gasoline, diesel)
Operation natural gas	29,065 kilo-British Thermal Units
Operation electricity	8,091 kilowatt hours
Increase in Energy Use from Existing Operations to Proposed Operations	(Annually)
Additional operation vehicle fuel	100,027 gallons (gasoline, diesel)
Additional operation natural gas	3,022,765 kilo-British Thermal Units
Additional operation electricity	841,419 kilowatt hours

Construction Vehicle Fuel Calculations

California Air Resource Board. 2019. EMFAC2014 Web Database. March. Website: <https://www.arb.ca.gov/emfac/2014/>. Accessed December 9, 2019

VMT = Vehicle Miles Traveled
FE = Fuel Economy

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Sonoma

Calendar Year: 2021

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MidYr	Speed	Fuel	Population	VMT (mi/day)	Fuel_Consumption (1000 gallons/day)	Calculations	
									FE (mi/gallon)	VMT*FE
Sonoma	2021	HHDT	Aggregated	Aggregated	GAS	16.2357747	1901.58782	0.413152808	4.602625917	8752.297397
Sonoma	2021	HHDT	Aggregated	Aggregated	DSL	1990.657711	245931.739	43.4813758	5.656024779	1390996.01
Sonoma	2021	LDA	Aggregated	Aggregated	GAS	127800.6513	5124518.91	176.0277166	29.11200014	149184995.2
Sonoma	2021	LDA	Aggregated	Aggregated	DSL	1744.049132	66522.4195	1.85737646	35.81525929	2382517.703
Sonoma	2021	LDT1	Aggregated	Aggregated	GAS	10787.93283	366089.647	15.28725683	23.94737333	8766885.439
Sonoma	2021	LDT1	Aggregated	Aggregated	DSL	24.12086989	393.849078	0.015190621	25.92712109	10211.37273
Sonoma	2021	LDT2	Aggregated	Aggregated	GAS	37609.02884	1576995.55	71.98203753	21.90818153	34549104.69
Sonoma	2021	LDT2	Aggregated	Aggregated	DSL	61.94278236	2947.49564	0.101025801	29.17567193	85995.16575
Sonoma	2021	LHDT1	Aggregated	Aggregated	GAS	3740.693587	110465.203	11.55172881	9.562655508	1056340.683
Sonoma	2021	LHDT1	Aggregated	Aggregated	DSL	4692.502384	152622.895	8.910520906	17.12839199	2614184.771
Sonoma	2021	LHDT2	Aggregated	Aggregated	GAS	518.3351583	18866.9752	2.158259728	8.741753811	164930.4524
Sonoma	2021	LHDT2	Aggregated	Aggregated	DSL	1142.216547	43547.786	2.801706884	15.5433055	676876.5416
Sonoma	2021	MHDT	Aggregated	Aggregated	GAS	329.7546429	15106.2266	2.391642459	6.31625624	95414.79808
Sonoma	2021	MHDT	Aggregated	Aggregated	DSL	4906.573775	256968.217	30.90363593	8.315145104	2136728.012

Worker Trips
Sum of VMT*FE (Column BI) **194979709.6**
Total VMT **7137467.865**
Weighted Average FE **27.31777057**

Vendor
Sum of VMT*FE (Column BI) **8144223.564**
Total VMT **845410.6297**
Weighted Average FE **9.633452997**

Haul
Sum of VMT*FE (Column BI) **1399748.307**
Total VMT **247833.3268**
Weighted Average FE **5.647942208**

Stonebridge Subdivision Project Construction Assumptions

Site Work Phase

Source: AQ/GHG Appendix, CalEEMod Output

Unmitigated Construction-Demolition,Site Prep,Grading,Paving - Sonoma-San Francisco County, Annual

Date: 12/6/2019 3:39 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
Demolition	Demolition	Demolition	4/1/2021	4/30/2021	5	20
Site Preparation	Site Preparation	Site Preparation	4/29/2021	5/12/2021	5	10
Grading	Grading	Grading	5/13/2021	6/23/2021	5	30
Stormwater Treatment Area	Building Construction	Building Construction	5/13/2021	9/29/2021	5	100
Paving	Paving	Paving	6/24/2021	9/29/2021	5	70

Trips and VMT	Phase Name	Trips per Day			Total Trips			Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length		Num Days	Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips
	Demolition	15	0	17	10.8	7.3	20	20	300	0	17	3,240	0	340	118.60	0.00	3.01
	Site Preparation	18	0	0	10.8	7.3	20	10	180	0	0	1,944	0	0	71.16	0.00	0.00
	Grading	20	0	138	10.8	7.3	20	30	600	0	138	6,480	0	2,760	237.21	0.00	24.43
	Stormwater Treatment Area	337	132	0	10.8	7.3	20	100	33,700	13,200	0	363,960	96,360	0	13,323.20	10,002.64	0.00
	Paving	15	0	0	10.8	7.3	20	70	1,050	0	0	11,340	0	0	415.11	0.00	0.00
	Site Work Phase Total Construction VMT (miles)																
	486,424																
	Site Work Phase Total Fuel Consumption (gallons)																
	24,195																

Phase 1

Source: AQ/GHG Appendix, CalEEMod Output

Unmitigated Construction-Homes 1-21 - Sonoma-San Francisco County, Annual

Date: 12/6/2019 2:39 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
Building Construction	Building Construction	Building Construction	9/30/2021	8/3/2022	5	220
Paving	Paving	Paving	8/4/2022	8/17/2022	5	10
Architectural Coating	Architectural Coating	Architectural Coating	8/18/2022	8/31/2022	5	10

Trips and VMT	Phase Name	Trips per Day			Total Trips			Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length		Num Days	Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips
	Building Construction	8	2	0	10.8	7.3	20	220	1,760	440	0	19,008	3,212	0	695.81	333.42	0.00
	Paving	15	0	0	10.8	7.3	20	10	150	0	0	1,620	0	0	59.30	0.00	0.00
	Architectural Coating	2	0	0	10.8	7.3	20	10	20	0	0	216	0	0	7.91	0.00	0.00
	Phase 1 Total Construction VMT (miles)																
	24,056																
	Phase 1 Total Fuel Consumption (gallons)																
	1,096																

Phase 2

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 22-42 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:42 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
	Building Construction	Building Construction	4/13/2021	2/14/2022	5	220
	Paving	Paving	2/15/2022	2/28/2022	5	10
	Architectural Coating	Architectural Coating	3/1/2022	3/14/2022	5	10

Trips and VMT	Phase Name	Trips per Day			Total Trips			Num Days	Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length			Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
	Building Construction	8	2	0	10.8	6.6	20	220	1,760	440	0	19,008	2,904	0	695.81	301.45	0.00	
	Paving	15	0	0	10.8	6.6	20	10	150	0	0	1,620	0	0	59.30	0.00	0.00	
	Architectural Coating	2	0	0	10.8	6.6	20	10	20	0	0	216	0	0	7.91	0.00	0.00	

Phase 2 Total Construction VMT (miles)
23,748

Phase 2 Total Fuel Consumption (gallons)
1,064

Phase 3

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 43-63 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:51 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
	Building Construction	Building Construction	10/25/2021	8/26/2022	5	220
	Paving	Paving	8/27/2022	9/9/2022	5	10
	Architectural Coating	Architectural Coating	9/10/2022	9/23/2022	5	10

Trips and VMT	Phase Name	Trips per Day			Total Trips			Num Days	Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length			Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
	Building Construction	8	2	0	10.8	7.3	20	220	1,760	440	0	19,008	3,212	0	695.81	333.42	0.00	
	Paving	15	0	0	10.8	7.3	20	10	150	0	0	1,620	0	0	59.30	0.00	0.00	
	Architectural Coating	2	0	0	10.8	7.3	20	10	20	0	0	216	0	0	7.91	0.00	0.00	

Phase 3 Total Construction VMT (miles)
24,056

Phase 3 Total Fuel Consumption (gallons)
1,096

Phase 4

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 64-84 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:59 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
	Building Construction	Building Construction	5/6/2022	3/9/2023	5	220
	Paving	Paving	3/10/2023	3/23/2023	5	10
	Architectural Coating	Architectural Coating	3/24/2023	4/6/2023	5	10

Trips and VMT	Phase Name	Trips per Day			Total Trips			Num Days	Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length			Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
	Building Construction	8	2	0	10.8	6.6	20	220	1,760	440	0	19,008	2,904	0	695.81	301.45	0.00	
	Paving	15	0	0	10.8	6.6	20	10	150	0	0	1,620	0	0	59.30	0.00	0.00	
	Architectural Coating	2	0	0	10.8	6.6	20	10	20	0	0	216	0	0	7.91	0.00	0.00	

Phase 4 Total Construction VMT (miles)
23,748

Phase 4 Total Fuel Consumption (gallons)
1,064

Phase 5

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 85-105 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 3:14 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days	
					Week	Num Days
	Building Construction	Building Construction	11/17/2022	9/20/2023	5	220
	Paving	Paving	9/21/2023	10/4/2023	5	10
	Architectural Coating	Architectural Coating	10/5/2023	10/18/2023	5	10

Trips and VMT	Phase Name	Trips per Day			Total Trips			Num Days	Worker Trip Number	Trips per Phase			VMT per Phase			Fuel Consumption (gallons)		
		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length			Vendor Trip Number	Hauling Trip Number	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
	Building Construction	8	2	0	10.8	6.6	20	220	1,760	440	0	19,008	2,904	0	695.81	301.45	0.00	
	Paving	15	0	0	10.8	6.6	20	10	150	0	0	1,620	0	0	59.30	0.00	0.00	
	Architectural Coating	2	0	0	10.8	6.6	20	10	20	0	0	216	0	0	7.91	0.00	0.00	

Phase 5 Total Construction VMT (miles)
23,748

Phase 5 Total Fuel Consumption (gallons)
1,064

Total (All Phases) Construction VMT (miles)
605,780

Total (All Phases) Fuel Consumption (gallons)
29,582

Construction Equipment Fuel Calculation

Site Work Phase

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Demolition,Site Prep,Grading,Paving - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 3:39 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days							
					Week	Num Days						
	Demolition	Demolition	4/1/2021	4/28/2021	5	20						
	Site Preparation	Site Preparation	4/29/2021	5/12/2021	5	10						
	Grading	Grading	5/13/2021	6/23/2021	5	30						
	Stormwater Treatment Area	Building Construction	5/13/2021	9/29/2021	5	100						
	Paving	Paving	6/24/2021	9/29/2021	5	70						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage			
	Demolition	Concrete/Industrial Saws	1	8	81	0.73	20	9,460.80	473.04			
	Demolition	Excavators	3	8	158	0.38	20	28,819.20	1,440.96			
	Demolition	Rubber Tired Dozers	2	8	247	0.4	20	31,616.00	1,580.80			
	Site Preparation	Rubber Tired Dozers	3	8	247	0.4	10	23,712.00	1,185.60			
	Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37	10	11,484.80	574.24			
	Grading	Excavators	2	8	158	0.38	30	28,819.20	1,440.96			
	Grading	Graders	1	8	187	0.41	30	18,400.80	920.04			
	Grading	Rubber Tired Dozers	1	8	247	0.4	30	23,712.00	1,185.60			
	Grading	Scrapers	2	8	367	0.48	30	84,556.80	4,227.84			
	Grading	Tractors/Loaders/Backhoes	2	8	97	0.37	30	17,227.20	861.36			
	Stormwater Treatment Area	Cranes	1	7	231	0.29	100	46,893.00	2,344.65			
	Stormwater Treatment Area	Forklifts	3	8	89	0.2	100	42,720.00	2,136.00			
	Stormwater Treatment Area	Generator Sets	1	8	84	0.74	100	49,728.00	2,486.40			
	Stormwater Treatment Area	Tractors/Loaders/Backhoes	3	7	97	0.37	100	75,369.00	3,768.45			
	Stormwater Treatment Area	Welders	1	8	46	0.45	100	16,560.00	828.00			
	Paving	Pavers	2	8	130	0.42	70	61,152.00	3,057.60			
	Paving	Paving Equipment	2	8	132	0.36	70	53,222.40	2,661.12			
	Paving	Rollers	2	8	80	0.38	70	34,048.00	1,702.40			
									Total Construction Equipment Fuel Consumption - Site Work Phase	32,875.06 gallons		

Phase 1

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 1-21 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:39 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days							
					Week	Num Days						
	Building Construction	Building Construction	9/30/2021	8/3/2022	5	220						
	Paving	Paving	8/4/2022	8/17/2022	5	10						
	Architectural Coating	Architectural Coating	8/18/2022	8/31/2022	5	10						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage			
	Building Construction	Cranes	1	2.8	231	0.29	220	41,265.84	2,063.29			
	Building Construction	Forklifts	3	3.2	89	0.2	220	37,593.60	1,879.68			
	Building Construction	Generator Sets	1	3.2	84	0.74	220	43,760.64	2,188.03			
	Building Construction	Tractors/Loaders/Backhoes	3	2.8	97	0.37	220	66,324.72	3,316.24			
	Building Construction	Welders	1	3.2	46	0.45	220	14,572.80	728.64			
	Paving	Cement and Mortar Mixers	1	8	9	0.56	10	403.20	20.16			
	Paving	Pavers	1	8	130	0.42	10	4,368.00	218.40			
	Paving	Paving Equipment	1	8	132	0.36	10	3,801.60	190.08			
	Paving	Rollers	2	8	80	0.38	10	4,864.00	243.20			
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	10	2,871.20	143.56			
	Architectural Coating	Air Compressors	1	6	78	0.48	10	2,246.40	112.32			
									Total Construction Equipment Fuel Consumption - Phase 1	11,103.60 gallons		

Phase 2

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 22-42 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:42 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days							
					Week	Num Days						
	Building Construction	Building Construction	4/13/2021	2/14/2022	5	220						
	Paving	Paving	2/15/2022	2/28/2022	5	10						
	Architectural Coating	Architectural Coating	3/1/2022	3/14/2022	5	10						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage			
	Building Construction	Cranes	1	2.8	231	0.29	220	41,265.84	2,063.29			
	Building Construction	Forklifts	3	3.2	89	0.2	220	37,593.60	1,879.68			
	Building Construction	Generator Sets	1	3.2	84	0.74	220	43,760.64	2,188.03			
	Building Construction	Tractors/Loaders/Backhoes	3	2.8	97	0.37	220	66,324.72	3,316.24			
	Building Construction	Welders	1	3.2	46	0.45	220	14,572.80	728.64			
	Paving	Cement and Mortar Mixers	1	8	9	0.56	10	403.20	20.16			
	Paving	Pavers	1	8	130	0.42	10	4,368.00	218.40			
	Paving	Paving Equipment	1	8	132	0.36	10	3,801.60	190.08			
	Paving	Rollers	2	8	80	0.38	10	4,864.00	243.20			
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	10	2,871.20	143.56			
	Architectural Coating	Air Compressors	1	6	78	0.48	10	2,246.40	112.32			
									Total Construction Equipment Fuel Consumption - Phase 2	11,103.60 gallons		

Phase 3

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 43-63 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:51 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days						
					Week	Num Days					
	Building Construction	Building Construction	10/25/2021	8/26/2022	5	220					
	Paving	Paving	8/27/2022	9/9/2022	5	10					
	Architectural Coating	Architectural Coating	9/10/2022	9/23/2022	5	10					
					Usage						
					Horse						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage		
	Building Construction	Cranes	1	2.8	231	0.29	220	41,265.84	2,063.29		
	Building Construction	Forklifts	3	3.2	89	0.2	220	37,593.60	1,879.68		
	Building Construction	Generator Sets	1	3.2	84	0.74	220	43,760.64	2,188.03		
	Building Construction	Tractors/Loaders/Backhoes	3	2.8	97	0.37	220	66,324.72	3,316.24		
	Building Construction	Welders	1	3.2	46	0.45	220	14,572.80	728.64		
	Paving	Cement and Mortar Mixers	1	8	9	0.56	10	403.20	20.16		
	Paving	Pavers	1	8	130	0.42	10	4,368.00	218.40		
	Paving	Paving Equipment	1	8	132	0.36	10	3,801.60	190.08		
	Paving	Rollers	2	8	80	0.38	10	4,864.00	243.20		
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	10	2,871.20	143.56		
	Architectural Coating	Air Compressors	1	6	78	0.48	10	2,246.40	112.32		
Total Construction Equipment Fuel Consumption - Phase 3									11,103.60 gallons		

Phase 4

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 64-84 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 2:59 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days						
					Week	Num Days					
	Building Construction	Building Construction	5/6/2022	3/9/2023	5	220					
	Paving	Paving	3/10/2023	3/23/2023	5	10					
	Architectural Coating	Architectural Coating	3/24/2023	4/6/2023	5	10					
					Usage						
					Horse						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage		
	Building Construction	Cranes	1	2.8	231	0.29	220	41,265.84	2,063.29		
	Building Construction	Forklifts	3	3.2	89	0.2	220	37,593.60	1,879.68		
	Building Construction	Generator Sets	1	3.2	84	0.74	220	43,760.64	2,188.03		
	Building Construction	Tractors/Loaders/Backhoes	3	2.8	97	0.37	220	66,324.72	3,316.24		
	Building Construction	Welders	1	3.2	46	0.45	220	14,572.80	728.64		
	Paving	Cement and Mortar Mixers	1	8	9	0.56	10	403.20	20.16		
	Paving	Pavers	1	8	130	0.42	10	4,368.00	218.40		
	Paving	Paving Equipment	1	8	132	0.36	10	3,801.60	190.08		
	Paving	Rollers	2	8	80	0.38	10	4,864.00	243.20		
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	10	2,871.20	143.56		
	Architectural Coating	Air Compressors	1	6	78	0.48	10	2,246.40	112.32		
Total Construction Equipment Fuel Consumption - Phase 4									11,103.60 gallons		

Phase 5

Source: AQ/GHG Appendix, CalEEMod Output
 Unmitigated Construction-Homes 85-105 - Sonoma-San Francisco County, Annual
 Date: 12/6/2019 3:14 PM

Construction Schedule	Phase Name	Phase Type	Start Date	End Date	Num Days						
					Week	Num Days					
	Building Construction	Building Construction	11/17/2022	9/20/2023	5	220					
	Paving	Paving	9/21/2023	10/4/2023	5	10					
	Architectural Coating	Architectural Coating	10/5/2023	10/18/2023	5	10					
					Usage						
					Horse						
Construction Equipment	Phase Name	Offroad Equipment Type	Amount	Hours	Power	Load Factor	Number of Days	HP Hours	Diesel Fuel Usage		
	Building Construction	Cranes	1	2.8	231	0.29	220	41,265.84	2,063.29		
	Building Construction	Forklifts	3	3.2	89	0.2	220	37,593.60	1,879.68		
	Building Construction	Generator Sets	1	3.2	84	0.74	220	43,760.64	2,188.03		
	Building Construction	Tractors/Loaders/Backhoes	3	2.8	97	0.37	220	66,324.72	3,316.24		
	Building Construction	Welders	1	3.2	46	0.45	220	14,572.80	728.64		
	Paving	Cement and Mortar Mixers	1	8	9	0.56	10	403.20	20.16		
	Paving	Pavers	1	8	130	0.42	10	4,368.00	218.40		
	Paving	Paving Equipment	1	8	132	0.36	10	3,801.60	190.08		
	Paving	Rollers	2	8	80	0.38	10	4,864.00	243.20		
	Paving	Tractors/Loaders/Backhoes	1	8	97	0.37	10	2,871.20	143.56		
	Architectural Coating	Air Compressors	1	6	78	0.48	10	2,246.40	112.32		
Total Construction Equipment Fuel Consumption - Phase 5									11,103.60 gallons		

Total Construction Equipment Fuel Consumption - All Phases 88,393.06 gallons

Notes:

Equipment assumptions are provided in the CalEEMod output files.
 Fuel usage estimate of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.
 South Coast Air Quality Management District. 1993. Air Quality Handbook, Table A9-3E.
 Website: <http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook>. Accessed April 18, 2019.

Construction Office Electricity Calculation

Energy Appendix: CalEEMod Typical Construction Trailer
 Typical Construction Trailer - Sonoma-San Francisco County, Annual
 Date: 12/9/2019 12:30 PM

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	12837.6	2.2748	1.7000e-004	3.0000e-005	2.2894
Total		2.2748	1.7000e-004	3.0000e-005	2.2894

kWh/yr = kilowatt hours per year

Energy by Land Use - Electricity

Annual 12,837.6 kWh/yr
Total Over Construction 32,885.359 kWh

Total Construction Schedule

Start 4/1/2021
 End 10/23/2023
 Total Calendar Days 935
 Years 2.56

Proposed Operation Fuel Calculation

California Air Resource Board (ARB). 2019. EMFAC2014 Web Database. Website: <https://www.arb.ca.gov/emfac/2014/>. Accessed December 6, 2019.

EMFAC2014 (v1.0.7) Emissions Inventory
 Region Type: County
 Region: Sonoma
 Calendar Year: 2023
 Season: Annual
 Vehicle Classification: EMFAC2007 Categories
 Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

VMT = Vehicle Miles Traveled
 FE = Fuel Economy

Given

Calculations

Region	CalYr	VehClass	MdYr	Speed	Fuel	Population	VMT	Fuel Consumption	FE	VMT*FE
Sonoma	2023	HHDT	Aggregated	Aggregated	GAS	15.7921137	1915.82923	0.406162509	4.716903	9036.78101
Sonoma	2023	HHDT	Aggregated	Aggregated	DSL	2026.45049	262377.919	44.1264226	5.94605	1560112.244
Sonoma	2023	LDA	Aggregated	Aggregated	GAS	131740.806	5232325.79	169.3754821	30.89187	161636340.8
Sonoma	2023	LDA	Aggregated	Aggregated	DSL	1830.07426	69161.557	1.818928881	38.02323	2629746.01
Sonoma	2023	LDT1	Aggregated	Aggregated	GAS	9835.57677	342710.039	13.28620674	25.79442	8840007.763
Sonoma	2023	LDT1	Aggregated	Aggregated	DSL	21.1372624	342.355783	0.012601421	27.16803	9301.132206
Sonoma	2023	LDT2	Aggregated	Aggregated	GAS	37182.887	1570398.27	66.34723722	23.66938	37170360.52
Sonoma	2023	LDT2	Aggregated	Aggregated	DSL	68.4421596	3145.30001	0.101278513	31.05595	97680.26589
Sonoma	2023	LHDT1	Aggregated	Aggregated	GAS	3248.98104	93060.1141	9.689461783	9.60426	893773.5683
Sonoma	2023	LHDT1	Aggregated	Aggregated	DSL	4259.82543	134470.385	7.779018281	17.28629	2324494.392
Sonoma	2023	LHDT2	Aggregated	Aggregated	GAS	465.626052	16974.9664	1.920725447	8.837789	150021.1735
Sonoma	2023	LHDT2	Aggregated	Aggregated	DSL	1064.98752	40269.4807	2.548835573	15.79917	636224.2806
Sonoma	2023	MCV	Aggregated	Aggregated	GAS	7219.59756	47125.1132	1.336180746	35.26852	1662032.853
Sonoma	2023	MDV	Aggregated	Aggregated	GAS	28502.7581	944468.156	55.91709375	16.89051	15952547.57
Sonoma	2023	MDV	Aggregated	Aggregated	DSL	475.0018	19880.7105	0.849399146	23.40562	465320.2822
Sonoma	2023	MH	Aggregated	Aggregated	GAS	824.685098	6990.84224	1.058401602	6.605094	46175.17129
Sonoma	2023	MH	Aggregated	Aggregated	DSL	241.833838	2132.10557	0.222229451	9.594163	20455.7683
Sonoma	2023	MHDT	Aggregated	Aggregated	GAS	317.157457	15041.1913	2.34462842	6.415171	96491.80874
Sonoma	2023	MHDT	Aggregated	Aggregated	DSL	5268.40201	272457.103	32.33188789	8.426885	2295964.69
Sonoma	2023	OBUS	Aggregated	Aggregated	GAS	148.894149	7849.06819	1.189541763	6.598396	51791.26397
Sonoma	2023	OBUS	Aggregated	Aggregated	DSL	267.595855	21731.9337	2.928975321	7.419637	161243.0593
Sonoma	2023	SBUS	Aggregated	Aggregated	GAS	24.606765	1255.66669	0.10478637	11.98311	15046.79306
Sonoma	2023	SBUS	Aggregated	Aggregated	DSL	186.005273	7047.36746	0.968964327	7.273093	51256.15746
Sonoma	2023	UBUS	Aggregated	Aggregated	GAS	50.4541115	7343.41343	1.471591499	4.990117	36644.49053
Sonoma	2023	UBUS	Aggregated	Aggregated	DSL	60.797577	8741.84971	1.957538525	4.465736	39038.79048

Vehicles	
Sum of VMT*FE	236851107.6
Total VMT	9129216.523
Weighted Average FE	25.9442973 miles/gallon

Total VMT

Source: AQ/GHG Appendix, CalEEMod Output
 Stonebridge Subdivision Project-Existing Emissions - Solano-San Francisco County, Annual
 Date: 12/5/2019 7:43 PM

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated Annual VMT	Mitigated Annual VMT
	Weekday	Saturday	Sunday		
Other Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	1,132.95	1,132.95	1,132.95	2,616,670	2,616,670
Total	1,132.95	1,132.95	1,132.95	2,616,670	2,616,670

	VMT	Fuel Consumption
Vehicles	2,616,670	100,857
Total	2,616,670	100,857

Total VMT	2,616,670 miles
Fuel consumption	100,857 gallons per year

Operation Natural Gas Use

Source: AQ/GHG Appendix, CalEEMod Output

Stonebridge Subdivision Project- Unmitigated Operational Only - Sonoma-San Francisco County, Annual

Date: 12/5/2019 7:04 PM

kBTU/yr = kilo-British Thermal Units/year
 CF = cubic feet

Single Family Housing 3,051,830 kBTU/yr
 Total 3,051,830 kBTU/yr

Dwellings Per dwelling
 105 29065.05 kBTU/yr

Conversion from kBTU/yr to CF/yr

Abraxas. 2019. Energy Conversion Calculator.

Website: <https://www.abraxasenergy.com/energy-resources/toolbox/conversion-calculators/energy/>. Accessed December 6, 2019.

Equivalency:

3,051,830 kBTU/yr
2,991,990 CF/yr natural gas

Energy Conversion Calculator

Convert From:

 kBTU

how many decimal places?

Convert

To:

- 3051830000 Btu
- 3051830 kBTU
- 3051.83 Million BTU
- 32198637597 Joules
- 3219863759.8 kiloJoules
- 3219863.76 MegaJoules
- 894402.87 kWh
- 894.403 MWh
- 30518.3 therm
- 3051.83 decatherm
- 29919.897 natural gas CCF
- 2991990.196 natural gas CF
- 84723.684 natural gas M3

Mitigated

	Natural Gas Use	COB	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio-CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										M/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	3,051,830	0.0165	0.1408	0.0598	9.0000e-004	0.0114	0.0114	0.0114	0.0114	0.0114	0.0114	0.0000	162.8575	162.8575	3.1200e-003	2.3900e-003	163.8253
Total		0.0165	0.1408	0.0598	9.0000e-004	0.0114	0.0114	0.0114	0.0114	0.0114	0.0114	0.0000	162.8575	162.8575	3.1200e-003	2.3900e-003	163.8253

Proposed Operation Electricity Use

Source: AQ/GHG Appendix, CalEEMod Output

Stonebridge Subdivision Project- Unmitigated Operational Only - Sonoma-San Francisco County, Annual

Date: 12/5/2019 7:04 PM

kWh/yr = kilowatt hours per year

	Electricity Use (kWh/yr)
Land Use	
Other Asphalt Surfaces	0
Other Non-Asphalt Surfaces	0
Single Family Housing	849510
Total	849,510 kWh/yr
Dwellings	
105	Per dwelling 8091 kWh/year

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	849510	150.5296	0.0112	2.3100e-003	151.4980
Total		150.5296	0.0112	2.3100e-003	151.4980

Electricity Use after accounting for onsite renewable (amount to be obtained from the grid):

	Electricity Use (kWh/yr)
Land Use	
Other Asphalt Surfaces	-77029.3
Other Non-Asphalt Surfaces	-77029.3
Single Family Housing	772481
Total	618,422 kWh/yr
Dwellings	
105	Per dwelling 5890 kWh/year

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	-77029.3	-13.6493	-0.0010	-0.0002	-13.7371
Other Non-Asphalt Surfaces	-77029.3	-13.6493	-0.0010	-0.0002	-13.7371
Single Family Housing	772481	136.8804	0.0102	2.1000e-003	137.7609
Total		109.5818	8.1400e-003	1.6800e-003	110.2867

Existing Operation Fuel Calculation

California Air Resource Board (ARB). 2019. EMFAC2014 Web Database. Website: <https://www.arb.ca.gov/emfac/2014/>. Accessed December 6, 2019.

EMFAC2014 (v1.0.7) Emissions Inventory

Region Type: County

Region: Sonoma

Calendar Year: 2023

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

VMT = Vehicle Miles Traveled

FE = Fuel Economy

Given

Calculations

Region	CalYr	VehClass	MdYr	Speed	Fuel	Population	VMT	Fuel Consumption	FE	VMT*FE
Sonoma	2023	HHDT	Aggregated	Aggregated	GAS	15.7921137	1915.82923	0.406162509	4.716903	9036.78101
Sonoma	2023	HHDT	Aggregated	Aggregated	DSL	2026.45049	262377.919	44.1264226	5.94605	1560112.244
Sonoma	2023	LDA	Aggregated	Aggregated	GAS	131740.806	5232325.79	169.3754821	30.89187	161636340.8
Sonoma	2023	LDA	Aggregated	Aggregated	DSL	1830.07426	69161.557	1.818928881	38.02323	2629746.01
Sonoma	2023	LDT1	Aggregated	Aggregated	GAS	9835.57677	342710.039	13.28620674	25.79442	8840007.763
Sonoma	2023	LDT1	Aggregated	Aggregated	DSL	21.1372624	342.355783	0.012601421	27.16803	9301.132206
Sonoma	2023	LDT2	Aggregated	Aggregated	GAS	37182.887	1570398.27	66.34723722	23.66938	37170360.52
Sonoma	2023	LDT2	Aggregated	Aggregated	DSL	68.4421596	3145.30001	0.101278513	31.05595	97680.26589
Sonoma	2023	LHDT1	Aggregated	Aggregated	GAS	3248.98104	93060.1141	9.689461783	9.60426	893773.5683
Sonoma	2023	LHDT1	Aggregated	Aggregated	DSL	4259.82543	134470.385	7.779018281	17.28629	2324494.392
Sonoma	2023	LHDT2	Aggregated	Aggregated	GAS	465.626052	16974.9664	1.920725447	8.837789	150021.1735
Sonoma	2023	LHDT2	Aggregated	Aggregated	DSL	1064.98752	40269.4807	2.548835573	15.79917	636224.2806
Sonoma	2023	MCY	Aggregated	Aggregated	GAS	7219.59756	47125.1132	1.336180746	35.26852	1662032.853
Sonoma	2023	MDV	Aggregated	Aggregated	GAS	28502.7581	944468.156	55.91709375	16.89051	15952547.57
Sonoma	2023	MDV	Aggregated	Aggregated	DSL	475.0018	19880.7105	0.849399146	23.40562	465320.2822
Sonoma	2023	MH	Aggregated	Aggregated	GAS	824.685098	6990.84224	1.058401602	6.605094	46175.17129
Sonoma	2023	MH	Aggregated	Aggregated	DSL	241.833838	2132.10557	0.222229451	9.594163	20455.7683
Sonoma	2023	MHDT	Aggregated	Aggregated	GAS	317.157457	15041.1913	2.34462842	6.415171	96491.80874
Sonoma	2023	MHDT	Aggregated	Aggregated	DSL	5268.40201	272457.103	32.33188789	8.426885	2295964.69
Sonoma	2023	OBUS	Aggregated	Aggregated	GAS	148.894149	7849.06819	1.189541763	6.598396	51791.26397
Sonoma	2023	OBUS	Aggregated	Aggregated	DSL	267.595855	21731.9337	2.928975321	7.419637	161243.0593
Sonoma	2023	SBUS	Aggregated	Aggregated	GAS	24.606765	1255.66669	0.10478637	11.98311	15046.79306
Sonoma	2023	SBUS	Aggregated	Aggregated	DSL	186.005273	7047.36746	0.968964327	7.273093	51256.15746
Sonoma	2023	UBUS	Aggregated	Aggregated	GAS	50.4541115	7343.41343	1.471591499	4.990117	36644.49053
Sonoma	2023	UBUS	Aggregated	Aggregated	DSL	60.797577	8741.84971	1.957538525	4.465736	39038.79048

Vehicles	
Sum of VMT*FE	236851107.6
Total VMT	9129216.523
Weighted Average FE	25.9442973 miles/gallon

Total VMT

Source: AQ/GHG Appendix, CalEEMod Output

Stonebridge Subdivision Project - Unmitigated Operational Only - Sonoma-San Francisco County, Annual

Date: 12/5/2019 7:04 PM

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	9.44	9.54	8.55	21,542	21,542
Total	9.44	9.54	8.55	21,542	21,542

	VMT	Fuel Consumption
Vehicles	21,542	830
Total	21,542	830

Total VMT	21,542 miles
Fuel consumption	830 gallons per year

Existing Operation Natural Gas Use

Source: AQ/GHG Appendix, CalEEMod Output

Stonebridge Subdivision Project-Existing Emissions - Solano-San Francisco County, Annual

Date: 12/5/2019 7:43 PM

kBTU/yr = kilo-British Thermal Units/year
 CF = cubic feet

Single Family Housing 29065.1 kBTU/yr
 Total 29,065 kBTU/yr

Dwellings Per dwelling
 1 29065.1 kBTU/yr

Conversion from kBTU/yr to CF/yr

Abraxas. 2019. Energy Conversion Calculator.

Website: <https://www.abraxasenergy.com/energy-resources/toolbox/conversion-calculators/energy/>. Accessed December 6, 2019.

Equivalency:

29,065 kBTU/yr
28,495 CF/yr natural gas

Mitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	29065.1	1.8000e-004	1.3400e-003	5.7000e-004	1.0000e-005	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	0.0000	1.5510	1.5510	3.0000e-005	3.0000e-005	1.5602
Total		1.8000e-004	1.3400e-003	5.7000e-004	1.0000e-005	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	1.1000e-004	0.0000	1.5510	1.5510	3.0000e-005	3.0000e-005	1.5602

Energy Conversion Calculator

Convert From:

 kBTU

how many decimal places?

Convert

To:

- 29065000 Btu
- 29065 kBTU
- 29.065 Million BTU
- 30665318900 Joules
- 30665318.9 kiloJoules
- 30665.319 MegaJoules
- 8518.109 kWh
- 8.518 MWh
- 290.65 therm
- 29.065 decatherm
- 284.951 natural gas CCF
- 28495.098 natural gas CF

Existing Operation Electricity Use

Source: AQ/GHG Appendix, CalEEMod Output

Stonebridge Subdivision Project-Existing Emissions - Solano-San Francisco County, Annual

Date: 12/5/2019 7:43 PM

kWh/yr = kilowatt hours per year

Mitigated

Land Use
Single Family Housing

Total

Dwellings
1

Electricity Use
(kWh/yr)
8090.57

8,091 kWh/yr

Per dwelling
8091 kWh/year

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	8090.57	1.4336	1.1000e-004	2.0000e-005	1.4428
Total		1.4336	1.1000e-004	2.0000e-005	1.4428

Typical Construction Trailer - Sonoma-San Francisco County, Annual

**Typical Construction Trailer
Sonoma-San Francisco County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	0.72	1000sqft	0.02	720.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	75
Climate Zone	4	Operational Year	2021		
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	390.65	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Typical construction trailer for estimate of energy usage
CO2 intensity factor adjusted based on Renewable Portfolio Standard

Land Use - 12'x60' single-wide unit (720 sq ft)

Construction Phase - Typical construction trailer for energy use estimates - estimates would be included in the operational component of the results

Off-road Equipment - Zeroed out construction equipment

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CO2IntensityFactor	641.35	390.65

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated							0.0000		0.0000		0.0000	2.2748	2.2748	1.7000e-004	3.0000e-005	2.2894
Electricity Unmitigated							0.0000		0.0000		0.0000	2.2748	2.2748	1.7000e-004	3.0000e-005	2.2894
NaturalGas Mitigated	6.0000e-005	5.8000e-004	4.9000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6290	0.6290	1.0000e-005	1.0000e-005	0.6327
NaturalGas Unmitigated	6.0000e-005	5.8000e-004	4.9000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6290	0.6290	1.0000e-005	1.0000e-005	0.6327

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	12837.6	2.2748	1.7000e-004	3.0000e-005	2.2894
Total		2.2748	1.7000e-004	3.0000e-005	2.2894

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	12837.6	2.2748	1.7000e-004	3.0000e-005	2.2894
Total		2.2748	1.7000e-004	3.0000e-005	2.2894