



626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 **phone**
213.599.4301 **fax**

esassoc.com

ATTACHMENT F

memorandum

date June 18, 2021

to City of Long Beach, Planning Department

from Kimberly Comacho and Heather Dubois, ESA

subject Downtown Plan Equivalency Calculator

Introduction

This Downtown Plan Equivalency Calculator (DPEC) has been developed to provide development flexibility so that the City of Long Beach (City) can allow for changes in market conditions over the build-out duration of the development of the Downtown Plan. Under the Equivalency Analysis, land uses to be developed would be allowed to be reallocated among the permitted land uses so long as the reallocations do not exceed the analyzed upper levels of environmental impacts that are identified in the Program Environmental Impact Report (Certified PEIR). The DPEC allows the City to easily track new projects and to consistently reduce the available commercial, office, and/or hotel space to accommodate increased demand for residential units.

This memorandum documents the analysis used to determine a conservative exchange rate to allow for the reallocation of commercial, office, and/or hotel space as residential units such that applicable regulations are satisfied and no additional significant environmental impacts or substantially greater impacts would occur than previously identified in the Certified PEIR. The DPEC is based on Air Quality, Greenhouse Gas, Noise, and Transportation impacts from the Certified PEIR and adjusted, as appropriate, to conform to current regulatory standards.

Impact Analyses used in informing the development of the Downtown Plan Equivalency Calculator

Air Quality

Air pollutant emissions generated by all the land uses developed in the Downtown Plan area must not be exceeded by new projects under consideration for approval under the Downtown Community Plan. Operational air pollutant emissions from land use developments are generated from area sources (landscaping equipment, consumer product use, application of architectural coatings), building energy consumption (natural gas for heating), and mobile sources (resident/worker vehicle trips and vendor trips). However, development of residential, commercial, office, and hotel uses may result in different maximum daily air pollutant emissions depending on the specific size and land use type of the development. In other words, different land use types generate different levels of air pollutant emissions on an equivalent floor area or unit basis. This is primarily due

to different vehicle trip generation rates and different building energy demand for various land use types on an equivalent basis.

For the purposes of this equivalency calculator, ESA determined the equivalent floor area of commercial and office uses and the equivalent number of hotel rooms that would generate the same maximum daily air pollutant emissions as one dwelling unit. The analysis is based on emissions and emission factors provided in the Air Quality Technical Memorandum prepared for the Proposed Locust Avenue Multifamily Residential Building Project (Locust Project)¹ and emission data in the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2).² The emissions from the Locust Project's mobile emissions were adjusted to remove the internal capture/public transportation accessibility reductions applicable to the Project. This allows for the equivalency rates to be universally applied to projects proposed for the Downtown Plan Area. Calculations for the equivalency rates are provide in Attachment A. Table 3 summarizes the exchange rate of commercial, office uses, or number of hotel rooms that would result in an equivalent level of emissions as one residential unit.

TABLE 3
AIR QUALITY EQUIVALENCY

Land Use	Exchange Rate
Commercial	0.060 KSF per DU
Office	0.170 KSF per DU
Hotel	0.311 Rooms per DU
KSF = thousand square feet; DU = dwelling unit Source: ESA 2021	

Greenhouse Gas Emissions

GHG emissions generated by all the land uses developed in the Downtown Plan area must not be exceeded by new projects under consideration for approval under the Downtown Plan. Annual operational GHG emissions from land use developments are generated from area sources (landscaping equipment), energy consumption (natural gas and electricity for heating and cooling), water demand, waste generation, and mobile sources (resident/worker vehicle trips and vendor trips). However, development of residential, commercial, office, and hotel uses may result in different annual GHG emissions depending on the specific size and land use type of the development. In other words, different land use types generate different levels of GHG on an equivalent floor area or unit basis. This is primarily due to different vehicle trip generation rates and building energy demand, water demand, and waste generation for various land use types on an equivalent basis.

¹ LSA 2020. Air Quality Technical Memorandum for the Proposed Locust Avenue Multifamily Residential Building Project, Long Beach, California (LSA Project No. SPT2001).

² CalEEMod is the current version of the emissions model for land use development projects recommended by the South Coast Air Quality Management District (SCAQMD). CalEEMod was developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with California Air Districts and is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant emissions from a variety of land use projects

For the purposes of this equivalency calculator, ESA determined the equivalent floor area of commercial and office uses and the equivalent number of hotel rooms that would generate the same annual GHG emissions as one dwelling unit. The equivalency analysis is based on the emissions and emission factors provided in the Greenhouse Gas Technical Memorandum prepared for the proposed Locust Project³ and emission data in CalEEMod (Version 2016.3.2). Calculations for the equivalency rates are provide in Attachment A. Table 4 summarizes the exchange rate of commercial, office uses, or number of hotel rooms that would result in an equivalent level of emissions as one residential unit.

TABLE 4
GREENHOUSE GAS EQUIVALENCY

Land Use	Exchange Rate	
Commercial	0.022	KSF per DU
Office	0.059	KSF per DU
Hotel	0.078	Rooms per DU
KSF = thousand square feet; DU = dwelling unit		
Source: ESA 2021		

Noise

The equivalency scenario considers community-wide noise generated by all the land uses developed in the Downtown Plan area. Differences in community-wide noise from land use development would result from differences in trip generation and the resultant traffic noise levels from various land use types on an equivalent floor area or unit basis. Thus, reallocation among the residential, commercial, office, and hotel land uses considered in the Certified PEIR can occur without a substantial change to the findings, significance determinations, and mitigation measures in the Certified PEIR based on an analysis of trip generation, which contributes to community-wide traffic noise.

Development of residential, commercial, office, and hotel uses may result in different trip generation rates depending on the specific size and land use type of the development. In other words, different land use types generate different trip volumes on an equivalent floor area or unit basis.

As discussed below in Transportation and Traffic, based on data provided in the Traffic Impact Analysis in the Certified PEIR,⁴ an exchange of 1,000 square feet of office space for every 3.177 dwelling units, 1,000 square feet of commercial space for every 12.32 dwelling units or 1 hotel room for every 1.59 dwelling units of proposed residential would be required. Table 5 summarizes the exchange rate of commercial, office uses, or number of hotel rooms that would result in an equivalent level of emissions as one residential unit.

³ LSA 2020. Greenhouse Gas Technical Memorandum for the Proposed Locust Avenue Multifamily Residential Building Project, Long Beach, California (LSA Project No. SPT2001).

⁴ Long Beach Downtown Community Plan Program EIR Traffic Impact Analysis, 2010.

TABLE 5
NOISE EQUIVALENCY

Land Use	Exchange Rate
Commercial	0.082 KSF per DU
Office	0.315 KSF per DU
Hotel	0.629 Rooms per DU
KSF = thousand square feet; DU = dwelling unit	
Source: ESA 2021	

Transportation and Traffic

The purpose of the transportation/traffic equivalency analysis is to provide a method by which additional residential development can occur within the Downtown Plan area despite the fact that the amount of residential development evaluated in the Certified PEIR has been exceeded.

PM peak hour traffic rates were used since these rates would be the most impactful traffic factor for projects in the Downtown Plan area because background traffic levels are higher in the p.m. peak hour than in the a.m. peak hour and traffic generation is higher in the PM peak hour than in the AM peak hour. Peak hour impacts were used as the basis of identifying project impacts in the traffic study for the Certified PEIR. Trip generation equivalency rates will allow the land uses within the Downtown Plan area to be exchanged for one another such that no additional peak hour traffic generation would result from any exchange. These factors are shown below in Table 6, and are derived from the total PM peak hour trips calculated for the Certified PEIR.

TABLE 6
PM PEAK HOUR TRIP GENERATION EQUIVALENCY

Donor Land Use	Recipient Land Use			
	Residential (DU)	Commercial (ksf) ^a	Office (ksf)	Hotel (room)
Generation Rate (trips)	0.371	4.538	1.179	0.590
Residential (DU)		0.082	0.315	0.629
Commercial (ksf)	12.230		3.850	7.691
Office (ksf)	3.177	0.260		1.998
Hotel (room)	1.590	0.130	0.501	

Notes:

DU = dwelling unit; ksf = 1,000 square feet

^a Includes retail and restaurant uses.

SOURCES: Long Beach Downtown Community Plan Program EIR Traffic Impact Analysis (Table 4 and Table 5), 2010; ESA, 2021.

Equivalency Rates

Air Quality, Greenhouse Gas, Noise, and Traffic provide for different exchange/equivalency rates as detailed in the analysis above. Table 7 provides a comparison of exchange rates by land use category. As shown in Table 7, the square footage replacement for noise/traffic is greater per dwelling use than the exchange rates provided for air quality and GHG. Using the more conservative (Traffic/Noise) exchange rate allows for the reallocation of commercial, office, and/or hotel space as residential units such that applicable regulations are satisfied and no

additional significant environmental impacts or substantially greater impacts would occur than previously identified in the Certified PEIR. Therefore, the calculator uses the Traffic/Noise exchange rates to determine reallocation amounts for new residential development proposed within the Downtown Plan area.

TABLE 7
EXCHANGE RATE COMPARISON

Land Use	Exchange Rate per Resource Area			
	Traffic/Noise	Air Quality	GHG	
Commercial	0.082	0.060	0.022	KSF per DU
Office	0.315	0.170	0.059	KSF per DU
Hotel	0.629	0.311	0.078	Rooms per DU
KSF = thousand square feet; DU = dwelling unit				
Source: ESA 2021				

Example Application

To illustrate how to use the factors provided in Table 7, consider the following example. A new residential development with 100 dwelling units is being proposed within the Downtown Plan area. Since the residential allotment for the Downtown Plan area has already been exceeded by the cumulative sum of already approved projects within the Downtown Plan area (see Table 2), an equivalent amount of any of the other Downtown Plan area uses that have not been thus far exceeded would need to be removed from the Downtown Plan area. If office is selected for the equivalency exchange, then you would exchange approximately 0.315 square feet of office for every dwelling unit of proposed residential development. In this example, 100 dwelling units would require the removal of 31,476 square feet of office.

Approved Offsets

The Certified PEIR evaluated impacts from the construction and operation of 5,000 residential units; 480,000 square feet of commercial⁵ space; 1,500,000 square feet of office space; and 800 hotel rooms. To date, approximately 5,252 dwelling units, 203,710 square feet of commercial space and 490,000 square feet of office space, and 223 hotel rooms have been completed, are under construction, or approved. This is 252 units over what was accounted for in the Certified PEIR. In addition, given the market conditions, the City has indicated the need to accommodate the ability to reallocate land uses for projects that are approved through check-lists or addendums are do not go through the full CEQA process. In addition, the City is forecasting the potential need of an additional 3,008 dwelling units within the City. This results in a total of 3,260 units more than was identified in the Certified PEIR. Using the factors provided in Table 7, 3,208 units would reallocate all but 0.24 ksf of office space, but would still require additional reallocation from other areas to meet the total required offsets of 3,260 units. Reallocation of only commercial would result in a decrease in 267 ksf of commercial space leaving 9 ksf of commercial space. 917 homes could be built with the reallocation of the remaining hotel rooms certified under the PEIR. Therefore, in order to provide for future flexibility in development within the City, a partial reallocation of from all of the land use types was used to determine the balance of land uses available. Using the

⁵ For the equivalency calculator commercial spaces is equivalent to retail and restaurant land uses.

rates above, 1,325 units will be reallocated from office square footage; 1,655 units would be reallocated from commercial square footage; and 280 units would be reallocated from hotel rooms.

Downtown Plan Equivalency Calculator

The Downtown Plan Equivalency Calculator has incorporated the application as described above to provide a tool for the City to use to easily reallocate land uses and update the available remaining land uses for the Downtown Plan area. As discussed above, the City has identified the need to increase the development of residential units and reduce the development of other non-residential land use development. The City has identified the need to increase residential dwelling units by a minimum of 3,260 units over what was approved in the Certified PEIR. These approved offsets have been built into the DPEC to provide ease of project tracking. The 3,260 additional residential units would result in a reduction of available non-residential development of 417,060 square feet of office; 135,320 square feet of commercial; and 177 hotel rooms. This leaves a balance of non-residential development of 592,940 square feet of office space; 140,970 square feet of commercial space; and 400 hotel rooms.

The calculator is an excel workbook that has five tabs to inform the reallocation of non-residential land use space to residential land use space. The instructions are provided in detail on the Calculator's *Instructions* tab. The *Approved Offsets* tab identifies provides an easy way to track the approval of the 3,260 additional dwelling units, taking into account the 252 units that are currently approved beyond the 5,000 allocated in the Certified PEIR. *The Project Inputs* tab is where the City/Project Applicant can enter the project specifics which will update the remaining balance for each land use type. The *Calculations* tab calculates the reallocation amounts and determines the updated balance. The amount of reallocation of each land use type required can be found on this tab. The *Background Information* tab provides the initial balance of remaining land uses that is used in the calculations tab. It provides the amount of development assumed in the Certified EIR for the Downtown Plan and subtracts the land uses already built, are under construction or approved as of June 2021.