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September 28, 2015

VIA HAND DELIVERY

Ms. Angela Calvillo
Clerk of the Board
Board of Supervisors
City and County of San Francisco
1 Dr. Carlton B. Goodlett Place
City Hall, Room 244
San Francisco, Ca. 94102-4689

Re: Appeal of Adoption of Negative Declaration: Comments to Appeal Response
Case No. 2014.0653E
Project Title: Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County

Dear Ms. Calvillo:

The following supplemental response is submitted on behalf of appellants, Solano County Orderly Growth Committee, in response to the Planning Department's September 21, 2015, memorandum of response and accompanying memoranda and materials ("Appeal Response"). The Appeal Response responds to the appellant's submittal on August 19, 2015, which was subsequently amended by the materials submitted on September 18, 2015.

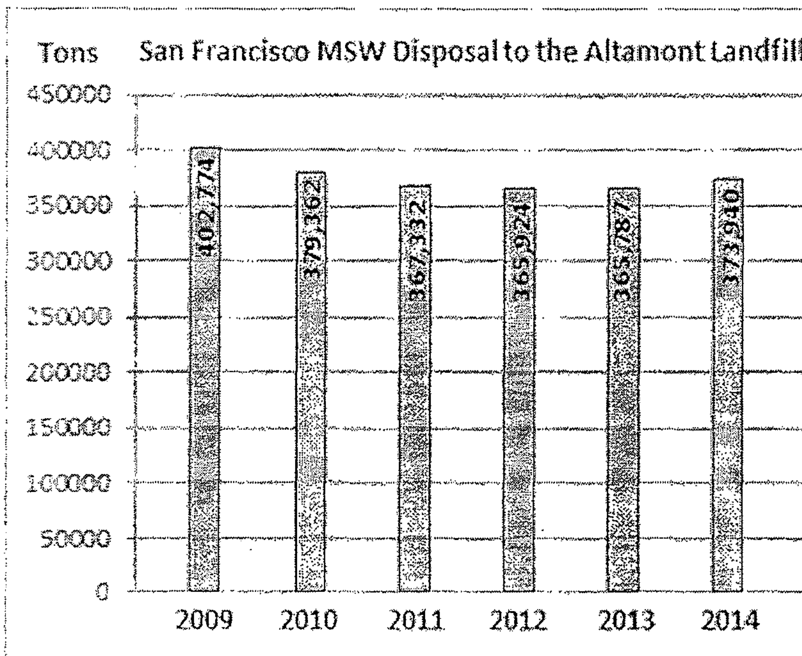
1. San Francisco MSW Volumes.

The Department argues that the data submitted by SWAPE on behalf of appellants, which demonstrated a levelling-off of per capita disposal rates and increases in overall volumes of San Francisco municipal solid waste ("MSW"), are erroneous. The criticism of the SWAPE data is misplaced.

In fact, regardless of how SWAPE analyzes the data, be it utilizing the total tonnage data that includes other types of waste, or utilizing data that solely looks at total tons disposed at the Altamont Landfill, it is clear that that the residential per capita disposal rates have levelled off (if not slightly increased) in recent years (see SWAPE Supplement Comments attached hereto), contrary to the Department of Energy ("DOE" or "Department") claims that levels of MSW disposals have been steadily decreasing.

Altamont only receives MSW through Recology and all of the MSW disposed of by Recology at Altamont is from San Francisco. (Organics and other materials and residue are delivered to either Hay Road and/or other facilities than Altamont.) The tables below indicate disposal volumes from San Francisco/Recology from 2009-2015. Note that the 2015 data reflects projected year-end total based on the year to date.

Year	Tons
2009	402,774
2010	379,362
2011	367,332
2012	365,924
2013	365,787
2014	373,940
2015	**387,000**



Thus, the data on actual MSW disposal volumes demonstrates that over the last six years disposal volumes have generally levelled-off, and that they have actually increased in the past two years. Specifically, from 2013 to 2015 there was an increase of 5.8%, which includes an increase of 2.23% from 2013 to 2014, and a 3.5% increase from 2014 to 2015.[1]

[1] Source: Data available from the Altamont Landfill, dated September 18, 2015.

This over-all levelling-off of diversion rates with an increase of the past two years follows a longer period, since 1988, of over-all reductions in MSW volume. However, even during this prior period of overall declines there were periods when MSW volumes increased. See San Francisco disposal (1988-2015) tonnage chart, attached hereto, which summarizes Recology's annual disposal tonnage at Altamont.

Thus, taken together, the more recent and the long-term disposal volume data contradicts the Department's claims of a consistent reduction of MSW volumes, and demonstrates that even over the years when over-all volumes in MSW are trending down, there have been years when MSW volumes substantially increase. This uneven history, and the evidence of the most recent six years of levelling-off and actual increases in MSW disposal volumes, demonstrate the uncertainties inherent in relying on future recycling/diversion programs to reduce future disposal rates is uncertain.

In light of the status of these programs, being in various stages of future and uncertain implementation and the history of uneven and unpredictable results, they cannot, for CEQA purposes, be relied upon, to off-set the demonstrated effects of population and commercial activity growth in San Francisco.

2. <u>Consistency of Project on Hay Road Capacity and Effect on Other Communities</u>

In the Appeal Response, DOE and Recology disclose for the first time that truck trips are not, as described in the FND, currently limited to 50 round trips a day. In fact, the Appeal Response states that there is variation in the number of trips, and that they are usually up to 70 on a peak day but have been up to 94. See Appeal Response at page 9. However, the Appeal Response further discloses that under the Project, the peak daily maximum number of trips may be approximately 100 trips per day. In Karl Heisler's memorandum to Paul Maltzer dated September 18, 2015 discussing the Acute Hazard Impacts, ESA states that on peak days as many as 100 trucks may make up to 200 one way trips. This statement was a reiteration of statements made by ESA to Mr. Maltzer in previous memoranda, including the September 11, 2015 memorandum addressing Noise Impacts, which provides "...[w]e understand that there is, under current conditions... and there will be, under anticipated future conditions... considerable daily variation in the number of haul trucks... such that on peak days as many as 100 trucks may make up to 200 one-way trips..."

Recology's states that it has 51 trucks available in its truck fleet for this Project. this would suggest that most of the trucks, on peak days, would need to make two round-trips per day, and possibly more. The FND does not adequately address the feasibility of making mulitple trips, or the hours when these additional round trips would be made. The need to make these, apparently weekly, repeat trips is inconsistent with the assumption in the transportation analysis that Recology would make its trips during off-peak hours. There is a fair argument that the additional vehicles, potentially operating during peak traffic congestion periods (and unable to take alternative routes, as they currently do by going south over the San Mateo bridge), may have significant air quality, greenhouse gas and transportation effects not considered in the FND, and may have additional local noise effects, particularly if operating during night time hours.

Furthermore, DOE and Recology's anticipation that they can manage MSW volume flows by making 100 round trips a day during peak periods is inconsistent with the daily capacity limitations at the Hay Road Landfill of 2400 tons per day (based on the approximately 24-25 ton capacity of each disposal truck). The FND does not address DOE's back-up plan for when MSW capacity exceeds Hay Road daily capacity limits. Moreover, the FND does not address the effect on other communities that currently and in the future intend to use the Hay Road Landfill. Either San Francisco will not be able to dispose of its MSW, or other communities will not be able to. There simply is not enough daily capacity at the Hay Road Landfill to accommodate all of the waste. Where will San Francisco's or other communities' MSW go when the daily limits are met? The environmental effects of potentially having to transport MSW to other facilities, and the potential need for new storage facilities should be addressed with respect to all affected users of Hay Road.

In addition to this short-term, daily capacity issue, there is a long-term Hay Road capacity issue that has not been addressed in the FND. The Mitigated Negative Declaration for the Hay Road landfill permit expansion described that the anticipated sources of increased tonnage for the Hay Road landfill would be "dispersed throughout Solano County and the surrounding communities that send waste to the site, as detailed in Appendix B." [See Traffic Impact Study] (MND at 1-13) Thus, from a trip generation (and waste source distribution) perspective, the MND TIS assumed 60% of volume from local standard garbage "packer" trucks and 35% from transfer trucks and 5% from other trucks. Figure 5 and 6 further demonstrate that sources of those trips, including 61% from Solano County, 7% from San Joaquin County, 15% from Contra Costa County, 4% from Sacramento County, 7% from Yolo County, 4% from Napa County and 2% from Sonoma County.

Thehe Disposal Agreement, (including the option to extend) anticipates up to five million tons of MSW disposal at Recology's Hay Road landfill over the next 10 to 15 years. The permit limits on the capacity of the Recology landfill was recently expanded pursuant to a 2012 Initial Study/Mitigated Negative Declaration and Land Use Permit (No. U 11 09). The permit expanded the maximum capacity of the solid waste disposal site to 37 million cubic yards. The MND for the Hay Road expansion, however, did not anticipate that a significant portion of the available permit capacity would be utilized for disposal of San Francisco MSW.

If the San Francisco/Recology Disposal Agreement will, as indicated, substantially accelerate the time when the Hay Road facility would reach capacity, then it is reasonable to foresee that the local communities that currently use the Hay Road facility, and were the anticipated long term users of the facility when the permitted capacity was expanded, will, far sooner than anticipated, need to transport their MSW to other, and potentially more remote, landfills. This reasonably foreseeable effect of San Francisco's extraordinary election to truck, its MSW to the remote Hay Road landfill, i.e., of forcing other communities to similarly truck their future MSW to more remote locations, should have been included in the CEQA analysis.

In conclusion, the Appeal Response is inaccurate in its assertion that SWAPE's data is erroneous to any extent. Moreover, it is unrefuted based on hard data that MSW disposal rates are levelling-off (possibly increasing), not decreasing. We are thankful that the Appeal Response has, for the first time, acknowledged that there will be several days where truck trips will greatly exceed (and may double) 50 round trips per day. However, now that this is acknowledged, it is critical that the County truly assess the impacts that these additional trips will have on the environment, and how the terms of the Disposal Agreement will affect surrounding communities and their ability to utilize the Hay Road Landfill.

Should you have any questions, comments, concerns, or clarifications, please do not hesitate to contact our office directly.

Very truly yours,

Courtney Rae Ross-Tait

Courtney Rae Ross-Tait, for
DONGELL LAWRENCE FINNEY LLP

CRT:gp

Attachments

cc: Sara Jones, Environmental Review Officer (via email only)
Paul Maltzer, Senior Environmental Planner (via email only)

1813-011/107537

Attachments:

SWAPE Report, dated May 19, 2015, Comments on the Proposed Negative Declaration of the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County;

SWAPE Report, dated September 18, 2015, Comments on Final Negative Declaration for the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County.

SWAPE Report, dated September 29, 2015, Comments on the Proposed Negative Declaration for the Agreement for the Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County.

SWAPE Computation Tables (Attachment to Reports listed above).

San Francisco Disposal Tonnage Chart, 1988-2015, provided by Altamont Landfill

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September 18, 2015

Subject: **Comments on the Proposed Negative Declaration for the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County**

We have reviewed the revised Final Negative Declaration (FND) dated July 20, 2015 for the agreement for disposal of San Francisco municipal solid waste (MSW) at the Recology Hay Road landfill in Solano County (hereinafter "Project" or "Disposal Agreement"). The proposed Project consists of an agreement to authorize the transportation and disposal of San Francisco's MSW to the existing Recology Hay Road Landfill located in unincorporated Solano County, at 6426 Hay Road, near State Route 113, southeast of Vacaville. MSW disposal under the Disposal Agreement would occur over a nine year period or until 3.4 million tons of MSW have been deposited in the Hay Road Landfill, whichever comes first. The City would have an option to renew the agreement for a period of six years, or until an additional 1.6 million tons of MSW have been deposited in the landfill, whichever comes first. The agreement would also limit the annual average number of round-trip truck trips transporting MSW to the landfill to fifty round-trip truck trips per day, based on a six-day work week. The MSW would be transported by long haul semi-trucks, primarily from the Recology San Francisco transfer station located at 501 Tunnel Avenue, with several additional trucks hauling residual wastes for disposal from Recology's Recycle Central facility, located at Pier 96 in San Francisco.

Our review concludes that the FND fails to adequately address the following issues, resulting in an underestimation of the significant impacts that the proposed Project may have on regional air quality and global climate change.

I. The FND fails to assess the Project's potential impacts in its entirety, only accounting for the net difference between current trips from the east end of the Bay Bridge to the Altamont Landfill and future trips to Recology's Hay Road Landfill.
II. The FND fails to adequately demonstrate consistency with greenhouse gas (GHG) reduction targets set forth in Assembly Bill 32 (AB32) and measures disclosed in the associated Scoping Plans. The FND states that the Project would comply with Assembly Bill 32 (AB32) through proposed fleet updates anticipated to occur in the future. There is, however, no actual commitment to these fleet updates. The FND also fails to support its assumption that fleet updates would result in lower effective GHG emissions.

III. The FND relies upon incorrect assumptions and values to estimate emissions from liquefied natural gas (LNG) trucks within Recology's current fleet. As a result, the criteria air pollutant and GHG emissions from these LNG-powered trucks are underestimated.
IV. The FND fails to account for the increased waste volumes that will occur in future years as San Francisco's population continues to grow. In fact, the FND erroneously assumes that over the lifetime of the proposed Project, the number of trips would remain consistent. However, our analysis demonstrates that while disposal rates have leveled off in recent years, San Francisco's population has steadily increased, which indicates that the amount of waste produced and hauled each year will also continue to grow.
V. In an effort to more accurately estimate the Project emissions, we conducted a preliminary supplemental analysis. The results of this analysis demonstrate that when correct LNG emission factors are used, even with possible future updates in Recology's truck fleet being taken into account, and increases in disposal volumes as a result of population growth are considered, the Project's GHG emissions in future years will exceed BAAQMD's threshold of 1,100 MT CO2e/year.[1]
VI. The FND fails to assess the local and cumulative impacts from proposed expansion and modernization plans, and increased management and/or diversion activities that would occur at the Tunnel Avenue facility in conjunction or closely associated with the proposed Project, and also including the cumulative impact of increased intensity of operations at the Tunnel Avenue transfer facility associated with the consolidation of operations (closure of Pier 96 facility and consolidation at Tunnel Avenue) and from increased MSW due to population growth.
VII. The FND fails to demonstrate compliance with the 2030 GHG reduction targets set forth by Executive Order B-30-15.

The FND relies on unrealistic assumptions, rather than facts, to determine the Project's impact on regional air quality and global climate change. When the Project's impacts are evaluated using hard facts and indisputable data, there is substantial evidence supporting a fair argument that the Project will have a potentially significant impact on air quality and climate change. As a result, an Environmental Impact Report (EIR) should be prepared to adequately assess Project significance.

I. Failure to Evaluate Greenhouse Gas and Air Quality Impacts of Entire Project

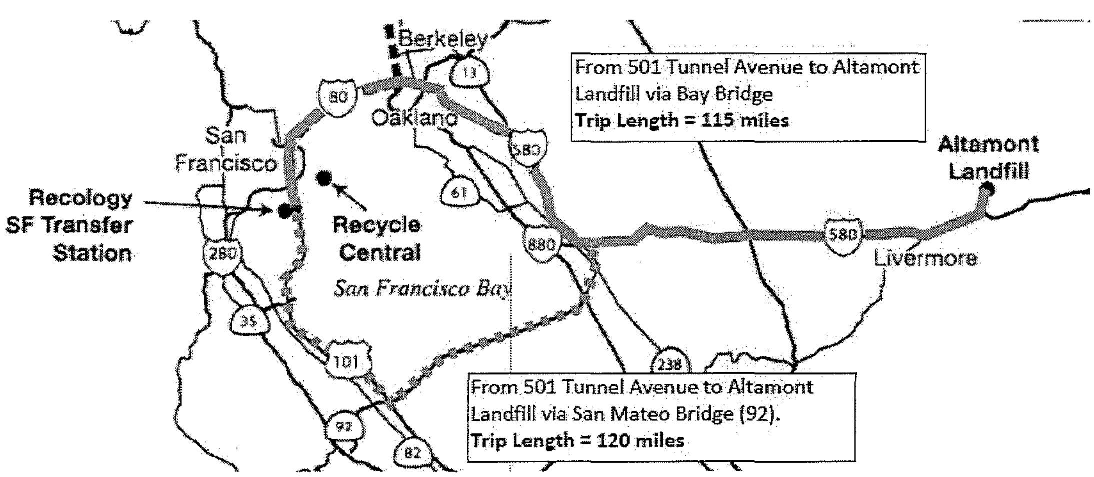
The FND evaluates the greenhouse gas (GHG) and criteria air pollutant impacts from the proposed Project by calculating the net difference in emissions resulting from municipal solid waste (MSW) trucks operating under the existing agreement with Recology for disposal of MSW at Waste Management's Altamont Landfill and the proposed new agreement and Project for transport and disposal at Recology's Hay Road Landfill. The FND treats the Project as a change in the existing agreement; however, this assumption is incorrect, because the Project would require an entirely separate contract with a different landfill.

1http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx, p. 2-2

The Project would be implemented by an agreement between the City and County of San Francisco and Recology to change the disposal site for San Francisco's MSW from the current Altamont Landfill in Livermore, California to the Recology Hay Road Landfill near Vacaville (p. 1). The new Hay Road agreement would be implemented upon termination of the Altamont contract. The Hay Road replacement MSW disposal landfill is located in a different part of the greater Bay Area, in a different county, a different air basin and district. The landfills operate under different permits and different ownership. It is neither an extension nor a modification to an existing operation or program. As a result, for CEQA purposes, the new agreement should not be treated as a change to the existing agreement; but rather, the new agreement and associated impacts should be treated as an entirely new Project.

In addition, the FND erroneously assumes all MSW trucks currently and in the future will follow the same route from the Tunnel Avenue facility over the Bay Bridge, where the routes would diverge under the new agreement. In fact, according to the May 21 Planning Commission Negative Declaration Appeal Hearing and information provided to us by Waste Management, a significant number of MSW trucks leave the Tunnel Avenue facility and head South on U.S. 101, and take the San Mateo Bridge (92) toward the Altamont Landfill when traffic on US 101 or north of the Bay Bridge is heavy. There is an incentive to take this option, as the San Mateo Bridge route only adds approximately five miles to the trip length, and is faster than the Bay Bridge route during peak traffic hours (see table and graph below).

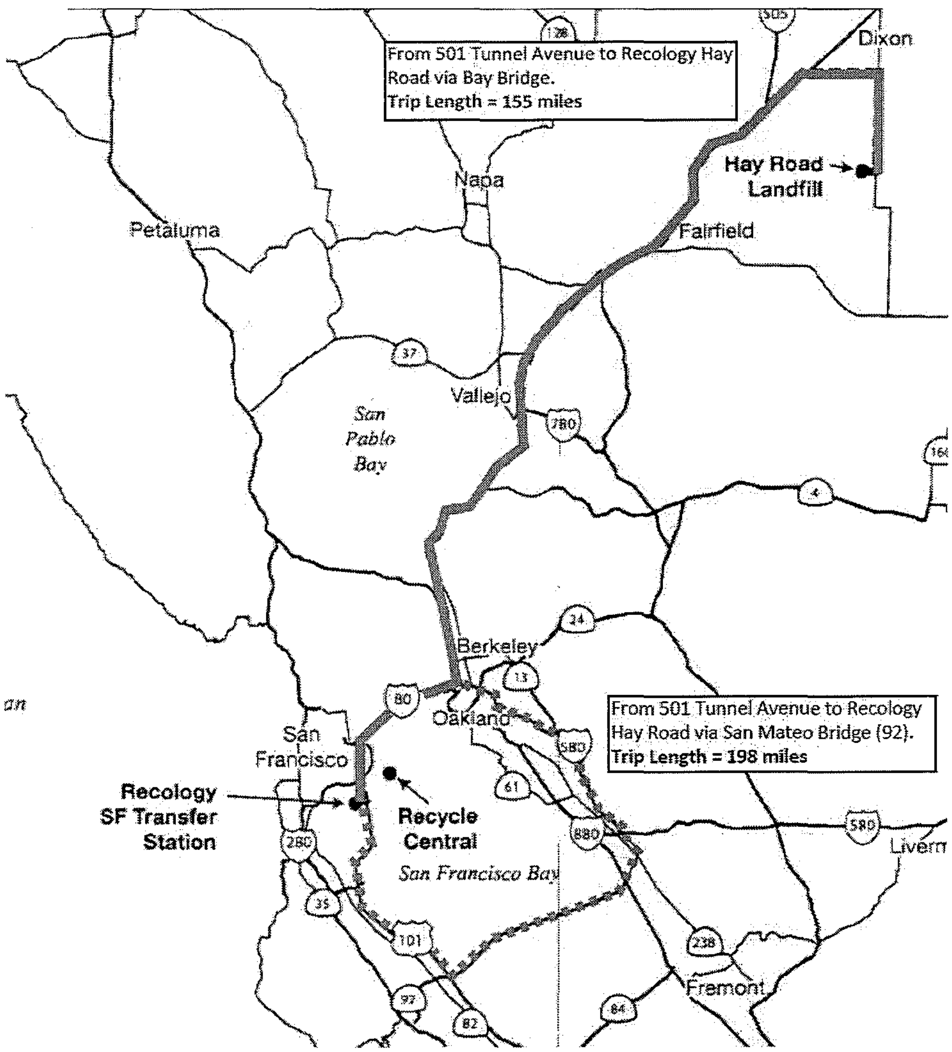
Current Routes	Trip Length (miles)
From Tunnel Avenue Facility to Altamont Landfill via Bay Bridge	115
From Tunnel Avenue Facility to Altamont Landfill San Mateo Bridge (92)	120
Increase in Trip Length	**5**



<u>Under the proposed Project, however, there is no incentive to take this alternate route during peak traffic hours.</u> The Bay Bridge route has a trip length of approximately 155 miles, where as the San Mateo

Bridge route has a trip length of approximately 198 miles, resulting in an increase of about 43 miles round-trip (see table and graph below).

Route	Trip Length (miles)
From Tunnel Avenue Facility to Recology Hay Road via Bay Bridge	155
From Tunnel Avenue Facility to Recology Hay Road via San Mateo Bridge (92)	198
Increase in Trip Length	**43**



As a result, the new landfill location would increase emissions along the Bay Bridge corridor when compared to current routes used to transport waste to the Altamont Landfill. This shift in transportation routes between existing and future conditions further supports the importance of treating the Project as an entirely new agreement, rather than treating it as a change in existing conditions. The routes currently taken will not reflect the future routes that will be taken to Recology Hay Road. As a result, the Project may have a significant effect on traffic along the Bay Bridge corridor, thus resulting in an increase in emissions along this route.

The FND fails to address these existing trips in its baseline or account for the change in routes to Hay Road. For all of these reasons, the analysis significantly underestimates the GHG emissions and vehicle miles travelled (VMT) under the proposed new agreement. Under the circumstances, including City and State policies with respect to reduction of VMT and reduction of GHG emissions, the more appropriate analysis would address the entirety of the VMT under the new agreement as a new project, rather than a modification of an existing project or agreement. Regardless, as described in more detail below, there is substantial evidence supporting a fair argument that the Project, even when only analyzing the "net new" VMT, as defined and assumed in the FND, would be expected to have a significant impact on GHG and criteria air pollutant emissions. As a result, an EIR is required to properly evaluate Project emissions.

The FND's "Air Quality and GHG Technical Report" (Technical Report) summarizes the proposed Project's total operational emissions (see excerpt below from p. 15). The values highlighted in blue are the Project's emissions emitted within the San Francisco Bay Area Air Basin, the values highlighted in yellow are the emissions emitted within the Sacramento Valley Air Basin, and the values highlighted in purple are the total emissions from the Project from both air basins.

Proposed San Francisco Bay Area Air Basin					
pounds/day:					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
7.1	24.88	96.45	23,671.95	6.48	2.51
tons/year (except for CO2e, which is in MT/year):					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
1.11	3.89	15.09	3,357.18	1.01	0.39
Proposed Sacramento Valley Air Basin					
pounds/day:					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
1.14	4.01	15.54	3,812.34	1.05	0.41
tons/year (except for CO2e, which is in MT/year):					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
0.18	0.63	2.43	540.67	0.16	0.06
Total Proposed (San Francisco and Sacramento Combined)					
pounds/day:					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
8.2	28.9	112.0	27,484.3	7.5	2.9
tons/year (except for CO2e, which is in MT/year):					
ROG	**CO**	**NOX**	**CO_2e**	**PM10**	**PM2.5**
1.3	4.5	17.5	3,897.9	1.2	0.5

If the Project's emissions within the San Francisco Air Basin are compared to the significance thresholds specified in the FND (see excerpt below), the Project's NO_x emissions would result in a significant impact (p. 49).

TABLE AQ-1
AIR QUALITY THRESHOLDS OF SIGNIFICANCE

Pollutant	Operational Thresholds for use within the SFBAAB	
	Average Daily Emissions (lbs. /day)	Maximum Annual Emissions (tons/year)
ROG	54	10[a]
NO_x	54	10[a]
PM_{10}	82[b]	15
$PM_{2.5}$	54	10
Fugitive Dust	Not Applicable	
CO	CO concentrations of 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average) as estimated by roadway vehicle volumes exceeding 44,000 vehicles per hour at any intersection.	

[a] Also applicable within the SVAB.

[b] YSAQMD significance threshold for PM10 is 80 lbs. /day.

SOURCE: BAAQMD, 2009; YSAQMD, 2007.

Furthermore, if the Project's greenhouse gas (GHG) emissions of 3,898 metric tons of carbon dioxide equivalents per year (MT CO_2e/year) within the San Francisco Air Basin are compared to BAAQMD's GHG threshold of 1,100 MT CO_2e/year, the emissions would result in a significant impact. This is clear and substantial evidence of a fair argument of significant environmental effects requiring preparation of an EIR under CEQA. An updated air quality evaluation must be prepared as part of an environmental impact report to evaluate these impacts, to address alternatives, and to implement mitigation measures to address NO_x and GHG emissions.

II. Failure to Demonstrate Consistency with AB32 GHG Reduction Targets

The FND fails to adequately assess the Project's impacts on global climate change. The FND claims that the Project will be compliant with the reduction measures set forth by AB32 and the associated Scoping Plans, yet fails to actually demonstrate this consistency. The FND gives the following reason as to how the Project will be consistent with AB32:

> "Most of Recology's transfer fleet currently runs on B-20 biodiesel (that is, diesel fuel that is derived from 20 percent vegetable or animal fats and 80 percent petroleum). Currently, eleven trucks in the fleet run on liquefied natural gas (LNG), and Recology is in the process of phasing in additional transfer vehicles that run on LNG or compressed natural gas (CNG). All of these fuels produce lower GHG emissions than conventional diesel. The proposed project is therefore consistent with the Scoping Plan Update's emphasis on reducing GHG emissions from heavy-duty trucks" (p. 70).

This explanation of how the Project will demonstrate consistency with AB32 is both inadequate and incorrect for a couple of reasons. First, the FND states that Recology is in the process of updating its current truck fleet, but there is no contractual commitment to the proposed future fleet updates. Subsequent comments made by Recology and the Department of the Environment to the representatives of the Planning Commission and to a Sub-Committee of the Board of Supervisors were similarly unsupported by any actual contract commitment.

Second, the FND states that phasing in additional transfer vehicles that run on LNG or CNG will reduce GHG emissions. This assumption, however, is not supported. LNG/CNG-powered Class 8 haul trucks may produce less CO_2 emissions compared to diesel-powered trucks, but may actually increase CH_4 and N_2O emissions. As a result, the claim that the proposed fleet updates to LNG/CNG-powered trucks will reduce GHG emissions cannot be used as a way to demonstrate consistency with AB32, until it is verified by supporting documentation and further analysis.

Failure to Demonstrate Contractual Commitment to Proposed Fleet Updates

The FND and Disposal Agreement fail to demonstrate a contractual commitment to the proposed fleet updates. Even if we were to assume that a portion of Recology's trucks will be replaced with LNG/CNG-powered trucks in the future, the FND assumes, yet fails to assess the impacts that this switch would have on global climate change. Alternatively fueled trucks do not necessarily emit less GHG emissions when compared to B20 diesel and new technology diesel trucks. Due to these reasons, the Project is actually inconsistent with "the Scoping Plan Update's emphasis on reducing GHG emissions from heavy-duty trucks," and as a result, is inconsistent with the GHG reduction targets set forth by AB32, and may result in a significant impact on global climate change.

The FND only analyzes the impacts that "<u>the truck hauling fleet currently used to transport San Francisco waste</u>" will have, because Recology has made no actual commitment to upgrade its fleet in any particular manner or schedule (p. 1). Absent such commitment, the FND cannot demonstrate consistency with AB32 and the associated Scoping Plans by claiming that the fleet will be updated in future years.

The only information discussing the specific fleet updates was provided at the May 21 Planning Commission Negative Declaration Appeal Hearing. Recology staff disclosed the following regarding the anticipated updates to Recology's fleet:

> "And more importantly on the future of our fleet, what's in front of you right now shows 11 LNG trucks with the balance being biodiesel. We have on order, coming to our facility by November of this year, another 12 LNG trucks and another 6 the year after that, which will get us to full capacity to handle all the MSW for San Francisco Honda LNG trucks. And also to that fact, the trailers on those trucks will be able to handle 26 tons per load, rather than what you're looking at right now of 24.5, which will also help on the truck tonnage. I have staff here from multiple parts of our company in terms of operations if there are other questions to be asked" (May 21, 2015 Hearing Transcript at p. 11).

Therefore, by November 2015, Recology's fleet is anticipated to include 23 LNG trucks, and by sometime in 2016, Recology's fleet is anticipated to include 29 LNG trucks. Of these 29 LNG trucks, 18 will purportedly have a hauling capacity of 26 tons per load. But, as explained below, this statement regarding larger trucks is suspect due to weight constraints on heavier LNG/CNG vehicles.

Even though we are provided with some information on the proposed fleet updates, neither the Disposal Agreement nor the FND reflect any commitment to these updates, nor do they identify these updates as a part of the proposed Project. Since Recology has entered into the Disposal Agreement based upon its current fleet, with little evidence suggesting otherwise, the FND cannot use these proposed fleet changes as a way to demonstrate consistency with AB32. Further, even if these fleet updates were certain, until the FND actually analyzes the change in emissions that the proposed fleet updates would result in, the FND cannot use these updates by themselves to demonstrate compliance with the reduction targets and measures set forth by AB32, the Scoping Plan, and the Update to the Scoping Plan.

The absence of terms in the Disposal Agreement to update its fleet or to otherwise comply with the reduction targets and measures set forth by AB32, the Scoping Plan, and the Update to the Scoping Plan is, however, itself evidence of a fair argument that the Project may result in a potentially significant impact to global climate change. As a result, an EIR should be prepared to adequately assess the potentially significant impacts that the Project's GHG emissions may have on the environment.

Potential Increase in CH_4 and N_2O Emissions Associated with CNG/LNG Class 8 Trucks Not Addressed

Even if we were to assume that the updates to the fleet were included in the terms of the proposed agreement(s), the change in GHG emissions, from diesel to liquefied natural gas (LNG) or compressed natural gas (CNG), was not adequately addressed in the FND. The FND claims that all of the fuels within Recology's truck fleet would "produce lower GHG emissions than conventional diesel" (p. 70). While this may be true, the FND fails to actually estimate the GHG emission reductions that these alternatively fueled trucks would result in. Furthermore, evidence suggests that while LNG/CNG- powered Class 8 heavy-duty trucks may reduce carbon dioxide (CO_2) emissions, they increase other GHG emissions like methane (CH_4) and nitrous oxide (N_2O). Lastly, CNG/LNG Class 8 trucks typically have a lower fuel economy than their diesel-powered counterpart, which means that they will use more fuel and fill up more often.

Greenhouse gas emissions are produced by mobile sources as fossil fuels are burned. Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are emitted directly through the combustion of fossil fuels in different types of mobile equipment, including heavy-duty trucks, and contribute to the effects of global climate change. According to the Environmental Protection Agency's (EPA) *Direct Emissions from Mobile Combustion Sources* guidance document, "for most transportation modes, N_2O and CH_4 emissions comprise a relatively small proportion of overall transportation related GHG emissions (approximately 2% combined). However, for gasoline fueled highway vehicles…N_2O and CH_4 could be a more significant (approximately 5%) portion of total GHG emissions. N_2O and CH_4 emissions are likely to be an even higher percentage of total GHG emissions from alternate fuel vehicles."[2]

According to this report, diesel heavy-duty vehicles emit 0.0051 grams of CH_4 per mile, and 0.0048 grams of N_2O per mile (see excerpt below).[3]

Vehicle Type/Control Technology	Emission Factor (g/mile) N_2O	Emission Factor (g/mile) CH_4	Emission Factor (g/km) N_2O	Emission Factor (g/km) CH_4
Diesel Heavy-Duty Trucks				
Advanced	0.0048	0.0051	0.0030	0.0032
Moderate	0.0048	0.0051	0.0030	0.0032
Uncontrolled	0.0048	0.0051	0.0030	0.0032

LNG/CNG-powered heavy-duty vehicles, on the other hand, emit higher rates of CH_4 and N_2O emissions compared to diesel-powered trucks, emitting 1.966 grams of CH_4 per mile, and 0.175 grams of N_2O per mile (see excerpt below).[4]

Vehicle Type/Fuel Type	Emission Factor (g/mile) N_2O	Emission Factor (g/mile) CH_4	Emission Factor (g/km) N_2O	Emission Factor (g/km) CH_4
Light-duty Vehicles				
Methanol	0.067	0.018	0.042	0.011
CNG	0.050	0.737	0.031	0.458
LPG	0.067	0.037	0.042	0.023
Ethanol	0.067	0.055	0.042	0.034
Heavy-duty Vehicles				
Methanol	0.175	0.066	0.109	0.041
CNG	0.175	1.966	0.109	1.222
LNG	0.175	1.966	0.109	1.222
LPG	0.175	0.066	0.109	0.041
Ethanol	0.175	0.197	0.109	0.122
Buses				
Methanol	0.175	0.066	0.109	0.041
CNG	0.175	1.966	0.109	1.222
Ethanol	0.175	0.197	0.109	0.122

Use of alternatively fueled vehicles may result in a reduction in tail pipe GHG emissions; however, an EIR is required to address the reports that other sources of GHG emissions, i.e., methane and nitrous oxide, would increase.

The EPA has found that alternatively fueled vehicles result in a significant increase in N_2O and CH_4 emissions.[5] Furthermore, according to a study conducted by the Carnegie Mellon University

2 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, p. 2
3 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, Table 2
4 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, Table A-7

Department of Engineering and Public Policy, none of the "natural gas pathways, CNG, LNG, and F-T liquids, achieves any emission reductions for Class 8 trucks compared to conventional diesel."[6] In fact, the study found that "of the Class 8 trucks, CNG emits lowest among natural gas pathways, but it cannot reduce emissions (0–3% higher for three types of Class 8 trucks) on average compared with conventional diesel. LNG...liquids increase GHG emissions by 2–34% for Class 8 trucks when compared to the baseline."[78] Furthermore, while natural gas combustion produces less CO_2 than diesel, concerns have been raised about the effects of methane emissions.[9] Therefore, even though LNG-powered heavy duty trucks emit less CO_2 emissions, the effect on climate change and resultant contribution to GHG emissions from methane and nitrous oxide should be addressed in an EIR in light of the these reports.

Increased Weight, Lower Payloads and Reduced Mileage

Retrofitting a Class 8 heavy-duty truck with a LNG/CNG engine can increase a truck's vehicle weight by as much as 2,000 pounds. Trucks fueled by CNG require heavy tanks for on-board storage of CNG under pressure; as a result, outfitting a heavy-duty truck to run on natural gas can add as much as 2,000 pounds to a vehicle's weight.[10] The additional weight these CNG trucks incur due to their fuel storage systems means they cannot carry as heavy payloads compared to diesel trucks. One study demonstrated that Class 8 tractor trucks using LNG with 160 diesel gallon equivalents (DGE) (2 tanks) will add over 1,000 lbs of extra weight compared to diesel. Similarly, Class 8 tractor trucks using CNG with 140 DGE (5 tanks) will add over 2,000 lbs of extra weight compared to diesel.[11]

Therefore, the proposed increase in payload from the current 24.5 tons to 26 tons that was indicated in the May 21 Hearing conflicts with current evidence, which suggests that the switch from diesel to CNG trucks will actually result in a decrease in the truck's payload, not an increase.

Not only are LNG/CNG-powered heavy-duty trucks heavier, but they are also less efficient than their diesel-powered counterparts. One gallon of LNG has the same energy density as 1.7 gallons of diesel, and one gallon of CNG has the same energy density as 3.8 gallons of diesel.[12] According to the EPA's *Efficient Use of Natural Gas Based Fuels in Heavy-Duty Engines* presentation, CNG-powered Class 8 trucks are typically 15 percent less efficient than diesel trucks.[13]

Assuming that updates to Recology's fleet were to be implemented during the term of the Disposal Agreement, all of these factors would need to be considered before the FND could determine that the addition of LNG/CNG-powered Class 8 heavy-duty trucks would result in a reduction of GHG emissions compared to diesel-powered trucks. Substantial evidence indicates that alternatively fueled trucks

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5 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, p. 2
6 http://pubs.acs.org/doi/pdf/10.1021/es5052759, Abstract, pp. 1
7 http://pubs.acs.org/doi/pdf/10.1021/es5052759
8 http://www.greencarcongress.com/2015/05/20150527-cmu.html
9 http://www.actresearch.net/wp-content/uploads/2013/04/ACT_NGP.pdf
10 http://ngvtoday.org/2014/09/03/bill-to-eliminate-ngv-weight-penalty-introduced-in-u-s-senate/
11 http://www.actresearch.net/wp-content/uploads/2013/04/ACT_NGP.pdf
12 http://www.westport.com/file_library/files/webinar/2013-06-19_CNGandLNG.pdf
13 http://energy.gov/sites/prod/files/2014/03/f8/deer12_kargul.pdf

increase CH_4 and N_2O emissions, increase the truck's total vehicle weight by as much as 2,000 pounds, and are less energy efficient compared to diesel fuel. Each and all of these factors have yet to be addressed, and present substantial evidence and a fair argument of a potential increase in GHG emissions, even assuming that Recology will phase in LNG/CNG-powered trucks in the future. Until an additional, detailed analysis is prepared, the FND cannot assume that updates to the fleet will reduce GHG emissions, thus demonstrating the Project's compliance with AB32. Therefore, because the Project results in a substantial increase in total vehicle miles traveled, there is a fair argument that the Project may increase GHG emissions, even with the addition of alternatively fueled trucks, and as a result, may not actually be consistent with GHG reduction targets set forth by AB32 and the associated Scoping Plans. An updated evaluation should be prepared as part of an EIR to adequately address the changes in Recology's truck fleet in future years, as well as evaluate the potential increase in GHG emissions that could occur.

III. Underestimation of Liquefied Natural Gas Air Pollutant Emissions

The values used to estimate emissions from LNG-powered trucks in the FND are incorrect, and greatly underestimate the GHG emissions that would be released from these vehicles. When the correct emission factors are used to estimate Project emissions, there is a fair argument that the Project will result in a potentially significant impact on regional air quality and global climate change. As a result, an updated air quality analysis should be prepared in an EIR to adequately estimate the Project's emissions.

Recology's current truck fleet is made up of 51 vehicles, 40 of which are B20 biodiesel-powered, and 11 of which are powered by liquefied natural gas (LNG) (p. 55). According to the FND, "Project air emissions were calculated using emission rates provided by ARB's EMFAC2011" model (p. 55). However, because the EMFAC2011 model does not provide biodiesel adjustment factors or LNG emission factors, alternative ARB documents, which disclose this information, were relied upon (p. 55). The FND's January 2015 "Air Quality and GHG Technical Report" (Technical Report) discloses the LNG emission factors used to estimate emissions, as well as the sources relied upon to derive these values. A review of these values and associated reports indicates, as explained below, that the emission factors used to estimate LNG-powered truck emissions in the FND are incorrect, and greatly underestimate the emissions that would be released from these vehicles.

Failure to Use Class 8 LNG Truck Emission Factors

As noted above, 11 of the 50 trucks that currently make up Recology's fleet run on liquefied natural gas (LNG) (p. 10). Because EMFAC2011 does not provide LNG emissions rates, the FND's Technical Report relies on emission factors[14] from CARB's *Methods to Find the Cost-Effectiveness of Funding Air Quality Projects for Evaluating Motor Vehicle Registration Fee Projects and CMAQ Projects*[15] (p. 3).

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14 For modeling purposes, however, the FND's Technical Report assumed that vehicles powered with compressed natural gas (CNG) and LNG would have the same emission rates in terms of grams per mile, since they are only slightly different forms of natural gas (p. 3).

15 http://myairdistrict.com/emfac_2010.pdf

However, according to the FND, "Recology owns and operates its own transfer truck fleet," which are "classified as heavy-heavy duty tractor-trailer type trucks (Class 8 trucks)" (p. 6). The truck fleet is an average of six years old, so emission factors for vehicle model year (MY) 2008 were used (p. 55). Therefore, emission factors for MY 2008 Class 8, alternatively fueled trucks should have been used to estimate emissions from Recology's LNG trucks. However, this is not the case.

The FND's Technical Report uses the following emission factors: 2.1 grams per mile (g/mi) for nitrogen oxides (NO_x), 0.018 g/mi for particulate matter with a diameter of 10 micrometers or less (PM_{10}), and 0.018 g/mi for fine particulate matter with a diameter less than 2.5 micrometers ($PM_{2.5}$) (Technical Report, Table 1, p. 4). These values, identified in the Technical Report represent emissions from buses and trucks (MY 2009 and earlier), not Class 8 trucks (see excerpt below).[16] Instead, the FND should have used the following emission factors to accurately estimate the LNG-powered truck emissions: 3.5 g/mi for NO_x, 0.029 g/mi for PM_{10}, and 0.029 g/mi for $PM_{2.5}$.

New Cleaner Vehicle Purchases or Re-powers (Typically Alternative-Fueled Vehicles)

Vehicle Type	Gross Vehicle Weight Rating (lb	MY	Engine Certification Emission Rates (g/bhp-hr) NOx	PM10	Conversion Factors+ (bhp-hr/mi)	Emission Factors (g/mi) NOx	PM10
Urban transit buses	> 33,000	<=2009	1.2	0.01	4.0	4.8	0.04
		2010+	0.2	0.01	4.0	0.8	0.04
Buses and trucks	14,001 – 33,000	<=2009	1.2	0.01	1.8	2.1	0.018
		2010+	0.2	0.01	1.8	0.4	0.018
Class 8 trucks	> 33,000	<=2009	1.2	0.01	2.9	3.5	0.029
		2010+	0.2	0.01	2.9	0.6	0.029

The emission factors used in the FND to estimate NO_x, PM_{10}, and $PM_{2.5}$ emissions released by Recology's Class 8 LNG-powered trucks resulted in a great underestimation of emissions. Based on this error, there is a fair argument that when correct emission factors are used to estimate emissions from Class 8 LNG-powered trucks, the Project may result in a potentially significant impact. Therefore, an Environmental Impact Report should be prepared to adequately assess the Project's impact on regional air quality.

Use of Incorrect LNG Truck CH_4 and N_2O Emission Factors

EMFAC2011 does not provide diesel emission rates for methane (CH_4) or nitrous oxide (N_2O). As a result, the FND relies on emission factors from CARB's *Local Government Operations Protocol (LGOP) for the Quantification and Reporting of Greenhouse Gas Emissions Inventories* [17](Technical Report, p. 3). According to this report, diesel heavy-duty vehicles have a CH_4 emission factor of 0.0051 g/mi, and a N_2O emission factor of 0.0048 g/mi (see excerpt below).[18]

Diesel Heavy-Duty Vehicles		
All Model Years	0.0048	0.0051

16 http://myairdistrict.com/emfac_2010.pdf, Table 5, pp. 8.
17 http://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf
18 http://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf, p. 216

These emission factors, however, only apply to diesel-powered heavy-duty trucks. According to the Environmental Protection Agency's (EPA) *Direct Emissions from Mobile Combustion Sources* guidance document, "for most transportation modes, N_2O and CH_4 emissions comprise a relatively small proportion of overall transportation related GHG emissions (approximately 2% combined). However, for gasoline fueled highway vehicles (e.g., passenger cars and light trucks) N_2O and CH_4 could be a more significant (approximately 5%) portion of total GHG emissions. N_2O and CH_4 emissions are likely to be an even higher percentage of total GHG emissions from alternate fuel vehicles."[19] Therefore, by using diesel-powered, heavy duty truck emission factors, and applying these values to LNG-powered trucks, the FND is greatly underestimating the greenhouse gas (GHG) emissions released from these trucks. Rather, an emission factor of 0.175 g/mi for N_2O, and an emission factor of 1.966 g/mi for CH_4 should be used.[20]

There is therefore a fair argument that when correct emission factors are used to estimate N_2O and CH_4 emissions from Class 8 LNG-powered trucks, the Project may result in a potentially significant impact. Therefore, an EIR should be prepared to adequately assess the Project's impact on regional air quality.

Fuel Economy of LNG Trucks Unsubstantiated

According to the FND, Recology's LNG trucks achieve a 3.71 miles per gallon (mpg) rate, which they used to estimate total CO_2 emissions (Technical Report, p. 3-4). This mileage, however, is not supported by documentation or justified in any way. The only reference provided in FND's Technical Report states that the value is "provided by Erin Merrill, Recology's Environmental Planning Manager" (p. 4). As a result, there is no way to verify if this mile per gallon rate is correct.

In an effort to verify this value, we attempted to find other reports that supported this 3.71 mpg rate. The San Francisco Department of Public Works (SFDPW) provides information on the current refuse collection and disposal rates in the City of San Francisco, and provides specific rates and assumptions used to calculate these rates for Recology San Francisco.[21] According to the 2013 *Recology San Francisco Rate Schedules* report, the average miles per gallon typically seen in Recology's LNG-powered trucks is 2.8 mpg (see excerpt below).[22]

	Actual		Projection	Rate Application
Description	RY 2011	RY 2012	RY 2013	RY 2014
Total Tons to Altamont	372,751	370,100	366,912	352,773
LNG Fuel Calculation:				
Total Number of Long Haul LNG Trucks	6	3	-	5
Tons hauled by LNG Trucks	49,549	28,384	0	36,630
LNG Tons Per Load	24.35	24.48	0.00	24.42
Loads	2,035	1,159	0	1,500
Roundtrip Miles per Load	110	110	0.00	110.00
Total Miles	223,833	127,541	0	165,000
Average MPG	2.8	2.8	0.0	2.8

19 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, p. 2
20 http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf, Table A-7
21 http://sfdpw.org/index.aspx?page=737
22 http://www.sfdpw.org/modules/showdocument.aspx?documentid=3038, p. 53/61

This mile per gallon rate, used by Recology San Francisco to determine the cost of LNG fuel, is approximately 25 percent lower than the 3.71 mpg rate disclosed in the FND. The FND's assumed 3.71 mpg rate is not supported by additional documentation nor is it justified in any way. A lower mpg rate would be expected to result in significantly higher emissions due to the need to consume more fuel. As a result, there is a fair argument of a substantial effect, thus requiring the preparation of an EIR.

IV. Failure to Evaluate Effects of Population Growth on Future Disposal Volumes

The Project's criteria air pollutant and GHG emissions are underestimated, due to incorrect assumptions made in the FND and associated "Air Quality and GHG Technical Report" (Technical Report). Specifically, the air quality analysis does not factor in any additional haul truck trips that would reasonably be expected to occur in future years as San Francisco's population and subsequent waste volume continue to grow. When the Project's air quality and GHG impacts are evaluated with the inclusion of this population growth, there is further substantial evidence supporting a fair argument that the Project will have a potentially significant impact on air quality and climate change. As a result, an EIR should be prepared to adequately assess Project significance.

In support of appellants appeal to the Planning Commission, we analyzed the anticipated population growth in San Francisco using published data from the Demographic Research Unit of the California Department of Finance. The Demographic Research Unit is designated as the single official source of demographic data for state planning. This department provides publicly available reports on population estimates from cities, counties, and the state according to year. It also provides population projections for future years. We utilized data from the following reports to determine the City of San Francisco's past, present, and future population: (1) "E-1 Cities, Counties, and the State Population Estimates with Annual Percent Change – January 1, 2014 and 2015;"[23] (2) "E-4 Population Estimates for Cities, Counties, and the State, 2011-2015, with 2010 Census Benchmark;"[24] and (3) "P-3 Population Projections by Race/Ethnicity, Detailed Age, and Gender, 2010 – 2060."[25] The values from these reports are summarized in the table below.

Reporting Year	Population
2010	**805,235**
2011	808,768
2012	816,446
2013	828,440
2014	834,903
2015	845,602
2016	857,106
2017	865,639
2018	874,210
2019	882,831

23 http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/view.php
24 http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php
25 http://www.dof.ca.gov/research/demographic/reports/projections/P-3/

2020	**891,493**
2021	899,992
2022	908,342
2023	916,398
2024	924,332
2025	932,109
2026	939,662
2027	947,118
2028	954,231
2029	960,992
2030	**967,405**

In an effort to further verify the accuracy of the values set forth by the California Department of Finance, for this updated Report we also analyzed information from the Association of Bay Area Governments (ABAG) taken from San Francisco's General Plan. The "2014 Housing Element" of San Francisco's General Plan relies on population projections provided by ABAG to determine the future increase in San Francisco's population, households, and employment.[26] ABAG estimates that San Francisco's population in 2020 will increase by 10.6 percent compared to 2010 population estimates, and will increase by another 10.3 percent by 2030, compared to 2020 population estimates (see excerpt below).[27]

	2000	2010	2020*	2030*	2040*
Total Population	776,733	805,235	890,400	981,800	1,085,700
Population Change	52,774	28,502	85,165	91,400	103,900
% Population Change	7.3%	3.7%	10.6%	10.3%	10.6%
Household Population	756,976	780,971	863,800	952,500	1,051,100
% HH Population Change	8.2%	3.2%	10.6%	10.3%	10.4%
Households	329,700	345,811	379,600	413,370	447,350
Households Change	24,116	16,111	33,789	33,770	33,980
% Households Change	7.9%	4.9%	9.8%	8.9%	8.2%

The population projections provided by ABAG are consistent with the population projections provided by the Department of Finance (see table below).

Department of Finance Projections			ABAG and General Plan Projections		
Reporting Year	**Population**	**Percent Increase**	**Reporting Year**	**Population**	**Percent Increase**
2010	805,235	-	2010	805,235	-
2020	891,493	10.7%	2020	890,400	10.6%
2030	967,405	8.5%	2030	981,800	10.3%

26 http://www.sf-planning.org/ftp/General_Plan/2014HousingElement-AllParts_ADOPTED_web.pdf
27 http://www.sf-planning.org/ftp/General_Plan/2014HousingElement-AllParts_ADOPTED_web.pdf, p. 1.4

In fact, the values relied upon to determine population growth in our May 21, 2015 letter submitted with the appeal actually underestimate the predicted increase in San Francisco's population compared to the projections set forth by ABAG, with an estimated 8.5 percent increase in population from 2020 to 2030 compared to ABAG's estimated 10.3 percent increase. Furthermore, the Department of Finance's predicted increase in population from 2010 to 2020 of 10.7 percent is consistent with ABAG's projected 10.6 percent increase. The California Department of Finance, ABAG, and San Francisco's General Plan all estimate an approximate 10 percent increase in San Francisco's population from 2010 to 2020. Furthermore, the Department of Finance underestimates San Francisco's projected 2030 population compared to the values set forth by ABAG and San Francisco's General Plan. This demonstrates that the population projections relied upon in the May 21, 2015 letter submitted with the appeal are not only consistent with the projections set forth by ABAG and San Francisco's General Plan, but are also conservative compared to the 2030 population projections set forth by ABAG. As a result, the analysis in our May 21, 2015 letter submitted with the appeal actually presents a conservative estimate of San Francisco's population growth, and confirms evidence previously presented of population growth assumptions.

According to the FND and associated Technical Report, the agreement would occur over a nine year period or until 3.4 million tons of MSW have been deposited in the Hay Road Landfill, whichever comes first, with the City having an option to extend the Disposal Agreement for a period of six years, or until an additional 1.6 million tons of MSW have been deposited in the landfill, whichever comes first (FND p. 1). Assuming that the proposed agreement would be renewed for a period of six years, the Project would operate for a total of 15 years, from about 2016 until 2030. Even with the projections above, with an estimated 20 percent increase in population from 2010 to 2030, the FND inexplicably assumes that the number of daily truck trips and the total waste volume would stay the same during the entire estimated 15 year possible term of the Disposal Agreement, i.e., 50 truck trips per day (p. 9). The notion that the total waste volume, and consequent daily truck trips, will remain unchanged for up to 15 years is unrealistic. Even with increased diversion efforts for which no evidence has been submitted in the record for this FND, the waste volume produced by San Francisco is going to increase. In fact, as explained below, the record shows that in recent years per capita disposal rates have actually increased, while diversion rates have flattened out.

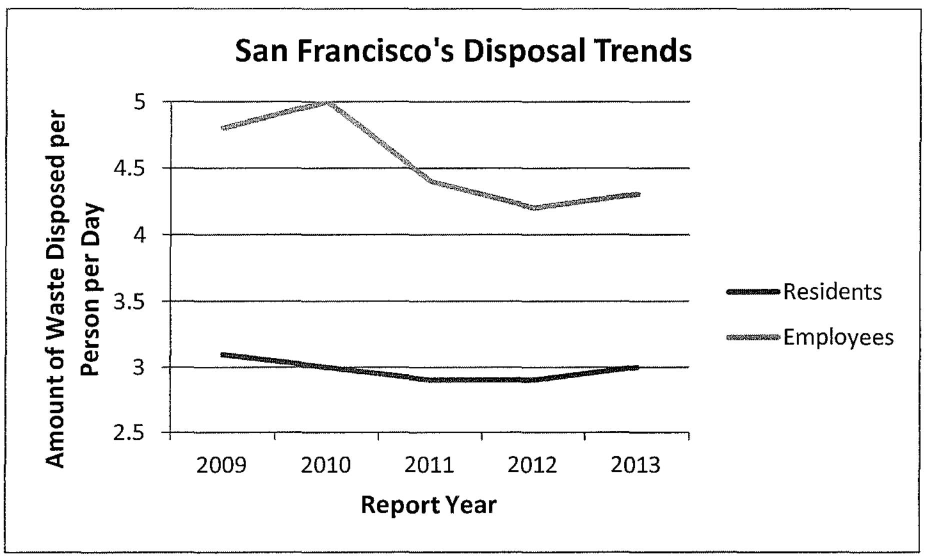
Per Capita Disposal Rates Have Remained Unchanged Over Past Five Years

The FND assumes that the total waste volume and the number of daily and annual truck trips would not increase during the Project's entire duration of disposal of up to 5 million and an estimated 15 years (p. 1a, 9). The FND assumes that based upon unexplained and undocumented increased diversion rates that will occur in future years, disposal volumes will not increase with population. Without any supporting evidence, the FND goes further and states that it anticipates that the total disposal volume will most likely decrease in future years (p. 17). There is no evidence to support this unsubstantiated assumption and the evidence submitted indicates that there will more likely be an increase in MSW rates and volumes.

Although San Francisco has made great strides in reducing the total amount of waste disposed in landfills by increasing recycling and composting efforts, during the past five years[28], San Francisco's per capita disposal rate has remained unchanged. According to the California Department of Resources Recycling and Recovery's (CalRecycle) *Jurisdiction Diversion/Disposal Rate Summary (2007 – Current)* report for the City and County of San Francisco, from 2009 – 2013 San Francisco demonstrated a residential per capita disposal rate of approximately 3.0 pounds per person per day (see table and graph below).[29]

Report Year	Per Capita Disposal Rate Residents*	Per Capita Disposal Rate Employees*
2009	3.1	4.8
2010	3	5
2011	2.9	4.4
2012	2.9	4.2
2013	3	4.3

* Disposal rates in units of pounds per person per day (PPD)

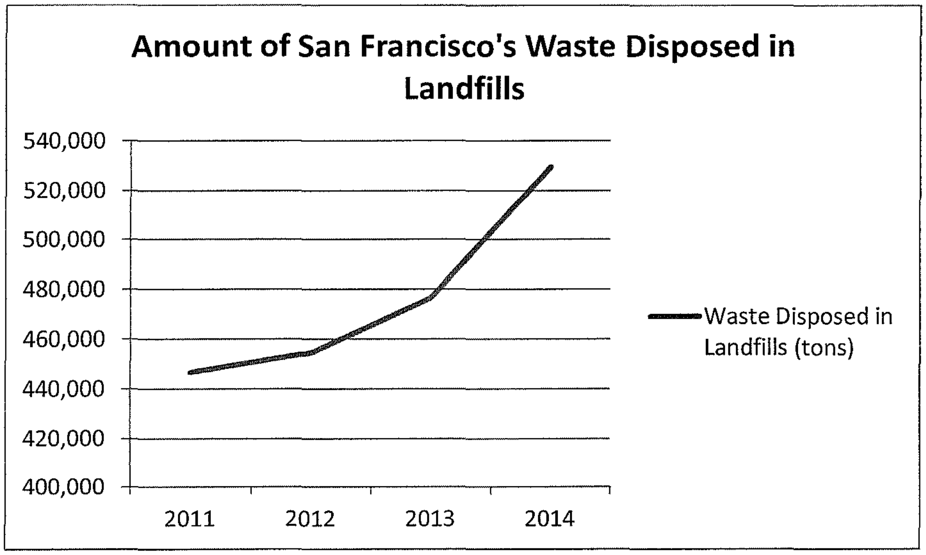


While per capita disposal rates have leveled off in recent years, the amount of waste disposed of by the City of San Francisco has steadily increased. According to CalRecycle's *Multi-Year Countywide Origin*

28 Past five years that disposal data was publicly available.
29http://www.calrecycle.ca.gov/LGCentral/reports/Viewer.aspx?P=JurisdictionID%3d438%26ReportName%3dDPGraphPopEmpNumbers%26ShowParameters%3dfalse%26AllowNullParameters%3dfalse

Summary report for the County of San Francisco, from 2011 – 2014 the total amount of San Francisco's MSW disposed of in landfills has steadily increased (see table and graph below).[30]

Report Year	Amount of San Francisco's MSW Disposed of in Landfills (tons)
2011	446,635
2012	454,570
2013	476,424
2014	529,474



<u>Because the per capita disposal rates have remained unchanged over the past five years, this increase in waste disposal can only be attributed to San Francisco's population growth</u>.

The disposal information provided by CalRecycle demonstrates that while residential disposal rates have leveled off, San Francisco's total waste volumes have steadily increased, which can only be attributed to San Francisco's steady population growth that has occurred in recent years. By failing to account for San Francisco's future population growth within the air quality and greenhouse gas analyses, the FND does not fully assess the actual, real life impacts of the proposed Project.

The FND's air quality analysis fails to account for the additional haul truck trips that would reasonably be expected to occur in future years as San Francisco's population and subsequent waste volume continue to grow. The FND attempts to justify this omission by claiming that the implementation of additional diversion programs will offset, if not reduce, the amount of waste disposed of at the landfill. The FND

30http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=ReportName%3dExtEdrsMultiYrCountyWide%26CountyID%3d38 fails, however, to disclose any information on what, if any, additional waste diversion programs are planned, how feasible and reliable these proposed waste reductions actually might be, and how Recology might implement the proposed reductions. In fact, the FND repeatedly states that there will be no changes to Recology's transfer station and other San Francisco facilities and operations (FND at cover page and pages 4, 9, 10, 11 and 17), before providing a two paragraph summary of Recology's pending plans to substantially modify those facilities and operations (at page 23), but without any recognition or analysis of the increased intensity of those operations, consolidation of operations, and potential cumulative impact of those plans during the approximately 15 year term of the Disposal Agreement. There is also no analysis that would support the assumption, as stated at the Planning Commission and at the Board Sub-Committee hearing, that future diversion programs could offset increased waste volumes associated with population growth.

Our analysis, based on current disposal trends, demonstrates that while per capita disposal rates have leveled off in recent years, San Francisco's population has steadily increased, which indicates that the amount of waste produced and hauled each year will also continue to grow. When the Project's air quality and GHG impacts are evaluated with the inclusion of this population growth, there is substantial evidence supporting a fair argument that the Project will have a potentially significant impact on air quality and climate change.

The FND cannot ignore these facts and assume there will be no changes in disposal rates, volumes or truck trips. The environmental analysis must demonstrate how Recology will ensure that it can meet the Disposal Agreement's limitations on annual trips, in light of this evidence, and how the City's MSW will be handled over the estimated 15 year term of this Agreement if it does not. As a result, an EIR should be prepared to adequately assess Project significance.

<u>The evidence demonstrates that while disposal rates have leveled off in recent years, San Francisco's population has steadily increased,</u> which indicates that the amount of waste produced and hauled each year will also continue to grow. As a result, there is substantial evidence to support a fair argument that the Project will have a potentially significant impact on regional air quality and climate change. An EIR should be prepared to adequately assess the impacts that the Project may have, using current data and facts rather than unsubstantiated assumption.

V. Analysis Demonstrates Significant Impact from Incremental Emissions

In an effort to more accurately estimate the Project emissions, we conducted a preliminary supplemental analysis. The results of this analysis demonstrate that when correct LNG emission factors are used, future possible updates in Recology's truck fleet are taken into account, and unmitigated increases in disposal volumes as a result of population growth are considered, the Project's GHG emissions in future years will exceed BAAQMD's threshold of 1,100 MT CO2e/year.[31]

31http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx, p. 2-2

We estimated the Project's operational emissions for two scenarios: (1) assuming that the current truck fleet (40 biodiesel trucks and 11 LNG trucks) will remain the same for the entire 15 year duration; and (2) assuming that the proposed changes in the fleet, as indicated by Recology at the May 21 hearing, would occur. The table below provides a summary of each scenario's proposed fleet composition.

Scenario	# of LNG Trucks	# of B20 Trucks	Total # of Trucks	Hauling Capacity (tons)	Daily Waste Hauled (tons/day)
1	11	40	51	24.5	1,248
2	29	19	48	26	1,248

It should be noted that the truck composition for Scenario 2 is based on Recology's comment at the May 21 hearing, as well as the anticipated daily waste volume disclosed in the FND. According to the testimony of Recology's representative, within the next two years, Recology will have a total of 29 LNG trucks. He further stated that these 29 LNG trucks "will get us to full capacity to handle all the MSW for San Francisco Honda LNG trucks." However, even if we were to assume that all 29 LNG trucks would have a hauling capacity of 26 tons per load, an additional 19 trucks with a 26 ton/load hauling capacity would have to be included in Recology's fleet to match the daily waste hauled by the trucks in Recology's current fleet. Therefore, for purposes of this analysis we conservatively assumed that with these proposed additions, Recology's future fleet would be composed of 29 LNG trucks and 19 biodiesel trucks, all with the hauling capacity of 26 tons per load. It should be noted, however, that the payload from a biodiesel truck to a LNG truck would most likely decrease due to the additional weight that LNG engines incur (anywhere from a 1,500 – 2,000 pound increase). Therefore, the emissions estimated in this scenario are highly conservative, and would most likely be greater than what is estimated in this analysis.

ABAG's population projections only provide estimates for 2010, 2020, 2030, and 2040. According to the FND, the proposed Project would start in 2016 and operate for a period of up to 15 years (p. 4). Therefore, it can be assumed that the Project would operate from about 2016 until 2030. Therefore, we limited our analysis to 2020 and 2030, which represent operational years with corresponding ABAG population estimates.

Furthermore, San Francisco's per capita rate, as discussed above, does not necessarily represent the per capita disposal rate that would occur at the landfill. For example, in 2010 San Francisco disposed of 455,331.84 tons of waste. Of that waste, approximately 383,104 tons was disposed of at Altamont.[32] Therefore, in an effort to determine the future disposal volume that would most likely occur at the Hay Road Landfill, exclusively, we estimated a residential per capita disposal rate (lbs/person/day) for the Altamont Landfill, using the same methods demonstrated by CalRecycle. We then took this per capita disposal rate, and applied it to the 2020 and 2030 ABAG population projections to estimate the waste volumes during these years. The results, for each scenario, are summarized in the tables below.

32http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d438%26ReportYear%3d2010%26ReportName%3dReportEDRSJurisDisposalByFacility

Scenario 1: Current Truck Fleet			
	2010	**2020**	**2030**
Total Population	805,235	890,400	981,800
Waste Disposal Rate (lbs/person/day)	2.6	2.6	2.6
Waste Disposed of at Altamont/Hay Road (tons)	383,104	423,623	467,108
Hauling Capacity (tons/truck)	24.5	24.5	24.5
Trips per Day	**50**	**55**	**61**

Scenario 2: Updated Truck Fleet			
	2010	**2020**	**2030**
Total Population	805,235	890,400	981,800
Waste Disposal Rate (lbs/person/day)	2.6	2.6	2.6
Waste Disposed of at Altamont/Hay Road (tons)	383,104	423,623	467,108
Hauling Capacity (tons/truck)	24.5	26	26
Trips per Day	**50**	**52**	**57**

As you can see for Scenario 1, in 2020, the daily trips increase from 50 trips per day to 55 trips per day, and increase to 61 trips per day in 2030. Furthermore, for Scenario 2, the daily trips increase from 50 trips per day (current conditions) to 52 trips per day, and then increase to 57 trips per day in 2030. Each additional truck trip per day results in roughly 313 additional truck trips annually, assuming a six day work week. (These trips would exceed the limitations on the Disposal Agreement.) As a result, the emissions from these additional truck trips have the ability to make a significant impact on the regional air quality within Sacramento Valley and the Bay Area.

The FND air quality and GHG Technical Report provides the emission rates, adjustment factors, formulas, and other parameters used to calculate the proposed and existing Project's emissions (p. 15 - 25). We used these values, as well as the corrected LNG emission rates, and applied them to the estimated daily haul trips for each year. We then calculated the net difference between the existing Project emissions and the proposed Project emissions for each scenario. The results of our calculations are summarized in the table below, and the calculation details can be found in **Attachment A**.

Scenario 1: Current Truck Fleet Emissions									
Scenario	Operational Year	Daily Hauling Trips	Project Condition per Air Basin	Tons per Year (CO_2e in Metric Tons per Year):					
				ROG	CO	NO_x	CO_2e	PM_{10}	$PM_{2.5}$
1	2020	55	Proposed - Sacramento	0.20	0.69	2.81	675	0.19	0.07
		55	Proposed - SF	1.23	4.31	17.45	4,202	1.18	0.46
		50	Existing - SF (2014)	0.89	2.98	12.98	3,324	0.90	0.34
		-	**Total Net Difference**	**0.53**	**2.01**	**7.27**	**1,554**	**0.47**	**0.19**
1	2030	61	Proposed - Sacramento	0.22	0.76	3.10	745	0.21	0.08
		61	Proposed - SF	1.35	4.75	19.24	4,634	1.30	0.51
		50	Existing - SF (2014)	0.89	2.98	12.98	3,324	0.90	0.34
		-	**Total Net Difference**	**0.68**	**2.53**	**9.35**	**2,054**	**0.61**	**0.24**

The results from Scenario 1, assuming that the current truck fleet remains the same, just taking into account population growth, we find that in 2020 and in 2030, the GHG emissions from waste transportation will exceed BAAQMD's threshold of 1,100 MT CO_2e/yr [33] by 450 MT CO_2e/yr and by 950 MT CO_2e/yr, respectively.

Scenario 2: Updated Truck Fleet Emissions									
Scenario	Operational Year	Daily Hauling Trips	Project Condition per Air Basin	Tons per Year (CO_2e in Metric Tons per Year):					
				ROG	CO	NO_x	CO_2e	PM_{10}	$PM_{2.5}$
2	2020	52	Proposed - Sacramento	0.25	0.31	1.88	658	0.16	0.06
		52	Proposed - SF	1.53	1.93	11.69	4,092	0.99	0.36
		50	Existing - SF (2014)	1.23	1.42	9.39	3,409	0.81	0.29
		-	**Total Net Difference**	**0.54**	**0.82**	**4.19**	**1,341**	**0.34**	**0.13**
2	2030	57	Proposed - Sacramento	0.27	0.34	2.08	726	0.18	0.06
		57	Proposed - SF	1.68	2.12	12.89	4,512	1.09	0.39
		50	Existing - SF (2014)	1.23	1.42	9.39	3,409	0.81	0.29
		-	**Total Net Difference**	**0.72**	**1.05**	**5.58**	**1,828**	**0.46**	**0.17**

The results from Scenario 2, assuming that the current truck fleet will undergo updates in future years, taking into account population growth, we find that in 2020 and in 2030, the GHG emissions from waste transportation will exceed BAAQMD's threshold of 1,100 MT CO_2e/yr by 240 MT CO_2e/yr and by 730 MT CO_2e/yr, respectively.

When the correct emission factors are applied, and population growth is taken into account, we find that under both scenarios, the Project would exceed BAAQMD's GHG significance threshold, resulting in

33http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx p. 2-2 a significant impact. Even under the most conservative scenario (Scenario 2), where we assumed that every truck within the fleet would have a payload of 26 tons, the GHG emissions from waste transport decreased a little, yet still resulted in a potentially significant impact.

This is clear and substantial evidence of a fair argument of significant environmental effects requiring preparation of an EIR under CEQA. An updated air quality evaluation must be prepared as part of an environmental impact report to evaluate these impacts, to address alternatives, and to implement mitigation measures to address the Project's significant GHG emissions.

VI. Failure to Assess Impacts from Increased Activities at Tunnel Avenue Facility

The FND fails to assess the impacts that would occur at the 501 Tunnel Avenue Transfer Facility due to comprehensive expansion and modernization plans and increased waste management and diversion activities. According to the FND:

> "Recology is planning a comprehensive redevelopment of its Tunnel and Beatty site. The proposal involves replacement of most of the buildings currently on-site with new recycling and resource recovery facilities, maintenance facilities, administrative offices, and supporting operations buildings. The proposal would focus on resource recovery rather than transfer and disposal, and would serve as a model of sustainable infrastructure. The City of Brisbane is the CEQA lead agency for this project. No environmental documents have yet been issued for this project. This project would not increase, and could reduce the quantity of MSW transported to the Hay Road Landfill" (p. 23).

The proposal at Tunnel Avenue includes the closure of the Pier 96 facility and the consolidation of those operations at the expanded Tunnel Avenue Facility. Although the proposed expansion of the Tunnel Avenue facility could affect the quantity of MSW transported to the Hay Road Landfill, the cumulative impacts on this modified facility and operations, including increased waste volumes and vehicle operations due to population growth, is not assessed in the FND. The City of San Francisco recently approved a Negative Declaration for the 501 Tunnel Avenue ("West Wing") Project. The West Wing Project proposed to construct a new building that would serve as an addition to the existing facility and would accommodate additional waste processing activities and equipment to support enhanced recovery of recyclable and compostable materials. The proposed building would provide approximately 14,000 square feet of space, including approximately 11,500 square feet on the main level and approximately 2,500 square feet on the lower level.[34]

Operation of the Tunnel Avenue Transfer Station is a required facility under the proposed Landfill Disposal Agreement (p. 17). Therefore, the extent to which the expansion of the Tunnel Avenue Facility might contribute to Recology's ability or plans to manage additional MSW under the Disposal Agreement should have been considered as part of the FND, and the environmental effects of the proposed modernization and expansion place should be considered in this CEQA analysis. Failure to do

34 http://sfmea.sfplanning.org/2013.0850E_501%20Tunnel%20Avenue_FMND.pdf

so constitutes impermissible piecemealing of the environmental analysis to avoid a significant effect. An EIR should be prepared to adequately assess the effects that the Project will have on the Tunnel Avenue Transfer Station, and to adequately assess the effects the proposed expansion of the Tunnel Avenue Facility will have on Recology's operations under the Disposal Agreement.

VII. Failure to Comply With Executive Order B-30-15 Reduction Targets

The reliance on a 15 percent below Business-As-Usual (BAU) emission threshold of significance is also fundamentally flawed because it is inconsistent with, and fails to take into account, the revised, more ambitious GHG reduction goals set by Governor Brown by Executive Order B-30-15. Governor Brown recently issued an executive order to establish an even more ambitious GHG reduction target. Executive Order B-30-15[35] requires emissions reductions above those mandated by AB 32 to reduce GHG emissions 40 percent below their 1990 levels by 2030. 1990 statewide GHG emissions are estimated to be approximately 431 million $MTCO_2e$ ($MMTCO_2e$).[36] Therefore, by 2030 California will be required to reduce statewide emissions by 172 $MMTCO_2e$ (431 x 40%), which results in a statewide limit on GHG emissions of 259 $MMTCO_2e$. 2020 "business-as-usual" levels are estimated to be approximately 509 $MMTCO_2e$.[37] Therefore, in order to successfully reach the 2030 statewide goal of 259 $MMTCO_2e$, California would have to reduce its emissions by 49 percent below the "business-as-usual" levels.

This 49 percent reduction target should be considered as a threshold of significance against which to measure Project impacts. Because the Project site will be in operation past 2020 and into 2030, the 2030 goals are applicable to any evaluation of the Project's impacts. A DEIR should be prepared to demonstrate the Project's compliance with these more aggressive measures specified in Executive Order B-30-15. Specifically, the Project should demonstrate, at a minimum, a reduction of 49 percent below "business-as-usual" levels. It should be noted, however, that this reduction percentage is applicable to statewide emissions. Because the Project emissions do not meet this 49 percent below BAU goal, and because the Project will result in vehicle miles travelled (VMT) that exceed regional averages for disposal of MSW, and, in fact, VMT that substantially exceed current regional standards and the existing VMT levels for disposal at the Altamont Landfill, a fair argument exists that the Project's GHG emissions are significant.

VIII. Conclusion

The FND fails to adequately address multiple issues, resulting in an underestimation of the significant impacts that the proposed Project may have on regional air quality and global climate change. First, the FND fails to assess the Project's potential impacts in its entirety, only accounting for the net difference between current trips from the east end of the Bay Bridge to the Altamont Landfill and future trips to Recology's Hay Road Landfill. Second, the FND fails to adequately demonstrate consistency with greenhouse gas (GHG) reduction targets set forth in Assembly Bill 32 (AB32) and measures disclosed in

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35 http://gov.ca.gov/news.php?id=18938
36 http://www.arb.ca.gov/cc/inventory/data/bau.htm
37 http://energyinnovation.org/wp-content/uploads/2015/04/CA_CapReport_Mar2015.pdf

the associated Scoping Plans, as well as fails to demonstrate compliance with the 2030 GHG reduction targets set forth by Executive Order B-30-15. The FND claims that the Project would comply with Assembly Bill 32 (AB32) through proposed fleet updates anticipated to occur in the future, but the FND provides no evidence or additional analyses that any such future updates would effectively reduce GHG emissions, and, as noted, there is no actual commitment to these fleet updates. Third, the FND fails to assess both the clearly related impacts of the Tunnel Avenue Transfer Station proposed expansion and modernization.

Finally, the FND fails to adequately assess the pollutant emissions from the Project, relying on faulty assumptions that underestimate the Project's air quality and GHG impacts. Specifically, the FND relies upon incorrect emission factors to estimate emissions from liquefied natural gas (LNG) trucks within Recology's current fleet, fails to account for the increased waste volumes that will occur in future years as San Francisco's population continues to grow, and fails to assess the change in emissions that would occur as a result of updates to Recology's fleet.

In an effort to more accurately estimate the Project emissions, we conducted a preliminary supplemental analysis. The results of this analysis demonstrate that when correct LNG emission factors are used, future updates in Recology's truck fleet are taken into account, and increases in disposal volumes as a result of population growth are considered, the Project's GHG emissions in future years will exceed BAAQMD's threshold of 1,100 MT CO_2e/year.[38]

In sum, the FND relies on unrealistic assumptions, rather than facts, to determine the Project's impact on regional air quality and global climate change. When the Project's impacts are evaluated using hard facts and indisputable data, there is substantial evidence supporting a fair argument that the Project will have a potentially significant impact on air quality and climate change. As a result, an EIR should be prepared to adequately assess Project significance.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Jessie Jaeger

38http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx, p. 2-2

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May 19, 2015

Subject: **Comments on the Proposed Negative Declaration for the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County; Case No. 2014.0653E**

We have reviewed the Preliminary Negative Declaration (PND) dated March 4, 2015 on the agreement for disposal of San Francisco municipal solid waste (MSW) at the Recology Hay Road landfill in Solano County ("Project"), and the Appeal filed on April 3, 2015 by Solano County Orderly Growth Committee. The proposed Project consists of an agreement to authorize the transportation and disposal of five million tons of MSW from San Francisco to the existing Recology Hay Road Landfill located in unincorporated Solano County, at 6426 Hay Road, near State Route 113, southeast of Vacaville. The MSW would be transported by long haul semi-trucks, primarily from the Recology San Francisco transfer station located at 501 Tunnel Avenue, with several additional trucks hauling residual wastes for disposal from Recology's Recycle Central facility, located at Pier 96 in San Francisco.

Our review of the PND concludes that an Environmental Impact Report (EIR) should be prepared because the PND:

- Fails to adequately assess the air quality and greenhouse gas impacts from the Project in its entirety;
- Does not comply with AB 32 reduction targets ;
- Does not consider San Francisco's population growth in future years; and
- Inadequately assesses the potential health risk from the Project as a whole.

Inadequate Project-Level Assessment of Greenhouse Gas and Air Quality Impacts

The PND evaluates the greenhouse gas (GHG) and criteria air pollutant (CAP) impacts from the proposed Project by calculating the net difference in emissions between an existing agreement with Recology for disposal of MSW at Waste Manager's Altamont Landfill and the new agreement and Project, a proposal for transport and disposal at Recology's Hay Road Landfill. The PND treats the Project as a change in the existing agreement; however, this assumption is incorrect, because the Project would require an entirely separate contract with a different landfill. A DEIR should be prepared to evaluate Project emissions in their totality.

The Project would be implemented by an agreement between the City and County of San Francisco and Recology to change the disposal site for San Francisco's MSW from the current Altamont Landfill in Livermore, California to the Recology Hay Road Landfill near Vacaville (p. 1). As a result, the contract for Altamont would end, and an entirely new contract for Hay Road would be executed. The existing agreement and the proposed agreement are for two entirely different landfills, in different counties, operating under different permits and different ownership. It is neither an extension nor a modification to an existing operation or program. As a result, the new agreement should not be treated as a change within the existing agreement; rather, the new agreement and associated impacts should be treated as an entirely new Project.

The PND's "Air Quality and GHG Technical Report" (Technical Report) summarizes the proposed Project's total operational emissions (see excerpt below from p. 15). The values highlighted in blue are the Project's emissions emitted within the San Francisco Bay Area Air Basin, the values highlighted in yellow are the emissions emitted within the Sacramento Valley Air Basin, and the values highlighted in purple are the total emissions from the Project from both air basins.

Proposed	San Francisco Bay Area Basin
Proposed	Sacramento Valley Air Basin
Total Proposed	Total Emissions

Proposed

pounds/day:					
ROG	CO	NOX	CO2e	PM10	PM2.5
6.81	23.89	92.59	22,725.08	6.22	2.41
tons/year (except for CO2e, which is in MT/year):					
ROG	CO	NOX	CO2e (MT)	PM10	PM2.5
1.07	3.74	14.48	3,222.89	0.97	0.38

Proposed

pounds/day:					
ROG	CO	NOX	CO2e	PM10	PM2.5
1.09	3.85	14.92	3,659.84	1.00	0.39
tons/year:					
ROG		NOX	CO2e (MT)	PM10	PM2.5
0.17	0.60	2.33	519.04	0.16	0.06

Total Proposed

pounds/day:					
ROG	CO	NOX	CO2e	PM10	PM2.5
7.9	27.7	107.5	26,384.9	7.2	2.8
tons/year:					
ROG	CO	NOX	CO2e	PM10	PM2.5
1.2	4.3	16.8	3,741.9	1.1	0.4

If the Project's emissions within the San Francisco Air Basin are compared to the significance thresholds specified in the PND (see excerpt below), the Project's NOx emissions would result in a significant impact (p. 49).

TABLE AQ-1
AIR QUALITY THRESHOLDS OF SIGNIFICANCE

Pollutant	Operational Thresholds for use within the SFBAAB	
	Average Daily Emissions (lbs. /day)	Maximum Annual Emissions (tons/year)
ROG	54	10[a]
NO_x	54	10[a]
PM_{10}	82[b]	15
$PM_{2.5}$	54	10
Fugitive Dust	Not Applicable	
CO	CO concentrations of 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average) as estimated by roadway vehicle volumes exceeding 44,000 vehicles per hour at any intersection.	

[a] Also applicable within the SVAB.

[b] YSAQMD significance threshold for PM10 is 80 lbs. /day.

SOURCE: BAAQMD, 2009; YSAQMD, 2007.

Furthermore, if the Project's greenhouse gas (GHG) emissions of 3,222.89 MT CO2e/year within the San Francisco Air Basin are compared to BAAQMD's GHG threshold of 1,100 MT CO2e/year, the emissions would result in a significant impact. An updated CEQA evaluation should be conducted to evaluate these impacts and to implement mitigation measures to address NOx and GHG emissions. Mitigation measures should be considered as discussed at the end of the following section.

Incremental Emissions Not Adequately Considered

The Project's criteria air pollutant and greenhouse gas emissions are underestimated even further, due to incorrect assumptions made in the PND and associated "Air Quality and GHG Technical Report" (Technical Report). Specifically, the air quality analysis does not factor in additional haul truck trips that would reasonably be expected to occur in future years as San Francisco's population and subsequent waste volume continue to grow.

We conducted a preliminary analysis of the incremental increase in Project emissions due to this population growth, and compared it to existing emissions (as is conducted in the PND). Even though this methodology greatly underestimates the Project's total operational emissions, the results of our analysis still demonstrated that the GHG emissions, <u>when population growth is accounted for, will exceed BAAQMD's significance threshold of 1,100 MT CO2e/year from 2019 – 2030</u>.

The PND and the associated Technical Report disclose the various assumptions made to calculate Project greenhouse gas (GHG) and criteria air pollutant emissions. According to the PND, the number of daily truck trips and the total waste volume would stay the same under the Project, which is estimated to occur over a 15 year contract period (p. 4, 9). This statement is not justified, nor is it substantiated by any supporting documentation. Furthermore, the idea that the total waste volume, and consequent daily truck trips, will remain unchanged for 15 years is unrealistic. The City of San Francisco has experienced a steady population increase every year for the past decade, and based on this trend, is most likely going to continue growing in future years. As a result, the waste volume produced by San Francisco is also going to increase, even with increased diversion efforts. Our review concludes that if the increase in population is included in the air quality calculations, the Project's GHG emissions in future years will exceed BAAQMD's threshold of 1,100 MT CO2e/year.[1] An updated CEQA evaluation should be prepared to account for the population growth that San Francisco will experience in future years, and should adjust the proposed Project's estimated daily truck trips and resultant emissions accordingly.

We used historical population data, population projections, waste volumes for San Francisco and the Altamont Landfill, and a number of other parameters specified in the PND and associated Technical Report to determine San Francisco's waste volume in future years. According to the PND and associated Technical Report, the proposed project would start in 2016 and operate for up to 15 years (Technical Report p. 2, PND p. 4); as a result, we calculated the waste volume, and subsequent emissions, for 2016 – 2030.

The PND discusses how they determined the number of daily truck trips Recology makes within a given year to the Altamont Landfill. The PND states:

> "Recology owns and operates its own transfer truck fleet...these trucks have a maximum payload of about 24.5 tons. In 2012, Recology hauled 374,844 tons of San Francisco MSW to the Altamont Landfill. Based on the total tonnage hauled to Altamont Landfill and the capacity of each transfer truck, it took approximately 15,300 loads to reach this tonnage-- or 294 loads per week for 52 weeks. Based on a 6 day week (Recology typically hauls MSW loads from Sunday evening through Friday) this resulted in approximately 50 trucks (or round trips) per day hauling San Francisco MSW to the Altamont Landfill" (p. 6).

This 2012 waste volume of 374,844 tons was taken from the California Department of Resources Recycling and Recovery's (CalRecycle) Disposal Reporting System (DRS),[2] which provides annual estimates of the disposal amounts for jurisdictions in California. The report shows the total amount disposed by the jurisdiction (San Francisco) at each disposal facility (Altamont Landfill) for a requested year.[3] According to the 2012 DRS report, San Francisco produced an estimated 454,570 tons of waste, of which 374,844 tons, or 82%, was disposed of at the Altamont Landfill.[4] Similarly, in 2013 San Francisco produced an estimated 476,424 tons of waste, of which 372,205 tons, or 78%, was disposed of

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1http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx p. 2-2

2http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d438%26ReportYear%3d2012%26ReportName%3dReportEDRSJurisDisposalByFacility

3 http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx

4http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d438%26ReportYear%3d2012%26ReportName%3dReportEDRSJurisDisposalByFacility at the Altamont Landfill.[5] Years prior to 2012 also exhibit the same trend in the amount of San Francisco's waste disposed of at the Altamont Landfill (see table below).

Reporting Year	Annual Disposal Amount (tons) San Francisco	Annual Disposal Amount (tons) Altamont Landfill	Percentage of Waste Allocated to Altamont Landfill
2008	594,660	498,382	84%
2009	484,812	406,417	84%
2010	455,332	383,104	84%
2011	446,634	374,202	84%
2012	454,570	374,844	82%
2013	476,424	372,205	78%
		AVERAGE (2012 – 2013)	**80%**

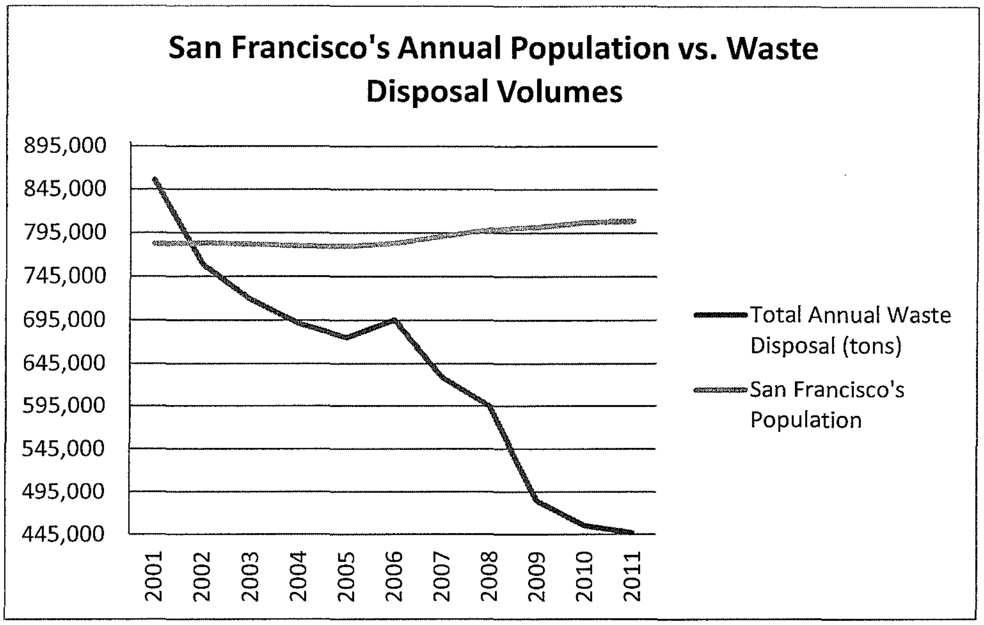
Utilizing the results from these reports, it can be assumed that roughly 82 – 84% of San Francisco's waste was disposed of by Recology to the Altamont Landfill in past years. Taking the percentages from 2012 to 2013, we calculated an average value of 80%, which we then used to determine the approximate waste volume that would be disposed of at the proposed Recology Hay Road Landfill in future years. It should be noted that we limited this average value to the most recent years (2012 – 2013) to account for the increased recycling and composting activities that have occurred over the past decade.

We then compared San Francisco's historical population[6] to the annual waste volume disposed by San Francisco.[7] As exhibited in the chart below, from 2001 to 2011, San Francisco's population steadily increased, but the waste disposed by San Francisco decreased. In 2001, the per capita disposal rate was approximately 6 pounds per person per day (lbs/person/day), and this value steadily decreased over the course of ten years, with the average per capita rate being approximately 4.6 lbs/person/day.

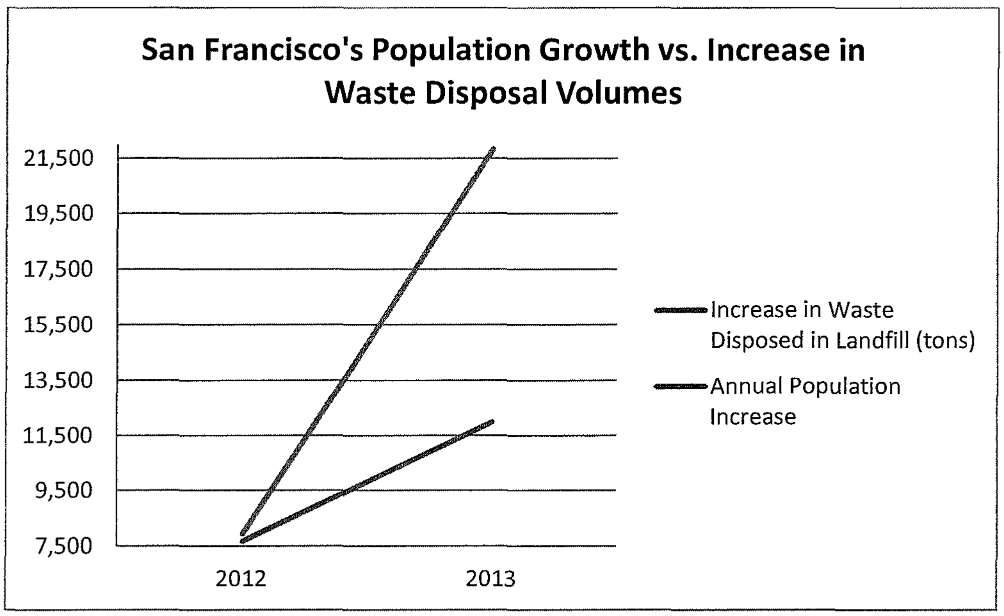
5http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=OriginJurisdictionIDs%3d438%26ReportYear%3d2013%26ReportName%3dReportEDRSJurisDisposalByFacility

6 http://www.dof.ca.gov/research/demographic/reports/estimates/e-7/view.php

7 http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx



Conversely, in 2012 and 2013, San Francisco's population and waste volume increased (see chart below).



This trend indicates that even with the implementation of recycling and composting, the waste volume has increased in recent years and will most likely increase in future years as the population increases. The lowest per capita disposal rate occurred in 2011, with a rate of approximately 3 lbs/person/day. Since then, this rate has slowly, but steadily increased each year. Furthermore, in recent years, average recycling commodity prices have decreased drastically.[89] From 2013 to 2014, recycling prices dropped

8 http://www.recyclingtoday.com/rt0515-ferrous-scrap-processors-challenges.aspx

by 23.7%, and in early 2015, prices decreased by 14%.[10] As a result, recycling programs for private waste management companies are less profitable. If recycling commodity prices continue to decline, recycling plants will continue to shut down, and rates of waste diversion will begin to decrease. For these reasons, we used the average of these two most recent years, exclusively.

CalRecycle's DRS only has disposal reports for 2013 or earlier; as a result, we had to use additional resources to estimate the waste volume for future years. The Demographic Research Unit of the California Department of Finance is designated as the single official source of demographic data for state planning. This department provides publicly available reports on population estimates from cities, counties, and the state according to year. It also provides population projections for future years. We utilized data from the following reports to determine the City of San Francisco's past, present, and future population: (1) "E-1 Cities, Counties, and the State Population Estimates with Annual Percent Change – January 1, 2014 and 2015;"[11] (2) "E-4 Population Estimates for Cities, Counties, and the State, 2011-2015, with 2010 Census Benchmark;"[12] and (3) "P-3 Population Projections by Race/Ethnicity, Detailed Age, and Gender, 2010 – 2060."[13] The values from these reports are summarized in the table below.

Reporting Year	Population
2014	834,903
2015	845,602
2016	857,106
2017	865,639
2018	874,210
2019	882,831
2020	891,493
2021	899,992
2022	908,342
2023	916,398
2024	924,332
2025	932,109
2026	939,662
2027	947,118
2028	954,231
2029	960,992
2030	967,405

9 http://www.houstonchronicle.com/business/article/Waste-Management-continues-to-struggle-with-6085567.php
10 http://www.wastedive.com/news/waste-management-q1-results-sink-under-divestitures-recycling-prices/392679/
11 http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/view.php
12 http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php
13 http://www.dof.ca.gov/research/demographic/reports/projections/P-3/

For the years where both the waste volume and population data were available, we determined a per person disposal rate, and then used this disposal rate to determine San Francisco's annual disposal amount for years where waste data was lacking. It should be noted that the methodology used to calculate a per person disposal rate is consistent with methods used by CalRecycle.[14] For example, in 2010, CalRecycle determined a disposal rate of 3 lbs/person/day by taking the total waste volume disposed by San Francisco, and dividing it by the population.[15]

The results of our calculations for 2014 - 2015 are summarized in the table below. The values in italics indicate data taken from a source (CalRecycle and the California Department of Finance); the underlined values were derived from this data. As you can see, the disposal rates are similar to the 2010 value.

Reporting Year	Population	Annual Disposal Amount (tons) San Francisco	Annual Disposal Amount (tons) Altamont Landfill	Percentage of Waste Allocated to Altamont Landfill	Disposal Rate (lbs/person/day)
2012	*816,446*	*454,570*	*374,844*	<u>82%</u>	<u>3.1</u>
2013	*828,440*	*476,424*	*372,205*	<u>78%</u>	<u>3.2</u>
2014	*834,903*	<u>468,685</u>	<u>374,948</u>	-	-
2015	*845,602*	<u>474,691</u>	<u>379,753</u>	-	-
-	-	-	**AVERAGE VALUE**	**<u>80%</u>**	**<u>3.1</u>**

According to the PND, a typical Recology transfer truck has a maximum payload (maximum tonnage that can be loaded into a trailer) of 24.5 tons (p. 6). We used this value, along with the values listed above, to determine the number of additional daily haul trips that would occur from 2016 - 2030, as a result of San Francisco's increasing population. The results of our calculations are summarized in the table below.

Reporting Year	Population	Estimated Annual Disposal Amount (tons)	Estimated Annual Disposal Amount (tons) Proposed Landfill	Hauling Trips Per Day (Round Trip)	Tons of Waste Per Haul
2014	834,903	468,685	376,321	50	24.5
2015	845,602	474,691	381,143	50	24.5
2016	857,106	481,149	386,329	50	24.5
2017	865,639	485,939	390,175	51	24.5
2018	874,210	490,750	394,038	51	24.5
2019	882,831	495,590	397,924	52	24.5
2020	891,493	500,452	401,828	52	24.5
2021	899,992	505,223	405,659	53	24.5
2022	908,342	509,911	409,422	53	24.5

14 http://www.calrecycle.ca.gov/LGCentral/Reports/Jurisdiction/DiversionDisposal.aspx
15http://www.calrecycle.ca.gov/LGCentral/Reports/DiversionProgram/JurisdictionDiversionDetail.aspx?JurisdictionID=438&Year=2010

2023	916,398	514,433	413,054	54	24.5
2024	924,332	518,887	416,630	54	24.5
2025	932,109	523,253	420,135	55	24.5
2026	939,662	527,493	423,539	55	24.5
2027	947,118	531,678	426,900	56	24.5
2028	954,231	535,671	430,106	56	24.5
2029	960,992	539,466	433,154	57	24.5
2030	967,405	543,066	436,044	57	24.5

At the current rates of disposal, the PND estimates that the agreement would have a term of up 15 years to allow for the disposal of 5 million tons of MSW (p. 4). However, they do not take into account San Francisco's population growth, nor do they consider the decrease (or rather lack of change) in recycling rates in recent years. As a result, the proposed agreement may not last the full 15 years, as originally anticipated. Based on the projected annual waste volumes listed above for the proposed landfill, from 2016 – 2030 (15 years) the estimated total waste volume would be approximately 6.1 million tons. From 2016 – 2027, the estimated total waste volume would be roughly 4.9 million tons, and from 2016 – 2028, the total waste volume would be roughly 5.3 million. As a result, the total duration of the proposed Project may be cut short by three to four years; however, for the purpose of this analysis, we assumed a period of 15 years.

Each additional truck trip per day results in roughly 313 additional truck trips annually, assuming a six day work week (see table below).[16] As a result, the emissions from these additional truck trips have the ability to make a significant impact on the regional air quality within Sacramento Valley and the Bay Area.

Reporting Year	Hauling Trips Per Day (Round Trip)	Additional Haul Trips Per Day	Additional Annual Haul Trips
2014	50	0	0
2015	50	0	0
2016	50	0	0
2017	51	1	313
2018	51	1	313
2019	52	2	626
2020	52	2	626
2021	53	3	939
2022	53	3	939
2023	54	4	1,252
2024	54	4	1,252
2025	55	5	1,565

16 The full length of these additional truck trips need to be considered in the environmental analysis, including the additional local transportation impacts of these additional trips.

2026	55	5	1,565
2027	56	6	1,877
2028	56	6	1,877
2029	57	7	2,190
2030	57	7	2,190

The Technical Report provides the emission rates, adjustment factors, formulas, and other parameters used to calculate the proposed and existing Project's emissions (p. 15 - 25). We used these values and applied them to the estimated daily haul trips for each year the proposed Project will be in operation. We then calculated the net difference between the existing Project emissions and the proposed Project emissions. The results of our calculations are summarized in the table below, and the calculation details can be found in **Attachment A**.

Operational Year	Daily Hauling Trips	Project Scenario Emissions per Air Basin	Incremental Increase in Proposed Project Annual Emissions (San Francisco and Sacramento Air Basins Combined)					
-	Round Trip per Day	-	*tons/year (except for CO2e, which is in MT/year)*					
			ROG	CO	NOx	CO2e	PM10	PM2.5
2016 (Current Conditions)	50	Proposed - SF	1.11	3.89	15.09	3,357	1.06	0.41
		Proposed - Sacramento	0.18	0.63	2.43	539	0.17	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.40***	***1.54***	***5.13***	***954***	***0.33***	***0.14***
2017 - 2018	51	Proposed - SF	1.13	3.97	15.39	3,424	1.08	0.42
		Proposed - Sacramento	0.18	0.64	2.48	550	0.17	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.42***	***1.63***	***5.48***	***1,032***	***0.36***	***0.15***
2019 - 2020	52	Proposed - SF	1.15	4.05	15.69	3,491	1.11	0.43
		Proposed - Sacramento	0.18	0.65	2.53	561	0.18	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.45***	***1.72***	***5.83***	***1,110***	***0.38***	***0.16***
2021 - 2022	53	Proposed - SF	1.18	4.13	15.99	3,559	1.13	0.43
		Proposed - Sacramento	0.19	0.66	2.58	572	0.18	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.47***	***1.81***	***6.18***	***1,188***	***0.41***	***0.17***
2023 - 2024	54	Proposed - SF	1.20	4.20	16.29	3,626	1.15	0.44
		Proposed - Sacramento	0.19	0.68	2.63	583	0.19	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.50***	***1.90***	***6.53***	***1,266***	***0.43***	***0.18***
2025 - 2026	55	Proposed - SF	1.22	4.28	16.60	3,693	1.17	0.45
		Proposed - Sacramento	0.20	0.69	2.67	593	0.19	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34

		Total Net Difference	***0.52***	***1.99***	***6.88***	***1,344***	***0.46***	***0.19***
2027 - 2028	56	Proposed - SF	1.24	4.36	16.90	3,760	1.19	0.46
		Proposed - Sacramento	0.20	0.70	2.72	604	0.19	0.07
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.55***	***2.08***	***7.23***	***1,422***	***0.48***	***0.19***
2029 - 2030	57	Proposed - SF	1.27	4.44	17.20	3,827	1.21	0.47
		Proposed - Sacramento	0.20	0.71	2.77	615	0.20	0.08
		Existing - SF (2014)	0.89	2.98	12.39	2,942	0.90	0.34
		Total Net Difference	***0.58***	***2.17***	***7.58***	***1,500***	***0.51***	***0.20***

The results of our analysis indicate that from 2019 until 2030, the GHG emissions from the proposed Project, compared to the existing Project's emissions, will exceed BAAQMD's 1,100 MT CO2e/year threshold[17], and as a result, will have a significant impact.

Additional mitigation measures, specific to the reduction of mobile source GHG emissions, are proposed in CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures,*[18] and should be considered in a subsequent analysis. Measures specified in CAPCOA's guidance document are more stringent and prescriptive than those measures identified in the PND, and provide many simple design features, that when combined together, optimize GHG emissions reductions. An updated CEQA evaluation should be prepared to include additional mitigation measures, as well as include an updated air quality assessment to ensure that the necessary mitigation measures are implemented to reduce GHG mobile source emissions to below BAAQMD thresholds.

Project Conflicts with GHG Reduction Targets

The PND compares the proposed Project's GHG emissions to the targets set forth by AB 32 Scoping Plan, BAAQMD's 2010 Climate Action Plan (CAP), and the Solano County CAP (p. 65). The PND determines Project compliance with transportation measures specified in the AB 32 Scoping Plan by assuring that Recology is in the process of phasing in cleaner vehicles into their fleet in future years. This proposed fleet update is not supported by documentation or any details, such as phase in year, number of trucks added, number of trucks removed, total fleet size in future years etc., and it also contradicts Project details described in the both the PND and the associated Technical Report. The proposed Project does not disclose the necessary information needed to actually conclude compliance with targets discussed in the AB 32 Scoping Plan. An updated CEQA evaluation should be conducted to address this issue, and mitigate, where necessary.

17http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_May%202011_5_3_11.ashx p. 2-2
18 http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

The PND compares the proposed Project's GHG emissions to the targets set forth by AB 32 Scoping Plan Update for transportation-related GHG emissions. [19] The PND states:

> "The AB 32 Scoping Plan and Scoping Plan Update include four transportation-related strategies for reduction of GHGs and criteria pollutants: (1) improve vehicle efficiency and develop zero emission technologies, (2) reduce the carbon content of fuels and provide market support to get these lower-carbon fuels into the marketplace, (3) plan and build communities to reduce vehicular GHG emissions and provide more transportation options, and (4) improve the efficiency and throughput of existing transportation systems" (p. 69).

The PND concludes that the Project would comply with the above measures because "currently, eleven trucks in Recology's fleet run on liquefied natural gas (LNG), and Recology is in the process of phasing in additional transfer vehicles that run on LNG or compressed natural gas (CNG)...the proposed project is therefore consistent with the Scoping Plan Update's emphasis on reducing GHG emissions from heavy-duty trucks" (p. 70).

Specifics on these proposed fleet additions are not disclosed, and supporting documentation to back up these claims is not provided. As a result, we are not able to verify the actuality of this claim, nor are we able to determine the extent of which these proposed additions will occur. Important details are omitted from the PND, such as the number of trucks added to Recology's fleet, the proposed year these new trucks will be implemented, the financial feasibility of these additional trucks, the size of Recology's fleet after the addition of these trucks, the resultant increase in daily truck trips if the fleet is enlarged etc. Without these details, it cannot be determined whether or not the proposed Project conflicts with AB 32's Scoping Plan Update.

These details are also crucial in determining the Project's air quality and GHG impacts. For example, if these additional trucks result in a larger truck fleet, the daily hauling trips will most likely increase, and subsequently, the Project's emissions. Furthermore, without knowing the year these trucks will be added, there is no way to determine the Project's compliance with the Scoping Plan. Because the Project is being compared to the current agreement, reductions in GHG emissions would have to occur during the Project's first year of operation. As a result, these additional trucks would need to be phased into Recology's fleet and in operation by 2016.

These proposed fleet additions present conflicting ideas within the PND and associated Technical Report. The Technical Report specifies that the "existing truck fleet and number of daily trips" would stay the same under the proposed Project, and uses this fact as a basis for calculating the Project's potential emissions and for determining the Project's air quality and GHG impacts (p. 2). Furthermore, the PND states that "the Recology Hay Road Landfill, the San Francisco Transfer Station, Recology's Recycle Central Facility, and the truck hauling fleet currently used to transport San Francisco waste would enter into one or more agreements for the transportation and disposal of 5 million tons of San

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19 http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

Francisco MSW at the Recology Hay Road Landfill" (p. 1). If these facilities and the current fleet are entering into the proposed agreement, exclusively, the addition of cleaner transfer trucks cannot be used as a way to show compliance with the AB 32 Scoping Plan Update.

The PND attempts to further justify the Project's compliance with AB 32's Scoping Plan Update. The PND states that "because the proposed project's GHG emissions would be below the quantitative significance threshold of 1,100 metric tons of CO2e per year...the proposed project would contribute to meeting the SFBAAB's fair share of emission reductions for the year 2020." This statement, as presented by the analysis conducted in the previous section, may not hold true. According to our analysis, GHG emissions from 2019 – 2030 would result in a significant impact. Furthermore, it is not clear if these truck additions would result in a larger fleet. If so, the daily hauling trips would increase, and as a result, both the emissions calculated in the Technical Report and the emissions calculated in the previous section, underestimate the proposed Project's potential emissions.

The PND also does not quantify or implement reduction targets for the proposed Project, which are specified in AB 32. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020, a reduction of approximately 15 percent below emissions expected under the "business as usual" scenario.[20] Since the PND treats the proposed new contract as a change in existing conditions, and not as two entirely different entities, the PND should demonstrate that this proposed Project "update" would result in a minimum 15 percent reduction in GHG emissions.

Furthermore, Governor Brown recently issued an executive order to establish an even more ambitious GHG reduction target. Executive Order B-30-15[21] requires emissions reductions above those mandated by AB 32 to reduce GHG emissions 40 percent below their 1990 levels by 2030. The newly-stated GHG reductions target should also be considered as a threshold of significance against which to measure Project impacts. The analysis would need to translate the new statewide targets into a project specific threshold against which Project GHG emissions are compared. An environmental impact report should be prepared to quantify any reductions expected to be achieved by mitigation measures, shown by substantial evidence that such measures will be effective and should demonstrate how the reductions will reduce the emissions below the significance threshold adopted.

Health Risk from Diesel Particulate Matter Inadequately Evaluated

The PND conducted a health risk assessment, and determined that the cancer risk from the proposed Project would be less than significant. Several incorrect assumptions were made in calculating the potential health risk. First, the PND and associated Technical Report use the model CALINE4 to predict a maximum 1-hour diesel particulate matter concentration from the Project's daily truck trips. CALINE4, however, should only be used for carbon monoxide (CO) analyses in California. Second, as previously mentioned, the incremental increase in daily truck trips that would occur as a result of San Francisco's

20 http://www.arb.ca.gov/cc/ab32/ab32.htm
21 http://gov.ca.gov/news.php?id=18938

growing population was not taken into account; as a result, the health risk calculated in the PND is underestimated. Our review of the estimated Project emissions of diesel particulate matter (DPM) determined that significant air quality impacts may be generated through the use of diesel-fueled hauling trucks to and from the site.

The PND's Technical Report conducts a health risk assessment using the CALINE4 model. However, according to the California Department of Transportation "CALINE4 is only accepted by U.S. EPA for CO analysis in California; for other pollutants... use CAL3QHCR or AERMOD."[22] For particulate matter hot spot analyses, the EPA has specified the models and procedures to be used for conformity purposes, and recommends the use of the CAL3QHCR line-source model for simple highway and intersection projects, and the AERMOD dispersion model for complex highway projects.[23] Therefore, in an effort to accurately estimate the potential health risk posed to sensitive receptors from the proposed Project, we used AERSCREEN, the screening version of the AERMOD model, to conduct our analysis.

Furthermore, the screening-level health risk assessment conducted in the PND and associated Technical Report does not account for the incremental increase in daily truck trips, and subsequent DPM emissions, that would occur as a result of San Francisco's growing population in future years. As a result, the cancer risk is underestimated. In our analysis, we corrected for this underestimation and calculated the cancer risk for the duration of the Project using emission rates that account for this steady increase in emissions every year.

As of 2011, the United States Environmental Protection Agency (USEPA) recommends AERSCREEN as the leading air dispersion model, due to improvements in simulating local meteorological conditions based on simple input parameters.[24] The model replaced SCREEN3, which is included in OEHHA[25] and CAPCOA[26] guidance as the appropriate air dispersion model for Level 2 health risk screening assessments (HRSAs). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

The AERSCREEN model relies on a continuous average emission rate to simulate maximum downwind concentrations from point, area, and volume emission sources. To account for the variability in hauling truck usage over the course of an operational year, we calculated an average DPM emission rate by the following equation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{tons}{year} \times \frac{2000\ lbs}{ton} \times \frac{453.6\ grams}{lb} \times \frac{312.9\ days}{year} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds}$$

22 http://www.dot.ca.gov/hq/env/air/software/caline4/calinesw.htm
23 http://www.dot.ca.gov/hq/env/air/pages/qualpm.htm
24 http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf
25 http://oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf
26 http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf

We then used the average emission rate and applied it to the total anticipated Project duration. The results of our calculation are summarized in the table below.

Year	Exhaust PM10 Emissions (tons/year)	Exhaust PM10 Emissions (g/sec)
2016	1.23	0.041
2017	1.26	0.042
2018	1.26	0.042
2019	1.28	0.043
2020	1.28	0.043
2021	1.31	0.044
2022	1.31	0.044
2023	1.33	0.045
2024	1.33	0.045
2025	1.36	0.046
2026	1.36	0.046
2027	1.38	0.046
2028	1.38	0.046
2029	1.41	0.047
2030	1.41	0.047
AVERAGE		**0.044**

We modeled the route taken by these trucks as a volume source, and used an initial lateral dimension of 100 meters to represent one link of the freeway at any given time during the 155 mile trip length. A volume height of three meters was selected to represent the height of exhaust stacks on heavy duty trucks, and an initial vertical dimension of 1.5 meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generated maximum reasonable estimates of single-hour downwind DPM concentrations from the Project. USEPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant may be estimated by multiplying the single-hour concentration by 10%.[27] The maximum single-hour downwind concentration in the AERSCREEN output was approximately 2.10 $\mu g/m^3$ DPM 216 meters downwind. The annualized average concentration for the sensitive receptors was estimated to be 0.21 $\mu g/m^3$.

We calculated excess cancer risks for adults, children, and infant receptors using applicable HRA methodologies prescribed by OEHHA. OEHHA recommends the use of Age Sensitivity Factors (ASFs) to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution.[28] According to the revised guidance, quantified cancer risk should be multiplied by a factor of ten during

27 http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf
28 http://oehha.ca.gov/air/hot_spots/pdf/2012tsd/Chapter11_2012.pdf

the first two years of life (infant), and by a factor of three for the subsequent fourteen years of life (child greater than two until sixteen). The results of our calculations are shown below.

Parameter	Description	Units	Adult Exposure	Child	Infant
Cair	Concentration	µg/m3	0.21	0.21	0.21
DBR	Daily breathing rate	L/kg-day	302	581	581
EF	Exposure Frequency	days/year	350	350	350
ED	Exposure Duration	years	15	14	2
AT	Averaging Time	days	25550	25550	25550
	Inhaled Dose	(mg/kg-day)	1.3E-05	2.2E-05	3.3E-06
CPF	Cancer Potency Factor	1/(mg/kg-day)	1.1	1.1	1.1
ASF	Age Sensitivity Factor	-	1	3	10
	Cancer Risk		**1.43E-05**	**7.72E-05**	**3.68E-05**

The excess cancer risk to adults, children, and infants are 14.3, 77.2, and 36.8 in one million, respectively. Consistent with OEHHA guidance, exposure was assumed to begin in the infantile stage of life to provide the most conservative estimate of air quality hazards. It should be noted that the infant exposure duration was limited to two years, as the ASF of 10 can only be applied to the first two years of life. Similarly, I limited the exposure duration for a child to 14 years, as the ASF of 3 can only be applied to a child greater than two years old up to 16 years.

Even with these shortened exposure durations for children and infants, the cancer risk posed to sensitive receptors located approximately 200 meters from the proposed truck route, for all three age categories, exceeds BAAQMD's significance threshold of 10 in one million. A refined health risk assessment should therefore be prepared to examine air quality impacts generated by the Project using site-specific meteorology and specific truck usage schedules. Our calculations demonstrate that the Project poses a significant health risk due to DPM emissions. Therefore, an updated CEQA evaluation should be completed and adequate mitigation measures and alternatives should be evaluated for the Project.

Conclusion

The PND does not adequately assess the proposed Project's air quality and greenhouse gas impacts, nor does it effectively demonstrate compliance will applicable greenhouse gas reduction targets. The PND incorrectly compares the emissions from the existing contract with Altamont Landfill to the proposed new contract with Recology Hay Road Landfill; as a result, the proposed Project's emissions are underestimated. Moreover, the PND does not account for the incremental increase in daily haul trips and subsequent emissions that will most likely occur in future years, as San Francisco's population and waste volume grow. The PND inadequately evaluates the potential health risk posed to sensitive receptors located near the proposed truck route. Due to each and all of these shortcomings, an EIR should be prepared to address and correct for these issues, and should implement mitigation measures, where necessary.

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Scenario 1: Current Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Existing Scenario	40	Trucks
# of LNG Haul Truck Fleet Utilized for Existing Scenario	11	Trucks
Total # of Haul Truck Round Trips by day for the Existing Scenario	50	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	115	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	39.2	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	10.8	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.423	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	1.918	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.243	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,754.438	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.092	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.085	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	3.317	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.519	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.004	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	19.08	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	2.985	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.016	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	73.49	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	11.496	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.868	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	17,450.97	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	2,729.83	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.051	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.008	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.048	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.007	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	4.651	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.728	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	1.823	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.285	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 1: Current Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	2.388	pounds/day	
LNG ROG Emissions	0.374	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	9.519	pounds/day	
LNG NOx Emissions	1.489	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	4,357.034	pounds/day	
LNG CO2 Emissions	681.565	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.479	pounds/day	
LNG CH4 Emissions	0.075	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	5.378	pounds/day	
LNG N2O Emissions	0.841	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	1.133	pounds/day	
LNG PM10 Emissions	0.177	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.373	pounds/day	
LNG PM2.5 Emissions	0.058	tons/year	

Scenario 1: 2020 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	40	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	11	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	55	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	133.5	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	43.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	11.9	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.475	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.626	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,718.815	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.103	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.095	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	4.785	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.749	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	27.53	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	4.306	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	99.32	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	15.537	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.789	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	21,946.06	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	3,432.99	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.065	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.010	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.061	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.010	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	6.100	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.954	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	2.459	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.385	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 1: 2020 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	3.065	pounds/day	
LNG ROG Emissions	0.480	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	12.219	pounds/day	
LNG NOx Emissions	1.911	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	5,592.898	pounds/day	
LNG CO2 Emissions	874.889	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.614	pounds/day	
LNG CH4 Emissions	0.096	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	6.903	pounds/day	
LNG N2O Emissions	1.080	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	1.454	pounds/day	
LNG PM10 Emissions	0.227	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.479	pounds/day	
LNG PM2.5 Emissions	0.075	tons/year	

Scenario 1: 2030 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	40	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	11	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	61	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	133.5	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	47.8	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	13.2	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.475	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.626	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,718.815	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.103	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.095	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	5.276	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.825	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	30.35	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	4.748	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	109.52	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	17.132	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.789	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	24,198.83	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	3,785.39	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.072	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.011	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.068	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.011	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	6.726	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	1.052	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	2.711	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.424	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 1: 2030 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	3.380	pounds/day	
LNG ROG Emissions	0.529	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	13.473	pounds/day	
LNG NOx Emissions	2.108	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	6,167.012	pounds/day	
LNG CO2 Emissions	964.697	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.678	pounds/day	
LNG CH4 Emissions	0.106	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	7.612	pounds/day	
LNG N2O Emissions	1.191	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	1.603	pounds/day	
LNG PM10 Emissions	0.251	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.528	pounds/day	
LNG PM2.5 Emissions	0.083	tons/year	

Scenario 1: 2020 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	40	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	11	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	55	Round Trips
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	21.5	Miles
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	43.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	11.9	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.470	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.630	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,714.029	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.104	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.096	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	0.762	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.119	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	4.43	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	0.694	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	16.00	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	2.503	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.779	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	3,524.54	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	551.34	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.010	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.002	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.010	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.002	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	0.984	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.154	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	0.397	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.062	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 1: 2020 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	0.494	pounds/day	
LNG ROG Emissions	0.077	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	1.968	pounds/day	
LNG NOx Emissions	0.308	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	900.729	pounds/day	
LNG CO2 Emissions	140.900	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.099	pounds/day	
LNG CH4 Emissions	0.015	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	1.112	pounds/day	
LNG N2O Emissions	0.174	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	0.234	pounds/day	
LNG PM10 Emissions	0.037	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.077	pounds/day	
LNG PM2.5 Emissions	0.012	tons/year	

Scenario 1: 2030 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	40	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	11	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	61	Round Trips
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	21.5	Miles
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	47.8	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	13.2	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.470	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.630	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,714.029	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.104	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.096	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	0.840	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.131	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	4.89	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	0.765	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	17.65	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	2.760	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.779	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	3,886.34	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	607.93	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.012	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.002	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.011	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.002	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	1.085	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.170	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	0.438	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.069	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 1: 2030 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	0.544	pounds/day	
LNG ROG Emissions	0.085	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	2.170	pounds/day	
LNG NOx Emissions	0.339	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	993.189	pounds/day	
LNG CO2 Emissions	155.363	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.109	pounds/day	
LNG CH4 Emissions	0.017	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	1.226	pounds/day	
LNG N2O Emissions	0.192	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	0.258	pounds/day	
LNG PM10 Emissions	0.040	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.085	pounds/day	
LNG PM2.5 Emissions	0.013	tons/year	

Scenario 2: Current Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Existing Scenario	19	Trucks
# of LNG Haul Truck Fleet Utilized for Existing Scenario	29	Trucks
Total # of Haul Truck Round Trips by day for the Existing Scenario	50	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	115	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	18.6	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	28.4	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.423	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	1.918	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.243	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,754.438	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.092	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.085	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	1.576	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.246	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.004	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	9.06	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	1.418	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.016	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	34.91	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	5.460	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.868	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	8,289.21	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	1,296.67	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.024	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.004	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.023	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.004	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	2.209	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.346	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	0.866	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.135	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 2: Current Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	6.296	pounds/day	
LNG ROG Emissions	0.985	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	25.096	pounds/day	
LNG NOx Emissions	3.926	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	11,486.727	pounds/day	
LNG CO2 Emissions	1,796.852	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	1.262	pounds/day	
LNG CH4 Emissions	0.197	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	14.178	pounds/day	
LNG N2O Emissions	2.218	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	2.986	pounds/day	
LNG PM10 Emissions	0.467	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.983	pounds/day	
LNG PM2.5 Emissions	0.154	tons/year	

Scenario 2: 2020 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	19	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	29	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	52	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	133.5	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	19.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	29.6	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.475	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.626	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,718.815	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.103	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.095	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	2.140	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.335	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	12.31	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	1.926	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	44.42	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	6.949	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.789	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	9,814.95	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	1,535.34	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.029	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.005	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.027	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.004	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	2.728	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.427	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	1.100	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.172	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 2: 2020 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	7.609	pounds/day	
LNG ROG Emissions	1.190	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	30.331	pounds/day	
LNG NOx Emissions	4.745	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	13,882.903	pounds/day	
LNG CO2 Emissions	2,171.683	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	1.525	pounds/day	
LNG CH4 Emissions	0.239	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	17.135	pounds/day	
LNG N2O Emissions	2.680	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	3.609	pounds/day	
LNG PM10 Emissions	0.565	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	1.188	pounds/day	
LNG PM2.5 Emissions	0.186	tons/year	

Scenario 2: 2030 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	19	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	29	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	57	Round Trips
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	133.5	Miles
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	21.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	32.7	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.475	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.626	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,718.815	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.103	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.095	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	2.360	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.369	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	13.57	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	2.123	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	48.98	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	7.662	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.789	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	10,822.46	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	1,692.94	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.032	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.005	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.030	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.005	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	3.008	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.471	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	1.212	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.190	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 2: 2030 Emissions
San Francisco Bay Area Air Basin (SFAAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	8.390	pounds/day	
LNG ROG Emissions	1.312	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	33.444	pounds/day	
LNG NOx Emissions	5.232	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	15,307.990	pounds/day	
LNG CO2 Emissions	2,394.607	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	1.682	pounds/day	
LNG CH4 Emissions	0.263	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	18.894	pounds/day	
LNG N2O Emissions	2.956	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	3.979	pounds/day	
LNG PM10 Emissions	0.622	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	1.310	pounds/day	
LNG PM2.5 Emissions	0.205	tons/year	

Scenario 2: 2020 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	19	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	29	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	52	Round Trips
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	21.5	Miles
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	19.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	29.6	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.470	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.630	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,714.029	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.104	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.096	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	0.341	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	0.053	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	1.98	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	0.310	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	7.16	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	1.120	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.779	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	1,576.28	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	246.58	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.005	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	0.001	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.004	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	0.001	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	0.440	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	0.069	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	0.178	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	0.028	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 2: 2020 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	1.225	pounds/day	
LNG ROG Emissions	0.192	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	4.885	pounds/day	
LNG NOx Emissions	0.764	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	2,235.823	pounds/day	
LNG CO2 Emissions	349.747	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.246	pounds/day	
LNG CH4 Emissions	0.038	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	2.760	pounds/day	
LNG N2O Emissions	0.432	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	0.581	pounds/day	
LNG PM10 Emissions	0.091	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.191	pounds/day	
LNG PM2.5 Emissions	0.030	tons/year	

Scenario 2: 2030 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
# of B20 Biodiesel Haul Truck Fleet Utilized for Proposed Scenario	19	Trucks
# of LNG Haul Truck Fleet Utilized for Proposed Scenario	29	Trucks
Total # of Haul Truck Round Trips by day for the Proposed Scenario	57	Round Trips
Mileage per truck per round trip (within the Sacramento Valley Air Basin)	21.5	Miles
Mileage per truck per round trip (within the San Francisco Bay Area Air Basin)	-	Miles
Haul Days Per Week	6	Days
LNG Truck Average MPG	2.8	MPG

Factor	Value	Units
Average # of vehicle round trips per day for the B20 Biodiesel Vehicles	21.4	Round Trips
Average # of vehicle round trips per day for the LNG Vehicles	32.7	Round Trips
Haul Days Per Year (based on 6 out of 7 days hauling per week, throughout the year)	312.9	Days per Year

Factor	Value	Units
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **ROG** Emission Factor	0.470	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO** Emission Factor	2.156	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **NOx** Emission Factor	7.630	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CO2** Emission Factor	1,714.029	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Running Exhaust Emission Factor	0.104	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Tire Wear Emission Factor	0.036	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Break Wear Emission Factor	0.062	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM10** Road Dust Emission Factor	0.287	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Running Exhaust Emission Factor	0.096	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Tire Wear Emission Factor	0.009	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Break Wear Emission Factor	0.026	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **PM2.5** Road Dust Emission Factor	0.072	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **CH4** Emission Factor	0.0051	grams/mile
Diesel Solid Waste Transport Truck (EMFAC2011: "T7 Tractor") **N2O** Emission Factor	0.0048	grams/mile

Calculation	Value	Units	Notes
ROG:		-	
Biodiesel B20 ROG Emissions	0.001	pounds/mile	B20 adjustment factor applied - 21.1% Reduction
Biodiesel B20 ROG Emissions	0.376	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 ROG Emissions	**0.059**	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO:			
Biodiesel B20 CO Emissions	0.005	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO Emissions	2.19	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO Emissions	**0.342**	tons/year	(Pounds per day/pounds per ton) x haul days per year
NOx:			
Biodiesel B20 NOx Emissions	0.017	pounds/mile	B20 adjustment factor applied - 2% Increase
Biodiesel B20 NOx Emissions	7.89	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 NOx Emissions	**1.235**	tons/year	(Pounds per day/pounds per ton) x haul days per year
CO2:			
Biodiesel B20 CO2 Emissions	3.779	pounds/mile	No B20 adjustment factor to apply
Biodiesel B20 CO2 Emissions	1,738.09	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CO2 Emissions	**271.89**	tons/year	(Pounds per day/pounds per ton) x haul days per year
CH4:			
Biodiesel B20 CH4 Emissions	0.000	pounds/mile	N/A
Biodiesel B20 CH4 Emissions	0.005	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 CH4 Emissions	**0.001**	tons/year	(Pounds per day/pounds per ton) x haul days per year
N2O:			
Biodiesel B20 N2O Emissions	0.000	pounds/mile	N/A
Biodiesel B20 N2O Emissions	0.005	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 N2O Emissions	**0.001**	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM10:			
Biodiesel B20 PM10 Emissions	0.001	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM10 Emissions	0.485	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM10 Emissions	**0.076**	tons/year	(Pounds per day/pounds per ton) x haul days per year
PM2.5:			
Biodiesel B20 PM2.5 Emissions	0.000	pounds/mile	B20 adjustment factor applied - 10.1% Reduction
Biodiesel B20 PM2.5 Emissions	0.196	pounds/day	Pounds per mile x round trip miles x # B20 round trips per day
Biodiesel B20 PM2.5 Emissions	**0.031**	tons/year	(Pounds per day/pounds per ton) x haul days per year

Scenario 2: 2030 Emissions
Sacramento Valley Air Basin (SVAB)

Factor	Value	Units
LNG/CNG **ROG** Emission Rate	0.873	grams/mile
LNG/CNG **NOx** Emission Rate	3.5	grams/mile
LNG/CNG **PM10** Emission Rate	0.029	grams/mile
LNG/CNG **PM2.5** Emission Rate	0.029	grams/mile
LNG/CNG **CO2** Emission Rate	4,460	grams/gallon
LNG/CNG **CH4** Emission Rate	0.175	grams/mile
LNG/CNG **N2O** Emission Rate	1.966	grams/mile
LNG Truck Average MPG	2.8	MPG

Calculation	Value	Units	Notes
ROG:			
LNG ROG Emissions	0.002	pounds/mile	
LNG ROG Emissions	1.351	pounds/day	
LNG ROG Emissions	0.211	tons/year	
NOx:			
LNG NOx Emissions	0.008	pounds/mile	
LNG NOx Emissions	5.386	pounds/day	
LNG NOx Emissions	0.843	tons/year	
CO2:			
LNG CO2 Emissions	3.512	pounds/mile	
LNG CO2 Emissions	2,465.332	pounds/day	
LNG CO2 Emissions	385.648	tons/year	
CH4:			
LNG CH4 Emissions	0.000	pounds/mile	
LNG CH4 Emissions	0.271	pounds/day	
LNG CH4 Emissions	0.042	tons/year	
N2O:			
LNG N2O Emissions	0.004	pounds/mile	
LNG N2O Emissions	3.043	pounds/day	
LNG N2O Emissions	0.476	tons/year	
PM10:			
LNG PM10 Emissions	0.001	pounds/mile	
LNG PM10 Emissions	0.641	pounds/day	
LNG PM10 Emissions	0.100	tons/year	
PM2.5:			
LNG PM2.5 Emissions	0.000	pounds/mile	
LNG PM2.5 Emissions	0.211	pounds/day	
LNG PM2.5 Emissions	0.033	tons/year	

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September 25, 2015

Subject: **Supplemental Comments on the Appeal Responses for the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County**

We have reviewed the September 21, 2015 response memorandum ("Appeal Response"), which addresses comments made in an August 19, 2015 letter of appeal ("Appeal Letter") on the Final Negative Declaration (FND) for the Agreement for Disposal of San Francisco Municipal Solid Waste at Recology Hay Road Landfill in Solano County ("Project").

Our review concludes that the Appeal Response fails to adequately analyze the entirety of the information presented in the May 19, 2015 SWAPE Report, only relying on components of the data taken out of context that support their main conclusions.

Furthermore, the Appeal Response proposes to implement three additional diversion programs that will supposedly reduce the number of trucks traveling to the landfill by 4 – 7 round-trip truck trips per day. These values, however, are unsupported by current data, and were derived with the assumption that each program will not only be successful once implemented, but will also reduce waste volumes to the maximum extent possible.

Lastly, if the proposed contract with Recology's Hay Road Landfill is approved, it is anticipated that San Francisco's waste will take up 50% of the landfill's remaining capacity. As a result, jurisdictions that currently dispose a majority of their waste at Hay Road will be forced to dispose elsewhere. The FND fails to evaluate the impacts that the Project will have on these local jurisdictions.

These issues and additional impacts further support a fair argument that the FND failed to adequately evaluate the entirety of the Project's environmental impacts. As a result, an Environmental Impact Report (EIR) should be prepared to consider these supplemental issues, as well as the issues addressed in SWAPE's May 19, 2015 Report, and SWAPE's September 18, 2015 Report.

Inadequate Evaluation of Waste Volumes Used in SWAPE Report

The Appeal Response critiques the total annual disposal tonnage of San Francisco-generated waste used by SWAPE in the May 19 Report, stating that "the total tonnage includes both the type of municipal solid waste that is the subject of the proposed project's Agreement, and other types of waste such as construction and demolition debris and self-generated waste hauled to other landfills that is not the subject of the proposed project Agreement" (p. 6). While this point is technically true, it is irrelevant to the results of SWAPE's analysis, and when adjusted waste volumes are used instead, the same results are generated.

The total annual disposal tonnage of San Francisco waste was used as a way to demonstrate that in recent years, as San Francisco's population increases so does the amount of waste. Furthermore, even when adjusted disposal tonnages are used, the trend in waste disposal demonstrated in SWAPE's May 19 Report remains the same. CalRecycle estimates the residential disposal rates within San Francisco based on the reporting year population and an adjusted reporting year disposal tonnage. This adjusted disposal tonnage accounts for waste exported out-of-state, Class II waste, and other disposal amounts that are not generated by San Francisco residents and businesses directly. For example, in 2014, a reported 529,782 tons of waste was generated. Of that waste, 31,355 tons were not applicable to the waste generated directly by residents and businesses in San Francisco. Using the adjusted rate and the reporting year population, a residential per capita disposal rate of 3.3 pounds per person per day was estimated (see excerpt below).[1]

Jurisdiction Diversion/Disposal Rate Detail

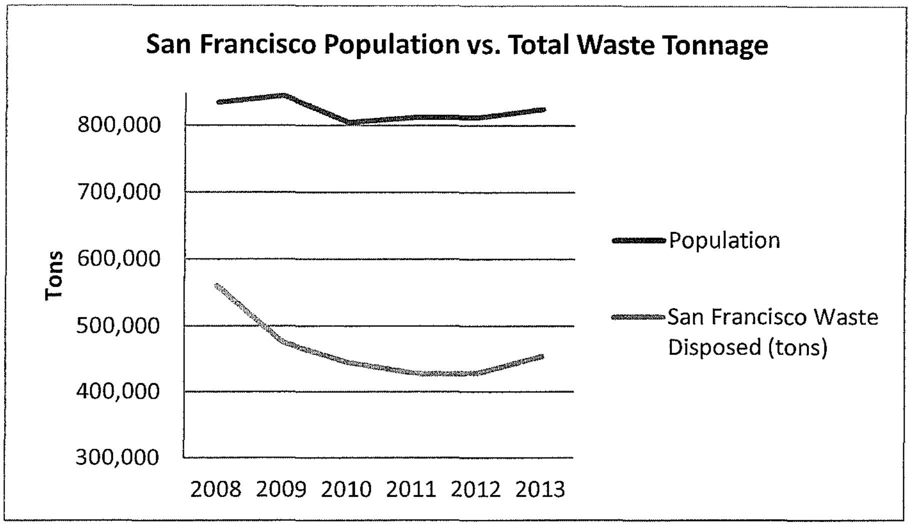
Jurisdiction:	San Francisco	**Reporting Year:**	2014
County:	San Francisco		

Reporting-Year Disposal Amount (tons):	529,782.22
Disposal Reduction Credits (Reported):	
Disaster Waste (tons):	0.00
Medical Waste (tons):	0.00
Regional Diversion Facility Residual Waste (tons):	0.00
C&D Waste (tons):	0.00
Out-of-State Export (Diverted):	0.00
Class II Waste (tons):	28,910.28
Other Disposal Amount (tons):	2,444.28
Total Disposal Reduction Credit Amount (tons):	31,354.56
Total Adjusted Reporting-Year Disposal Amount (tons):	$\boxed{498,427.66}$
Reporting-Year Transformation Waste (tons):	307.95
Reporting-Year Population:	$\boxed{836,620}$
Reporting-Year Employment:	625,161

	Population		Employment	
	Target	Annual	Target	Annual
Disposal Rate without Transformation (pounds/person/day):		3.3		4.4
Transformation Rate (pounds/person/day):	1.3	0.0	2.1	0.0
Calculated Disposal Rate (pounds/person/day):	6.6	3.3	10.6	4.4

Using these reporting year population estimates and adjusted disposal rates, we still find that from 2011 to 2013 the amount of waste disposed has increased proportionally to San Francisco's population (see chart below).

1http://www.calrecycle.ca.gov/LGCentral/Reports/DiversionProgram/JurisdictionDiversionDetail.aspx?JurisdictionID=438&Year=2014



The Appeal Response also finds issue with the following two assumptions made in the May 19 SWAPE Report: (1) No data are offered to support SWAPE's conclusion that a constant percentage (80%) of San Francisco's total waste will be hauled under the proposed agreement; (2) No data are offered to show an increase in per capita generation of the type of waste addressed by the proposed Project agreement (p. 7).

First, while the Appeal Response is correct in their assumption that 80% of San Francisco's waste may not be consistently hauled under the proposed agreement, this argument is again, irrelevant to the results of SWAPE's analysis. As was previously discussed, the residential per capita rate is estimated by CalRecycle using the total amount of waste generated by San Francisco residents and businesses. Because not all of this waste is disposed of at the current Altamont Landfill, using this per capita rate to estimate the total waste that will be disposed under the proposed contract would overestimate disposal volumes compared to population. Therefore, in an effort to avoid overestimating waste volumes that may occur in future years under the proposed contract, we applied this 80% value to the per capita disposal rate provided by CalRecycle. If we were to eliminate this 80% value entirely, and just calculate a per capita disposal rate based off of historical waste volumes disposed at Altamont, we would get the same results (see tables below).

Year	Population	Tons Disposed at Altamont Landfill	Altamont Disposal Rate (lbs/person/day)
2012	816,446	374,844	2.5
2013	828,440	372,205	2.5

Year	Population	Total Tons Disposed by San Francisco	San Francisco Disposal Rate (lbs/person/day)	Percent of Waste Disposed at Altamont	Altamont Disposal Rate (lbs/person/day)
2012	816,446	454,570	3.1	82%	2.5
2013	828,440	476,424	3.2	78%	2.5

Therefore, whether the per capita disposal rate is estimated using San Francisco's total waste volume and then multiplied by 80%, or is estimated using the waste volume disposed at Altamont Landfill directly, the results of SWAPE's analysis remain the same.

Second, the evidence does support the conclusion that a very slight increase in per capita generation has occurred. However, the main point of SWAPE's argument is that in recent years the per capita disposal rates have leveled off, and has not decreased. As a result, as San Francisco's population continues to grow, so does the amount of waste generated. Using the adjusted total San Francisco waste volumes from CalRecycle, as discussed above, it is apparent that the per capita disposal rates have leveled off in recent years, if not slightly increased (see table below).

Reporting Year	Population	San Francisco Total Waste (tons)	Per Capita Disposal Rate (lbs/person/day)
2010	804,989	444,398	3.0
2011	812,820	428,910	2.9
2012	812,538	428,048	2.9
2013	825,111	454,219	3.0
2014	836,620	498,428	3.3

Similarly, using the Altamont Landfill waste volumes to estimate the per capita disposal rate results in a similar trend (see table below).

Reporting Year	Population	Waste Disposed at Altamont (tons)	Per Capita Disposal Rate (lbs/person/day)
2010	804,989	383,104	2.6
2011	812,820	374,202	2.5
2012	812,538	374,844	2.5
2013	825,111	372,205	2.5
2014	836,620	378,995	2.5

Therefore, the evidence and historical data, whether we look at San Francisco as a whole or disposal at Altamont Landfill, demonstrates that the per capita disposal rates have leveled off in recent years, if not increased slightly.

Finally, the Appeal Response claims that waste volumes at the Altamont Landfill have decreased in recent years based on the 2012 to 2013 Altamont waste volumes provided in the SWAPE Report, and as a result, will continue to decrease (p. 7). While the waste volume from 2012 to 2013 decreased by roughly 2,500 tons, the waste volume from 2013 to 2014 increased by roughly 6,800 tons. Furthermore, disposal data for the Altamont Landfill provided to us by the Altamont Landfill support the anticipated future increase in disposal, with a reported 2.23% increase from 2013 to 2014, and a projected 3.5% increase from 2014 to 2015.

The Appeal Response seems to only focus on very minute details of the analysis conducted in SWAPE's May 19 Report that when adjusted or simply taken out, do not affect the overall results of the analysis. SWAPE's May 19 Report, supplemental September 18 Report, and this supplemental letter all come to the same conclusions:

- The residential per capita disposal rates have leveled off, if not slightly increased, in recent years;
- San Francisco's population is growing, and is anticipated to continue to grow over the course of the proposed agreement with Hay Road; and
- As a result, the amount of waste generated by San Francisco and disposed of at the proposed Hay Road Landfill will increase in future years.

The FND Cannot Rely on Additional Future Diversion Programs to establish that Contract Requirements will be met

The Appeal Response states that because the proposed agreement limits the total number of truck trips to an annual average of 50 trips per day, that San Francisco and Recology must take steps to ensure that diversion of recyclable and composting materials away from landfills out paces population growth (p. 8). Reliance on these additional diversion programs, however, to meet the disposal agreement limitations and to off-set the demands from population and commercial growth, requires that all the outlined programs would in fact be adopted and implemented and, moreover, that the proposed programs will not only be successful, but that they will also reduce disposal volumes to the fullest extent possible.

While certain programs and technologies have been shown in certain contexts to reduce total disposal amounts by a projected value, the success and effectiveness of these same technologies and programs in San Francisco has not been established and is unknown, and will remain unknown until the program is actually adopted and implemented. As a result, for CEQA purposes it should not be assumed that future plans to increase recycling and diversion will negate the effects of San Francisco's growing population and to make it possible for Recology to operate within the contract limitations on annual average number of trips/and therefore total volume limits on disposal of San Francisco municipal solid waste, as no conclusive evidence is available to support this assumption.

Furthermore, and as an example of this point, the actual effectiveness of at least one of the proposed methods to reduce truck trips outlined in the Appeal Response is highly questionable (p. 8). The Appeal Response states that "Recology has purchased new lighter weight transfer trailers that will enable Recology to transport one ton more waste per truck compared to existing conditions. These new trailers can eliminate 1-2 round trip truck trips per day, without changing overall truck weight (p. 8)." While it is not explicitly stated, using information from the FND, it can be assumed that these new lighter weight transfer trailers will be installed on the proposed LNG- and/or CNG-powered Class 8 trucks. As is discussed in SWAPE's September 18 Report, the additional weight added to a Class 8 truck equipped with a CNG engine can be as much as 2,000 pounds. Therefore, the proposed one ton (or 2,000 pound) increase from these lighter weight trailers would be negated by the additional weight that a CNG-retrofit incurs.

Impacts that Disposal at Hay Road Will Have on Other Communities

According to the FND, Recology's Hay Road Landfill allows acceptance of up to 2,400 tons of MSW per day (FND, p. 18). The FND concludes that the addition of San Francisco's waste would not significantly impact Hay Road, as the addition of approximately 1,200 tons per day of San Francisco's MSW to the current average of about 651 tons per day (for a total of 1,851 tons), would not exceed this 2,400 ton disposal limit. This conclusion, however, is inadequate for two reasons.

First, information disclosed in the Appeal Response suggested that the peak daily maximum number of trips that have occurred on any given day may be as high as approximately 94 trips per day, or approximately 2,300 tons per day, which would make up approximately 96% of the permitted daily acceptance volume. When combined with current peak disposal amounts, the permitted daily acceptance volume may be exceeded.

Second, Recology Hay Road is predicted to remain operational until 2050 under current disposal rates. However, the addition of San Francisco's waste at Hay Road may significantly shorten the landfill's operational period. Both the short term and long term impacts that the proposed contract will have on Hay Road directly affects the communities that currently rely on Hay Road for waste disposal.

The Appeal Response discloses for the first time that truck trips are not, as described in the FND, currently limited to 50 round trips a day (p. 9). In fact the number of trips under current conditions reportedly varies substantially and usually peak at around 70 round trips per day with the highest reported number of trips reaching 94 trips per day (Appeal Response, p. 9; Exhibit C, pp. 3). On any given day, 94 trips, or approximately 2,300 tons of waste, could be hauled to Recology's Hay Road Landfill. If a peak number in current trips occur within the same day (average is assumed to be 651 tons; therefore, peak disposal volumes may be higher on any given day), the daily limit of 2,400 tons may be exceeded. The FND does not propose a back-up plan for when MSW capacity exceeds Hay Road daily capacity limits.

Furthermore, the FND has not evaluated the impacts that may occur on communities who currently rely on Hay Road as their primary waste disposal location as a result of the proposed Project. According to the Complete Permit Package for Recology Hay Road, as of January 2013, Hay Road has a remaining capacity of 29,255,000 cubic yards.[2] Using the 3 to 1 refuse to cover volume ratio disclosed in this document, approximately 21.9 million cubic yards of this remaining capacity is reserved for refuse exclusively. Again, using the assumed waste density of 1,090 pounds per cubic yard within this document, we estimated a remaining waste capacity of approximately 11.9 million tons. Assuming that 5 million tons of San Francisco's waste will be disposed at Hay Road over the course of approximately 15 years (based on the approved term and tonnage under base agreement and assuming the City exercises the option under the agreement), the proposed Project would take up approximately 50% of the remaining capacity at Hay Road. However, if a more realistic disposal volume that takes into account population growth in future years is assumed, the percent of Hay Road's total capacity taken up by San Francisco's waste may be more.

The proposed contract will substantially accelerate the time when the Hay Road facility would reach capacity as compared to the period anticipated in the mitigated negative declaration of the Hay Road Landfill permit expansion. As a result, communities that rely on Hay Road as their primary waste disposal location long term may be forced to transport their waste to other landfills located much farther away. It is therefore reasonable to foresee that the Recology/DOE contract may increase the distance these displaced communities would need to travel to dispose of their municipal solid waste, which may result in an increase in pollutant and greenhouse gas emissions down the line. This is another fair argument of a potential significant impact that should be addressed in an updated analysis as part of an EIR.

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2 http://www.calrecycle.ca.gov/SWFacilities/Directory/48-aa-0002/Document, Complete Permit Package, 2/15/2013

1988-2015

Year	SFT Tons Disposed
11/88 - 12/88	108,030
1989	651,575
1990	643,645
1991	591,685
1992	590,140
1993	599,279
1994	604,401
1995	606,783
1996	639,455
1997	667,871
1998	678,195
1999	690,648
2000	743,345
2001	690,897
2002	627,618
2003	581,567
2004	560,253
2005	545,437
2006	546,734
2007	520,265
2008	467,218
2009	402,774
2010	379,362
2011	367,332
2012	365,924
2013	365,787
2014	373,940
YTD August 2015	257,935

Monthly flow 2015 32,242

Source: Altamont Land Fill