Stockton Air Quality Mitigation Fee Study

Prepared for:

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PREFACE

Development of an air quality mitigation program for the City of Stockton has proceeded in several steps:

- preparation of a background information report (Jones & Stokes Associates 1989),
- discussions with the technical advisory committee regarding mitigation program options,
- preparation of a general plan amendment regarding air quality goals and policies, and
- preparation of draft language for ordinances implementing an air quality mitigation fee program and an employer-based trip reduction program.

The program development steps outlined above have been undertaken in consultation with a technical advisory committee established by the City of Stockton. The technical advisory committee has included representatives of various public agencies (City of Stockton, County of San Joaquin, San Joaquin Council of Governments, Air Pollution Control District, and Stockton Metropolitan Transit District), business organizations (Building Industry Association and Chamber of Commerce), and citizens groups (Land Utilization Alliance).

The technical advisory committee has recommended that the air quality mitigation fee program and the employer-based trip reduction program be addressed through separate city council resolutions. The technical advisory committee also has recommended that the air quality mitigation fee program be considered as an amendment to the City of Stockton public facilities fee ordinance, rather than as an independent ordinance.

INTRODUCTION

Air Quality Background

As noted in the air quality mitigation program background report (Jones & Stokes Associates 1989), all portions of San Joaquin County, including the City of Stockton, periodically experience air pollution episodes during which the state and federal ambient air quality standards for ozone are exceeded. Vehicle traffic associated with urban development is a significant source of the emissions that produce ozone and other photochemical pollutants affecting the Stockton area. Estimates prepared by the California Air Resources Board indicate that the amount of ozone precursor emissions produced by

vehicle traffic in San Joaquin County exceeds the amount produced by industrial sources (California Air Resources Board 1990).

Continuing urban development in the City of Stockton will result in additional vehicle traffic and vehicle emissions and will contribute to the difficulty in achieving the state and federal ambient air quality standards for ozone. The quantity of air pollutant emissions associated with urban development is primarily dependent on the type of development rather than the neighborhood location of the development.

Because the chemical reactions that produce ozone take a few hours, photochemical smog is inherently an areawide air pollution problem. Vehicle emissions released in any part of the City of Stockton can affect ozone levels in any other part of the city. Additionally, vehicle emissions produced by traffic associated with new development are not restricted to the immediate neighborhood of the new development but occur throughout the community. Personal exposure to air pollution occurs as a consequence of personal activity and travel patterns rather than as a consequence of features or conditions that are geographically localized and fixed.

The areawide nature of ozone air pollution problems is reflected in the air pollution control programs mandated by federal and state legislation. The California Clean Air Act of 1988 requires air pollution control districts to develop and implement an attainment plan to achieve the state air quality standards as expeditiously as practicable. Air quality plans for most ozone nonattainment areas must include:

- measures that provide a substantial reduction in the rate of increase in passenger vehicle trips and miles traveled per trip,
- measures that will prevent any increase in vehicle emissions after 1997, and
- measures that will achieve by 1999 an average passenger vehicle occupancy of at least 1.5 during the weekday commute period.

The transportation control measure requirements of the California Clean Air Act of 1988 can only be effective with the active support and cooperation of cities and counties. The City of Stockton General Plan includes policies directing the city to cooperate with other agencies in developing and implementing plans to achieve state and federal air quality standards.

Mitigation Fee Program Background

The California Environmental Quality Act requires public agencies to evaluate and implement feasible measures to minimize the adverse environmental effects of projects they approve. Most cities and counties in California do not have a formalized process for evaluating and mitigating the air quality impacts of development projects they approve. Instead, air quality issues are addressed on a case-by-case basis during environmental

reviews required by the California Environmental Quality Act. Case-by-case evaluations provide flexibility for addressing impacts that occur onsite or in areas immediately adjacent to a project site. Such evaluations are generally less effective in providing mitigation for offsite impacts or for incremental contributions to cumulative impact issues. Case-by-case evaluations can also result in a lack of consistency in terms of project evaluations and project approval conditions or mitigation requirements.

Impact fee programs have been widely implemented in California as one mechanism for ensuring that all developments provide a fair contribution toward mitigating offsite and cumulative impact issues. Most impact fee programs have focused on physical facilities (e.g., parks, street improvements, library facilities, fire stations, or school facilities). There is, however, no requirement that development fee programs be restricted to physical facility improvements.

State legislation requires that development fee programs must be structured in a manner that provides a clear relationship between the types of development covered by the fee program, the problem being addressed by the fee program, and the level of the fee charged. Development fee programs thus require two demonstrations:

- a nexus demonstration (i.e., that there is a causal relationship between the affected development types and the problem being addressed by the fee program) and
- an equitability demonstration (i.e., that fee levels for different development types are reasonably related to the relative impact of the different development types).

Purpose of this Report

The City of Stockton General Plan includes implementation programs calling for the development of an air quality mitigation fee ordinance that is coordinated with or integrated into a transportation system management ordinance.

The City of Stockton air quality mitigation fee program recommended in this report is designed to provide a uniform and consistent program to reduce and partially offset the air quality impacts of future development in the Stockton area. The fees collected through the program would be used to fund programs and activities that are not easily implemented through development conditions or mitigation measures on a project-by-project basis. A geographically uniform fee structure is recommended as the most equitable method for addressing the relationship between a particular development's air pollution burden on the community and the air pollution reduction benefits received from programs funded by the fee.

This report documents the technical considerations behind the recommended air quality mitigation fee program. In addition, this report provides information and analyses that support the nexus and equitability determinations that must be made in adopting a fee program:

- that a fair and reasonable relationship exists between the amount of the fee and the air pollution impact attributable to different types of development, and
- that a reasonable relationship exists between the amount of the fee and the cost of the programs and activities that will be supported by the air quality mitigation fee fund.

GENERAL APPROACH TO AIR QUALITY MITIGATION FEE DEVELOPMENT

Development of a fair and equitable air quality mitigation fee program requires four types of analyses:

- characterization of vehicle trip patterns and resulting emissions for different land use categories,
- identification of programs or activities that will reduce or offset ozone precursor emissions from vehicle traffic in the Stockton area,
- development of example budgets for those programs or activities that may be funded by the air quality mitigation fee revenues, and
- establishment of an equitable fee structure that is expected to generate a revenue stream consistent with the anticipated program budget.

Comparative travel pattern and vehicle emission estimates provide a mechanism for ensuring fees for different land use categories are set in an equitable manner. Example program budgets must be combined with assumptions regarding the level of development to set actual fee values for different land use categories.

LAND USE CATEGORIES

Land use categories provide the basis for distinguishing among different types of development for two important purposes: assessing relative contributions to areawide ozone problems and setting differential fee levels for the air quality mitigation fee program.

The public facilities fee program adopted by the City of Stockton contains fee schedules for six general land use categories:

- single-family residential units,
- multiple-family residential units,
- guest rooms,
- offices and other high-density employment uses,
- retail commercial and other medium-density employment uses, and
- industrial and other low-density employment uses.

To simplify administration of the city's fee programs, the land use categories listed in the public facilities fee program have been used for structuring the air quality mitigation fee program.

TRIP GENERATION RATES

Trip generation analyses were performed in two stages: selection of typical daily trip generation rates and partitioning of daily trips by trip purpose. Table 1 summarizes the trip generation rate and trip purpose assumptions used for this study.

Daily Trip Generation Rates

The Stockton public facilities fee ordinance references the Institute of Transportation Engineers (ITE) trip generation manual as a preferred source of trip generation rates. The most recent edition of the manual (Institute of Transportation Engineers 1991) contains trip generation data for 120 different land use categories, with extensive differentiation of nonresidential land uses. The ITE trip generation manual was used to identify typical daily trip rates for residential land use categories.

The extensive breakdown of nonresidential land use categories in the ITE manual complicates identification of generalized trip rates for retail, office, and industrial land uses. Thus, the nonresidential trip rates identified in the north Stockton public facilities fiscal study (Recht Hausrath & Associates 1987) were used for this study.

Trip Purpose Splits

Vehicle emission estimates depend on many factors, several of which can be related to the purpose of a vehicle trip. In particular, trip distance and travel time patterns directly affect vehicle emissions and are most easily estimated by considering major trip purposes

Table 1. Typical Average Weekday Trip Patterns by Land Use Category for the Stockton Area

Land Use Category	Weekday Trip Rate Basis	Weekday Trip Rate	Composition of Average Weekday Trip Rate (Percent)						
			H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
Single-family housing	Per dwelling unit	9.6	35.00	20.00	45.00	0.00	0.00	0.00	0.00
Multiple unit housing	Per dwelling unit	6.5	35.00	20.00	45.00	0.00	0.00	0.00	0.00
Hotel/motel/group quarters	Per guest room	7.1	5.00	0.00	60.00	40.00	15.00	1.00	1.00
Retail/medium-density employment	Per 1,000 square feet	50.0	5.00	50.00	0.00	30.00	14.00	0.50	0.50
Office/high-density employment	Per 1,000 square feet	15.0	45.00	0.00	10.00	35.00	9.00	1.00	0.00
Industrial/low-density employment	Per 1,000 square feet	5.2	60.00	0.00	0.00	5.00	5.00	15.00	15.00

Notes: Trip rates for residential and guestroom categories based on data from ITE Trip Generation Manual, 5th Edition.
Trip rates for nonresidential categories based on data from the Recht Hausrath & Associates 1987 north Stockton fiscal and public facilities study.
Allocation of total trips by trip type based on judgment of Jones & Stokes Associates staff.

H-W = home-work trips.
H-S = home-shopping trips.
H-O = home-other trips.
O-W = other-work trips.
O-O = other-other trips.
HDGV = heavy-duty gasoline-fueled vehicle trips.
HDDV = heavy-duty diesel-fueled vehicle trips.
ROC = reactive organic compounds.
NOx = nitrogen oxides.

separately. Trip distance and travel time patterns also are used to estimate other factors (such as cumulative vehicle operating mode conditions) that also affect vehicle emissions.

Five nondirectional trip purpose categories (home-work trips, home-shopping trips, home-other trips, other-work trips, and other-other trips) have been used to assist in estimating cumulative vehicle emissions for the six land use categories. In addition, two categories of heavy duty vehicle trips (heavy-duty gasoline-fueled vehicle trips and heavy-duty diesel-fueled vehicle trips) have been included in the analysis. Partitioning of daily trips into the seven trip purpose categories was based on Jones & Stokes Associates staff judgment, utilizing statewide travel survey data published by the California Department of Transportation (Caltrans) (California Department of Transportation 1981).

TRIP LENGTH AND TRAVEL TIME PATTERNS

Reasonable estimates of trip distance and travel time patterns for different trip types are necessary for accurate estimates of cumulative vehicle emissions associated with different land uses. Assumptions used for this study were developed primarily from evaluation of land use and highway maps. Supplemental information was derived from the Caltrans statewide travel survey data report (California Department of Transportation 1981).

Table 2 summarizes the trip distance analysis performed for this study. Attention was focused on home-work trips because the Caltrans travel survey data are least accurate for this trip type. Trip distance estimates were prepared for trips internal to the Stockton area and for trips between Stockton and a representative sample of other communities.

The Stockton general plan background report (City of Stockton 1990) provided population data for five subareas of Stockton. The general plan land use map was used to estimate typical distances between residential and nonresidential land use clusters within and between each of the five subareas. Highway maps were then used to estimate travel distances from each of the five subareas to other Central Valley communities and representative Bay Area communities. The population estimates from the general plan background report allowed calculation of weighted average distances for internal and external home-work trips. A weighted mean home-work trip distance was calculated by assuming that 75% of work trips are internal to the Stockton area, 20% involve other Central Valley communities, and 5% involve Bay Area communities.

Trip distance estimates for other trip purposes were set by comparing data from other sources with the residential/nonresidential distance estimates within and between the five Stockton subareas.

The trip distance estimates summarized in Table 2 were used to develop estimated travel time distribution patterns for each trip purpose. The travel time distributions (Table 3) were in turn used to estimate cumulative vehicle operating mode characteristics for each trip purpose. Vehicle operating modes are an important parameter used by the EMFAC7PC vehicle emission rate model.

Table 2. Estimated Average Trip Lengths for Trips Originating in the Stockton Area

Residential Subarea	Distribution of 1990 Population	Miles to Internal Employment Centers by Subarea					Miles to Employment Centers in Other Communities							
		North	North Central	East	Downtown	South	Lodi	Manteca	Sacramento	Modesto	Livermore	Walnut Creek	East Bay	West Bay
North (A)	49.26%	3.5	4.5	5.5	6.0	7.5	12.0	18.0	47.0	35.0	45.0	70.0	75.0	93.0
North central (B)	23.32%	3.0	3.0	3.5	2.5	4.5	15.5	15.5	50.0	32.5	40.5	63.5	70.5	88.5
East (C)	6.66%	6.0	4.0	2.5	3.5	4.5	13.0	12.0	47.0	29.5	41.5	66.3	71.5	80.5
Downtown (D1)	2.83%	4.5	2.5	3.5	0.5	3.0	13.5	14.0	52.0	31.0	39.0	64.0	69.0	87.0
South (D2)	17.93%	6.5	4.5	4.5	3.0	3.0	16.0	12.0	55.0	29.0	38.0	64.0	69.0	87.0
Mean distance		4.1	4.1	4.6	4.3	5.7	13.6	15.9	49.2	32.9	42.5	67.5	71.5	90.5
Work trip distribution		5%	5%	5%	30%	30%	5%	5%	5%	5%	2%	1%	1%	1%
Mean internal work trip length		4.9 miles												
Mean overall work trip length		12.4 miles												

Comparison Data Considered in Developing Final Trip Length Estimates

Trip Type	Caltrans Trip Lengths from Traffic Models (miles per trip)		Jones & Stokes Associates Traffic Modeling Data for Sacramento (miles per trip)	Caltrans 1957 and 1978 Origin-Destination Survey Data for Stockton (minutes per trip)	Final Jones & Stokes Associates Trip Length Estimates for Stockton (miles per trip)
	Sacramento	Stockton			
Home-work	6.0	5.9	11.5	16.5	12.4
Home-shopping	2.6	3.2	7.5	11.9	3.5
Home-other	3.4	4.0	8.0	13.7	4.6
Other-work	4.3	4.0	7.4	13.1	4.4
Other-other	3.3	3.2	6.3	12.1	4.0

Table 3. Calculation of Operating Mode Parameters for Trips Originating in the Stockton Area

Trip Type	Portion of Total Travel	Distribution of Travel by Trip Duration Intervals										
		Under 5 Minutes	5-10 Minutes	10-15 Minutes	15-20 Minutes	20-25 Minutes	25-30 Minutes	30-35 Minutes	35-40 Minutes	40-45 Minutes	45-50 Minutes	Over 50 Minutes
H-W	23.34%	25%	35%	20%	10%	5%	5%	2%	3%	4%	3%	3%
H-S	13.35%	56%	22%	13%	3%	1%	1%	1%	1%	1%	1%	0%
H-O	31.92%	45%	25%	15%	9%	1%	1%	1%	1%	1%	1%	0%
O-W	9.20%	50%	25%	15%	5%	1%	1%	1%	1%	1%	1%	1%
O-O	22.09%	51%	25%	10%	7%	1%	1%	1%	1%	1%	1%	0%

Cumulative Trip Characteristics

Trip Type	Mean Travel Time (minutes)	Mean Cold Start Mode	Mean Hot Start Mode	Mean Hot Stable Mode	Catalyst Cold Start Mode	Catalyst Hot Start Mode	Noncat Cold Start Mode	Noncat Hot Start Mode
H-W	16.65	62.79%	5.80%	31.41%	60.53%	5.06%	54.93%	33.69%
H-S	9.03	45.38%	42.19%	11.43%	46.51%	41.73%	29.77%	58.80%
H-O	10.08	56.05%	28.61%	15.34%	57.86%	26.79%	36.72%	47.93%
O-W	9.90	52.00%	34.00%	13.11%	54.43%	32.46%	33.99%	51.50%
O-O	9.43	33.69%	63.62%	12.70%	25.23%	63.07%	7.26%	80.16%
MEANS	11.29	48.71%	38.34%	17.75%	50.11%	38.16%	35.35%	48.90%

Notes: H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
HDGV = heavy-duty gasoline-fueled vehicle trips
HDDV = heavy-duty diesel-fuel vehicle trips
Light/medium-duty vehicle fleet assumed to be 91.43% catalyst equipped.

EMISSION RATES ASSOCIATED WITH DIFFERENT TRIP TYPES

Vehicle emissions associated with different trip purposes were estimated using the EMFAC7PC computer program available from the California Air Resources Board. The technical assumptions used in generating vehicle emission rates are summarized in Table 4. Table 5 summarizes the resulting emission rates for 5-mph speed increments. Table 6 provides a further summary of vehicle emission rates for the specific distance and speed assumptions identified in Table 4.

PROGRAMS AND ACTIVITIES THAT MAY BE FUNDED BY MITIGATION FEE REVENUES

The process of setting an air quality mitigation fee schedule requires identification of the programs and activities on which fee revenues may be spent. The following programs and activities have been identified as candidates for ongoing or periodic expenditure of funds raised through the air quality mitigation fee:

- ongoing administrative costs of the air quality mitigation fee program;
- expanded ridesharing program services through the San Joaquin Council of Governments;
- marketing programs aimed at increasing the participation of Stockton residents in ridesharing programs;
- design, acquisition, and construction of park-and-ride facilities serving Stockton residents;
- expansion of service by the Stockton Metropolitan Transit District;
- marketing programs aimed at increasing transit use by Stockton residents;
- programs in the Stockton area that convert gasoline- or diesel-fueled vehicles to run on alternative, less-polluting fuels;
- establishment and operation of employer-based trip reduction programs for the Stockton area;
- design and construction of bicycle facilities in the Stockton area, with priority given to those facilities that connect segmented bicycle facility corridors and accommodate nonrecreational bicycle travel; and
- other such facilities and services as are determined by the city manager in consultation with the air pollution control district to provide an air quality benefit

Table 4. Parameter Assumptions Used in the EMFAC7FC Emission Rate Model

Parameter	LDA	LDT	MDT	MCY	HDGV	HDDV
VMT distribution	70.94%	25.50%	2.52%	1.04%	NA	NA
Leaded gasoline	4.31%	5.16%	13.47%	100.00%	45.41%	0.00%
Unleaded gasoline	92.87%	91.65%	86.53%	0.00%	51.59%	0.00%
Diesel fuel	2.82%	3.19%	0.00%	0.00%	0.00%	100.00%

Estimated Cumulative Operating Mode Percentages by Trip Type

Operating Mode	H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
Cold start	62.79%	45.38%	56.05%	52.80%	23.69%	0%	0%
Hot start	5.80%	43.19%	28.61%	34.09%	63.62%	0%	0%
Hot stabilized	31.41%	11.43%	15.34%	13.11%	12.70%	0%	0%

Speed and Distance Assumptions for Stockton Area Trips

Parameter	H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
Distance (miles)	12.4	3.5	4.6	4.4	4.0	4.6	12.4
Speed-1 (mph)	30	25	30	30	30	30	30
Travel fraction	65.0%	78.0%	85.0%	90.0%	87.0%	75.0%	35.0%
Speed-2 (mph)	55	45	55	55	55	45	55
Travel fraction	35.0%	22.0%	15.0%	10.0%	13.0%	25.0%	65.0%

Notes:
- LDA = light-duty automobiles.
- LDT = light-duty trucks.
- MDT = medium-duty trucks.
- MCY = motorcycles.
- HDGV = heavy-duty gasoline-fueled vehicle trips.
- HDDV = heavy-duty diesel-fueled vehicle trips.
- NA = not applicable.
- H-W = home-work trips.
- H-S = home-shopping trips.
- H-O = home-other trips.
- O-W = other-work trips.
- O-O = other-other trips.

Table 5. 1995 EMFAC7D Emission Rates, San Joaquin Valley Fleet Mix

ROC Emission Rates (grams per vehicle mile traveled)

Speed (mph)	H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
5	3.34	3.00	3.26	3.19	2.43	10.41	7.26
10	2.40	2.35	2.34	2.29	1.74	6.82	5.70
15	1.83	1.64	1.78	1.74	1.32	4.66	4.58
20	1.44	1.30	1.41	1.38	1.05	3.32	3.75
25	1.17	1.05	1.14	1.12	0.85	2.46	3.14
30	0.97	0.87	0.94	0.92	0.70	1.91	2.70
35	0.81	0.73	0.79	0.78	0.59	1.54	2.37
40	0.70	0.63	0.68	0.67	0.51	1.29	2.12
45	0.61	0.56	0.60	0.59	0.45	1.13	1.94
50	0.56	0.50	0.54	0.53	0.41	1.04	1.81
55	0.50	0.46	0.50	0.48	0.37	0.99	1.74

NO_x Emission Rates (grams per vehicle mile traveled)

Speed (mph)	H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
5	1.35	1.40	1.41	1.41	1.35	4.64	23.10
10	1.23	1.28	1.28	1.29	1.24	4.88	19.16
15	1.14	1.19	1.19	1.19	1.15	5.11	16.47
20	1.07	1.12	1.12	1.13	1.08	5.35	14.67
25	1.03	1.08	1.08	1.08	1.03	5.58	13.54
30	1.00	1.04	1.04	1.05	1.01	5.82	12.95
35	0.99	1.03	1.03	1.03	1.00	6.05	12.83
40	0.99	1.03	1.04	1.04	1.00	6.29	13.17
45	1.01	1.06	1.06	1.06	1.03	6.52	14.01
50	1.05	1.11	1.11	1.11	1.06	6.76	15.44
55	1.11	1.17	1.17	1.17	1.12	6.99	17.6

Notes:
ROC = reactive organic compounds.
NO_x = nitrogen oxides.
H-W = home-work trips.
H-S = home-shopping trips.
H-O = home-other trips.
O-W = other-work trips.
O-O = other-other trips.
HDGV = heavy-duty gasoline-fueled vehicle trips.
HDDV = heavy-duty diesel-fueled vehicle trips.

Emission rates are based on vehicle mix and operating mode parameters presented in Table B-4, assuming a 75°F air temperature.

ROC emission rates assumed to be 95% of EMFAC7D total organic gas emission rates.
I&M program emission reductions assumed to be 28.2% for ROC and 12.0% for NO_x.

Table 6. Stockton Area Summer Weekday Ozone Precursor Emissions by Trip Type

Pollutant	H-W	H-S	H-O	O-W	O-O	HDGV	HDDV
ROC grams/mile	0.81	0.94	0.87	0.88	0.66	1.71	2.07
NO_x grams/mile	1.04	1.07	1.06	1.06	1.02	6.00	15.99
ROC + NO_x grams/mile	1.84	2.02	1.94	1.94	1.68	7.71	18.07
ROC grams/trip	9.98	3.29	4.02	3.85	2.64	7.89	25.72
NO_x grams/trip	12.89	3.76	4.89	4.68	4.09	27.58	198.30
ROC + NO_x grams/trip	22.88	7.06	8.90	8.53	6.73	35.46	224.02

Notes: ROC = reactive organic compounds.
NO_x = nitrogen oxides.
H-W = home-work trips.
H-S = home-shopping trips.
H-O = home-other trips.
O-W = other-work trips.
O-O = other-other trips.
HDGV = heavy-duty gasoline-fueled vehicle trips.
HDDV = heavy-duty diesel-fueled vehicle trips.

by facilitating trip reduction programs or by otherwise reducing indirect emissions associated with development in the City of Stockton.

The identified programs are focused on the Stockton area. Most of the identified programs provide air quality benefits by reducing the cumulative amount of vehicle travel generated by Stockton area land uses. One of the programs will modify vehicles so that they run on less-polluting fuels.

In addition to summarizing emission rates used in this study, Table 6 provides data that can be used to assess emission reductions provided by programs that eliminate various types of trips. Table 7 indicates the emission reduction potential of a comprehensive trip reduction program focusing on work-related trips. The California Clean Air Act effectively sets a performance goal of increasing commute period average vehicle occupancy to 1.5 persons per vehicle by 1999. Existing average vehicle occupancy during commute periods is generally between 1.1 and 1.2 persons per vehicle. Significant emission reductions will be achieved if there is substantial progress toward the 1.5 persons per vehicle goal.

RECOMMENDED FEE STRUCTURE

Establishment of a recommended fee structure requires an iterative comparison of reasonable program budgets with fee revenues generated by alternative fee schedules. The fee revenue estimates should be based on reasonably anticipated development levels.

The Stockton general plan background report identified annual residential building permit levels for the 1980-1988 period. An average of 630 single-family units and 676 multiple units received building permits each year during this period. Anticipated mitigation fee revenue estimates were based on a development level of 1,200 residential units per year (600 single-family units, 500 multiple units, and 100 guest room units) plus a modest amount of nonresidential development (75,000 square feet of retail space, 40,000 square feet of office space, and 25,000 square feet of industrial space).

Funding Target for Setting Fee Levels

Table 8 presents a series of example program budgets that might be considered during a typical development year. Each example budget provides funding for one major program and several smaller programs. The general funding target of about $180,000 was derived in an iterative manner by considering alternative program funding levels and alternative air quality mitigation fee levels. Based on typical development levels during the 1980-1988 period, a mitigation fee based on $1.00 per gram of ozone precursor emissions should provide annual revenues that can fund a variety of program options.

As is apparent from the alternative budget examples presented in Table 8, the funding target for the air quality mitigation fee program anticipates that program funding

Table 7. Emission Reductions from Different Trip Reduction Program Performance Levels

Parameter	Case 1	Case 2	Case 3
Case definition: existing work trip vehicle occupancy factor	1.10	1.15	1.20
1990 occupied dwelling units in Stockton	73,510	73,510	73,510
Estimated 1990 single-family units	55,997	55,997	55,997
Estimated 1990 multiple units	17,513	17,513	17,513
Daily vehicle trips from single-family units @ 9.6 per unit	537,571	537,571	537,571
Daily vehicle trips from multiple units @ 6.5 per unit	113,835	113,835	113,835
Total daily home-based vehicle trips	651,406	651,406	651,406
Estimated daily home-work vehicle trips @ 35% of daily trips	227,992	227,992	227,992
Estimated work-related person trips	250,791	262,191	273,591
Work-related vehicle trips @ 1.5 vehicle occupancy factor	167,194	174,794	182,394
Net reduction in work trips @ 1.5 vehicle occupancy factor	60,798	53,198	45,598
Percent reduction in work trips @ 1.5 vehicle occupancy factor	26.7%	23.3%	20.0%
Avoided 1995 summer ROC emissions, pounds per day	1,338	1,170	1,005
Avoided 1995 summer NOx emissions, pounds per day	1,716	1,502	1,287
Work-related vehicle trips @ 1.4 vehicle occupancy factor	179,136	187,279	195,422
Net reduction in work trips @ 1.4 vehicle occupancy factor	48,856	40,713	32,570
Percent reduction in work trips @ 1.4 vehicle occupancy factor	21.4%	17.9%	14.3%
Avoided 1995 summer ROC emissions, pounds per day	1,075	896	717
Avoided 1995 summer NOx emissions, pounds per day	1,379	1,149	919
Work-related vehicle trips @ 1.3 vehicle occupancy factor	192,916	201,685	210,455
Net reduction in work trips @ 1.3 vehicle occupancy factor	35,076	26,307	17,537
Percent reduction in work trips @ 1.3 vehicle occupancy factor	15.4%	11.5%	7.7%
Avoided 1995 summer ROC emissions, pounds per day	772	579	386
Avoided 1995 summer NOx emissions, pounds per day	990	743	495

Notes: 1990 occupied housing units from Table III-41 of the Stockton General Plan Background Report.

Single-family/multiple unit split based on urban area percentages derived from Table II-5 of the Stockton General Plan Background Report.

1995 summer ROC and NOx emissions for work trips based on EMFAC7PC emission rates presented in Table 6.

ROC = reactive organic compounds.
NOx = nitrogen oxides.

Table 8. Example Annual Expenditure Plan for the Air Quality Mitigation Fund

Example Expenditure Plan with Funding for Park-and-Ride Facility Construction	
Budget Item	Budgeted Amount
Mitigation fee program administration	$7,500
Marketing and promotion programs	
Transit promotion	$10,000
Ridesharing promotion	$20,000
Subtotal	$30,000
Fleet vehicle fuel conversion program	$15,000
Reserve for transit service expansion	$25,000
50-space park-and-ride facility construction @ 350 square feet per space and $5 per square foot	$87,500
Contingency reserve	$5,000
Total	$180,500

Fee level adequacy check: Fee per gram of weekday ROG+NOx emissions	$1.00

Development Type	Amount	Fee
Single family units	600	$77,400
Multifamily units	500	$43,500
Guest room units	100	$8,200
Retail commercial, square feet	75,000	$35,550
Office space, square feet	10,000	$9,080
Industrial use, square feet	25,000	$6,950
		$180,680

Example Expenditure Plan with Funding for Expanded Transit Service	
Budget Item	Budgeted Amount
Mitigation fee program administration	$7,500
Marketing and promotion programs	
Transit promotion	$20,000
Ridesharing promotion	$15,000
Subtotal	$35,000
Fleet vehicle fuel conversion program	$15,000
Allocation to SMART for expanded transit service	$100,000
Bus stop amenities (benches, shelters, bike racks)	$15,000
Contingency reserve	$7,500
Total	$180,000

Example Expenditure Plan with Partial Funding of City Trip Reduction Coordinator Office	
Budget Item	Budgeted Amount
Mitigation fee program administration	$7,500
Marketing and promotion programs	
Transit promotion	$15,000
Ridesharing promotion	$25,000
Subtotal	$40,000
Fleet vehicle fuel conversion program	$25,000
Reserve for transit service expansion	$30,000
50% funding of city trip reduction Coordinator office	
1 coordinator position	$32,625
1 junior position	$18,750
1/2 clerical position	$6,750
Equipment and supplies	$5,000
Education and outreach programs	$5,000
Training programs	$2,500
Subtotal	$70,625
Contingency reserve	$7,500
Total	$180,625

choices will have to be made in most years. In years when mitigation fee revenues exceed the $180,600 base level estimate, more programs can be funded or selected programs can be funded to a greater extent than indicated in the example budgets. Conversely, program funding will have to be decreased in years when mitigation fee revenues fall below the anticipated base level.

Recommended Fee Schedule

Table 9 summarizes the recommended air quality mitigation fee schedule. The recommended fee basis ($1.00 per gram of ozone precursor emissions) provides both administrative simplicity and an anticipated revenue flow adequate to fund various combinations of identified mitigation programs.

ADMINISTRATIVE RECOMMENDATIONS

Administrative guidelines for the public facilities impact fee program already address most of the administrative procedures required for any impact fee program. In particular, procedures are outlined for:

- exemptions from fee requirements;
- fee determination for alteration or reconstruction associated with a change in use; and
- annual reporting of fee program balances, expenditures, and anticipated budgets.

Because certain aspects of the air quality mitigation fee differ from other impact fee components, some special provisions in the administrative guidelines may prove useful.

Supplemental Definitions

The City of Stockton public facilities fee ordinance contains definitions for many of the terms associated with the air quality impact fee. If necessary, the administrative guidelines for the public facilities fee program could be amended to include definitions for the following terms specific to the air quality impact fee:

- "Air Pollution Control District (APCD)" means the San Joaquin Valley Unified Air Pollution Control District or any successor agency.
- "Nitrogen Oxides (NO_x)" means the combination of nitric oxide (NO) and nitrogen dioxide (NO_2).

Table 9. Summer Weekday Ozone Precursor Emissions and Proportionate Air Quality Mitigation Fee by Land Use Category

Land Use Category	Emissions Basis	ROC	NO_x	ROC+NO_x	Air Quality Mitigation Fee
Single-family housing	Per dwelling unit	57.3	71.6	128.9	$129 per dwelling unit
Multiple-unit housing	Per dwelling unit	38.7	48.5	87.3	$87 per dwelling unit
Hotel/motel/group quarters	Per guest room	30.7	51.6	82.3	$82 per guest room
Retail/medium-density employment	Per 1,000 square feet	192.0	281.6	473.6	$474 per 1,000 square feet
Office/high-density employment	Per 1,000 square feet	98.4	128.6	227.0	$227 per 1,000 square feet
Industrial/low-density employment	Per 1,000 square feet	59.1	218.7	277.7	$278 per 1,000 square feet

Notes: ROC = reactive organic compounds.
NO_x = nitrogen oxides.
Air quality mitigation fee based on $1.00 per gram of ROC + NO_x.

Average summer weekday emissions by land use based on trip rates presented in Table 1, travel patterns presented in Table 3, emission rate parameters presented in Table 4, and EMFAC7D emission rates summarized in Tables 5 and 6.

Table 9. Summer Weekday Ozone Precursor Emissions and Proportionate Air Quality Mitigation Fee by Land Use Category

Land Use Category	Emissions Basis	ROC	NO_x	ROC+NO_x	Air Quality Mitigation Fee
Single-family housing	Per dwelling unit	57.2	71.6	128.9	$129 per dwelling unit
Multiple-unit housing	Per dwelling unit	38.7	48.5	87.3	$87 per dwelling unit
Hotel/motel/group quarters	Per guest room	30.7	51.6	82.3	$82 per guest room
Retail/medium-density employment	Per 1,000 square feet	192.0	281.6	473.6	$474 per 1,000 square feet
Office/high-density employment	Per 1,000 square feet	98.4	128.6	227.0	$227 per 1,000 square feet
Industrial/low-density employment	Per 1,000 square feet	59.1	218.7	277.7	$278 per 1,000 square feet

Notes: ROC = reactive organic compounds.
NO_x = nitrogen oxides.
Air quality mitigation fee based on $1.00 per gram of ROC + NO_x.

Average summer weekday emissions by land use based on trip rates presented in Table 1, travel patterns presented in Table 3, emission rate parameters presented in Table 4, and EMFAC7D emission rates summarized in Tables 5 and 6.

- "Ozone Precursor Emissions" means the combined emissions of reactive organic compounds and nitrogen oxides.

- "Reactive Organic Compounds (ROC)" means any gaseous compound containing carbon except methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, carbonates, ammonium carbonates, and halogenated hydrocarbons.

Retroactive Fee Application Provision

The administrative guidelines for the public facilities impact fee program should be amended to apply the air quality impact fee to those development projects that were previously approved with conditions requiring payment of any subsequently adopted air quality fee program. The following language could be used as the basis for the fee application provision:

- The air quality mitigation fee shall be applied to developments approved before the effective date of this resolution when the development approval was conditioned in a manner requiring payment of a subsequently adopted air quality fee.

Emission Offset Program Fee Adjustment Provision

The administrative guidelines for the public facilities impact fee program should be amended to provide an adjustment to the air quality impact fee for those development projects that implement indirect source emission offset programs in a manner acceptable to the air pollution control district. The following language could be used as the basis for the fee adjustment provision:

- Any development that provides in a manner satisfactory to the Air Pollution Control District a program to fully or partially offset its associated indirect source ozone precursor emissions shall have its Air Quality Mitigation Fee reduced by a commensurate proportion.

- It shall be the responsibility of the applicant to obtain and present to the city a written determination from the Air Pollution Control District as to the emission offset program's acceptability and anticipated effectiveness.

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