APPENDIX E

Preliminary Air Quality Evaluation

WZI INC.

AIR QUALITY IMPACT STUDY

KERN CANYON RANCH

February 2000

Prepared for:
Mountain View Bravo

Prepared by:
WZI Inc.
4700 Stockdale Highway, Suite 120
Bakersfield, California 93309

13680010.RPT.001

4700 Stockdale Highway, Suite 120 Bakersfield, California 93309 (661) 326-1112 Fax: (661) 326-0191
E-mail: wzi@wziinc.com

TABLE OF CONTENTS

EXHIBITS

TABLES

APPENDICES

I. INTRODUCTION

This assessment examines the potential impact on air quality resulting from the proposed land development project known as Kern Canyon Ranch, located in the northeastern part of City of Bakersfield (Exhibit 1). This document was prepared pursuant to the San Joaquin Valley Unified Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts.*

This project requires an amendment to the Land Use Element and Circulation Element of the Metropolitan Bakersfield 2010 General Plan, and a zone change. The Bakersfield City Planning Department is Lead Agency under the California Environmental Quality Act for the preparation of an Environmental Impact Report for the project.

II. PROJECT DESCRIPTION

The Kern Canyon Ranch Project encompasses approximately 694 acres in Sections 17, 18, 19 and 20, Township 29 South, Range 29 East, MDBM. A majority of the project (92%) is located in Section 17. The project is located north of State Route 178, west of Masterson Street, and south of Paladino Drive. The proposed land use distribution for Kern Canyon Ranch is approximately 72% low density residential, 9% high density residential, 14% commercial and 5% freeway. The proposed zoning and General Plan land use designations are shown on Exhibits 2 and 3, respectively. This study assumes that the project will not reach complete build out until the year 2020.

This study is based on the following development scenario:

TABLE 1
Kern Canyon Ranch – Development Scenario

Land Use	Acres	Proposed Development
Low Density Residential	500	2750 Dwelling Units
High Density Residential	55.5	1300 Dwelling Units
General Commercial	96.9	1,048,706 sq ft gross leaseable floor area

III. ENVIRONMENTAL SETTING

The proposed project is located in the San Joaquin Valley Air Basin, within the City of Bakersfield, and within the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District. The topography of the air basin includes foothills and mountain ranges to the east, west and south, and a relatively flat valley floor. The valley is characterized by long, hot, dry summers and short, foggy winters. The features of the valley produce climate episodes such as frequent temperature inversions. The topography of the project area is flat with an elevation of approximately 740 feet above mean sea level as shown on the U. S. Geological Survey topographical map, Oil Center, California, Quadrangle.

State and National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) are assigned as the result of provisions of the Federal Clean Air Act. The NAAQS establish acceptable pollutant concentrations which may be equaled continuously or exceeded only once per year. California Ambient Air Quality Standards (NAAQS) are limits set by the California Air Resources Board (CARB) that cannot be equaled or exceeded. An air pollution control district must prepare an Air Quality Attainment Plan if the standards are not met. The California and National Ambient Air Quality Standards are shown in Table 2.

TABLE 2
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,4,6]	Method[7]
Ozone	1 hour	0.09 ppm (180 □g/m3)	Ultraviolet Photometry	0.12 ppm (235 □g/m3)	Same as Primary Std	Ethylene-Chemilumi-nescence
Carbon Monoxide	8 hour	9.0 ppm (10 mg/m3)	Non-Dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m3)		Non-Dispersive Infrared Spectroscopy (NDIR)
	1 hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
	Annual Average			0.053 ppm (100 □g/m3)		
Nitrogen Dioxide	1 hour	0.25 ppm (470 □g/m3)	Gas Phase Chemilumi nescence	80 □g/m3	Same as Primary Std	Gas Phase Chemilumi-nescence
	Annual Average			(0.03 ppm)		
	24 hour	0.04 ppm (105 □g/m3)		365 □g/m3 (0.14 ppm		
	3 hour				1300 □g/m3 (0.5 ppm)	
Sulfur Dioxide	1 hour	0.25 ppm (655 □g/m3)	Ultraviolet Fluorescence			Pararosaniline
Suspended Particulate Matter (PM_{10})	Annual Geometric Mean	30 □g/m3	Size Selective Inlet High Volume Sampler and Gravimetric Analysis			Inertial Separation and Gravimetric Analysis
	24 hour	50 □g/m3		150 □g/m3		
	Annual Arithmetic Mean			50 □g/m3	Same as Primary Std	
Sulfates	24 hour	25 □g/m3	Turbidimetric Barium Sulfate			
	30-day Average	1.5 □g/m3				
Lead	Calendar Quarter		Atomic Absorption	1.5 □g/m3	Same as Primary Std	Atomic Absorption
Hydrogen Sulfide)	1 hour	0.03 ppm (42 □g/m3)	Cadmium Hydr-oxide STRactan			
Vinyl Chloride (chlorothen)	24 hour	0.010 ppm (26 □g/m3)	Tedlar Bag Collection, Gas Chromatography			
Visibility Reducing Particles[8]	8 hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with ARB Method V.				

The five directly emitted primary pollutants are carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), reactive organic gases (ROG) and particulates (PM). Ozone (O_3) is considered a secondary pollutant because it forms from reactions involving NO_x and ROG. The following is a summary of the characteristics of the primary and secondary pollutants.

Ozone (O_3):

Ozone is a pungent, colorless toxic gas. Ozone makes up 90 percent of the group of pollutants known as photochemical oxidants. Ozone and other photochemical oxidants are products of atmospheric reaction of nitrogen oxides and reactive organic gases with ultraviolet light. High ozone levels can adversely affect plants, and in humans, can cause respiratory irritation.

Carbon Monoxide (CO):

Carbon monoxide is an odorless, colorless toxic gas produced by incomplete combustion of carbon-containing substances. Carbon monoxide interferes with the transfer of fresh oxygen from blood into body tissues.

Nitrogen Oxides (NO_x):

Nitrogen oxides are formed from nitrogen and oxygen at high combustion temperatures and further reacts to form other oxides of nitrogen such as nitrogen dioxide. Nitrogen dioxide reacts with ultraviolet light to initiate reactions producing photochemical smog, and it reacts in air to form nitrate particulates. Nitrogen dioxide significantly affects visibility.

Sulfur Oxides (SO_x):

Sulfur dioxide is a colorless, pungent gas primarily formed by combustion of sulfur-containing fossil fuels. High sulfur dioxide concentrations irritate the upper respiratory

tract, while low concentrations of sulfur dioxide injure lung tissues. Sulfur oxides can react to form sulfates which significantly reduce visibility.

Particulates (PM_{10}):

Dust, aerosols, soot, mists and fumes make up atmospheric particulates. Sources of particulates include industrial and agricultural operations, combustion and photochemical actions of pollutants in the atmosphere. Particulates substantially reduce visibility and adversely affect the respiratory tract. PM_{10} is made up of finely divided particulate matter less than 10 microns in diameter.

Reactive Organic Gases (ROG):

Organic compounds are made primarily of carbon and hydrogen. Motor vehicle emissions and evaporation of organic compounds produce hydrocarbon emissions. Hydrocarbon levels can affect plant growth. Many hydrocarbon species react in the atmosphere to form photochemical smog.

Air Quality: Basin-wide

The San Joaquin Valley Unified Air Pollution Control District has jurisdiction in eight counties located in the San Joaquin Valley, including the Bakersfield area. The San Joaquin Valley Air Basin has been designated as attainment for carbon monoxide and non-attainment for ozone and particulate matter (PM_{10}) by federal standards and California standards. The California Clean Air Act requires that all reasonable stationary and mobile source control measures be implemented in moderate non-attainment areas to help achieve a mandated, 5-percent per year reduction in ozone precursors, and to reduce population exposures. Table 3 contains ambient air quality classifications for the Bakersfield area.

TABLE 3
Ambient Air Quality Classifications
Project Area of the San Joaquin Valley

Pollutant	State	Federal
Carbon Monoxide	Attainment	Attainment
Ozone	Non-Attainment/Serious	Non-Attainment/Serious
Oxides of Nitrogen	Attainment	Attainment/unclassified
Sulfur Dioxide	Attainment	Attainment/non-attainment
Particulate	Non-Attainment	Non-Attainment/Serious

Air Monitoring Station

The closest air monitoring station to the project site is the Bakersfield station on Golden State Highway. The station monitors particulates, ozone, carbon monoxide, nitrogen oxide, sulfur oxide, total hydrocarbons, and methane.

Table 4 contains the maximum pollutant levels detected during 1997 and 1998 (the latest data available).

TABLE 4
Maximum Pollutant Levels
at the Bakersfield, Golden State Highway
Monitoring Station

Pollutant	Time Averaging	1998 Maximums	1997 Maximums	Standards	
				National	State
Ozone (O_3)	1 hour	0.132 ppm	0.117 ppm	0.12 ppm	0.09.ppm
Carbon Monoxide (CO)	8 hour	3.11 ppm	2.91 ppm	9 ppm	9 ppm
Nitrogen Dioxide (NO_2)	1 hr	0.097 ppm	0.076 ppm		0.25 ppm
	Annual	0.024 ppm	0.024 ppm	0.053 ppm	
Particulates (PM_{10})	24 hour		124 $\mu g/m^3$	150 $\mu g/m^3$	50 $\mu p/m^3$

IV. IMPACT OF THE PROPOSED PROJECT

A. Short-Term Emissions

Short-term impacts from the projects will primarily result in fugitive particulate matter emissions during construction. San Joaquin Valley Unified Air Pollution Control District (Air District) Regulation VIII specifies control measures for specified outdoor sources of fugitive particulate matter emissions. The Air District does not require a permit for these activities, but does impose measures to control fugitive dust, such as the application of water or a chemical dust suppressant. The rules contained in Regulation 8 are listed below:

- Rule 8010 - Fugitive dust administrative requirement for control of fine particulate matter.
- Rule 8020 - Fugitive dust requirements for control of fine particulate matter from construction, demolition, excavation and extraction activities.
- Rule 8070 - Fugitive dust requirements for control of fine particulate matter from vehicle and/or equipment parking, shipping, receiving, transfer, fueling and service areas one acre or larger.

In addition, the facility shall include the following as requirements of local zoning regulations.

- Water sprays or chemical suppressants must be used in all unpaved areas to control fugitive emissions.
- All access roads and parking areas must be covered with asphalt-concrete paving.

Compliance with Air District Regulation VIII and the local zoning code will reduce particulate emission impacts to levels that are considered "less than significant."

Construction will also result in exhaust emissions from diesel-powered heavy equipment. Exhaust emissions from construction include emissions associated with the transport of machinery and supplies to and from the site, emissions produced onsite as the equipment is used and emissions from trucks

transporting excavated materials from the site and fill soils to the site. Examples of these emissions include CO, ROG, NO_x, SO_x and PM_{10}.

B. Long-Term Emissions

Long-term emissions will be caused by mobile sources (vehicle emissions) and stationary source energy consumption (heating and cooling) emissions. The major long-term impact to air quality will be emissions caused by motor vehicles traveling to and from the area.

Mobile Source - Ozone Precursors

The Bakersfield area is a non-attainment area for federal air quality standards for ozone and particulates. Nitrogen oxides and reactive organic gases are regulated as ozone precursors. A precursor is defined by the San Joaquin Valley Unified Air Pollution Control District as "a directly emitted air contaminant that, when released into the atmosphere, forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an ambient air quality standard has been adopted..."

The Air District regulates air quality in the Bakersfield area. The predicted emissions associated with vehicular traffic (mobile sources) are not subject to the Air District's permit requirements, however, the Air District is responsible for overseeing efforts to improve air quality within the San Joaquin Valley. The Air District has prepared an Air Quality Attainment Plan to bring the San Joaquin Valley into compliance with the California Ambient Air Quality Standard for ozone. The Air District reviews land use changes to evaluate the potential impact on air quality. The Air District has established a significance level for reactive organic gases and oxides of nitrogen of 10 tons per year each, but has not established levels of significance for other pollutants.

Vehicle emissions have been estimated for the year 2020 (expected completion date of this project) using the URBEMIS7G computer model from the California Air Resources Board. This model predicts carbon monoxide, total hydrocarbons, nitrogen oxide, sulfur oxide and particulate

matter emissions from motor vehicle traffic associated with new or modified land uses. Appendix I contains the URBEMIS7G modeling results.

The predicted annual tailpipe emissions (Table 5) for reactive organic gases and nitrogen oxides attributable to this project are considered significant, based on the Air District's levels of significance as summarized below:

TABLE 5
Project-Related Mobile Source Emissions – Ozone Precursors

Pollutant	Reactive Organic Gas (tons/year)	Nitrogen Oxides (tons/year)	Carbon Monoxide (tons/year)	PM10 (tons/year)
Residential – Low Density	19.59	46.07	177.14	23.37
Residential – High Density	6.07	12.13	46.64	6.15
Commercial	18.82	56.04	186.65	27.59
Total	44.48	114.24	410.43	57.11
Level of Significance	10	10	N/A	N/A

Mobile Source - Carbon Monoxide

Carbon monoxide emissions are a function of vehicle idling time and, thus, under normal meteorological conditions depend on traffic flow conditions. Carbon monoxide transport is extremely limited: it dispenses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthful levels, affecting sensitive receptors (residents, school children, hospital patients, the elderly, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable Level of Service (LOS). CO "Hot Spot" modeling is required if a traffic study reveals that the project will reduce the LOS on one or more streets to E or F; or, if the project will worsen an existing LOS F.

A traffic study was prepared by Crenshaw Traffic Engineering for the Kern Canyon Ranch project. The study indicates that the predicted LOS, after mitigation, does not warrant a CO Hot Spot analysis. The tables below present the predicted LOS (after mitigation):

TABLE 6
Predicted Traffic Impacts - Intersections

Intersections	LOS
Fairfax and SR 178	C
Morning Drive and SR 178	C
Comanche Drive and SR 178	B
Panorama Drive and Morning Drive	C
Panorama Drive and Fairfax Road	C
Morning Drive and Auburn Street	A
Western Street and Panorama Drive	A
Vineland Road and State Route 178	B

TABLE 7
Predicted Traffic Impacts – Street Segments

Street Segments	LOS EB	LOS WB
Morning Drive from Panorama Drive to SR 178	A	A
SR 178 from Fairfax Road to Morning Drive	A	B
SR 178 from Morning Drive to Vineland Road	B	B
SR 178 from Vineland Road to Masterson Street	A	A
SR 178 from Masterson Street to Comanche Drive	A	A
SR 178 from Comanche Drive to Alfred Harrell Hwy	A	A
Fairfax Road from Panorama Drive to Paladino Drive	A	A
Fairfax Road from Panorama Drive to SR 178	A	B
Vineland Road from project to SR 178	A	B
Panorama Drive from Morning Drive to Fairfax Road	A	A
Panorama Drive from Fairfax Road to westerly project boundary	A	A

EB Eastbound
WB Westbound

Area Source Emissions

Area source emissions result from fuel and personal product use. Electricity and natural gas are utilized by almost every commercial and residential development. The URBEMIS7G computer model predicted the following emissions from natural gas usage and landscape maintenance. The numbers shown below are from typical energy consumption and do not include fireplaces and consumer products such as hairspray.

TABLE 8
Area Source Emissions

Source	ROC Ton/year	NO_x Ton/year	CO Ton/year	PM10 Ton/year
Natural Gas	0.95	12.30	5.83	0.00
Landscaping	0.33	0.04	2.85	0.01
Total	1.28	12.34	8.68	0.01
Significance Level	10	10	N/A	N/A

Potential Effect on Sensitive Receptors

The air quality impact of this project is not likely to affect sensitive receptors. Sensitive receptors are areas where young children, chronically ill individuals, or other individuals more sensitive than the general population are located. Examples of sensitive receptors are schools, day care centers and hospitals.

The nearest receptor is Chavez School, which is located south of Highway 184, approximately ¼ mile from the project site.

Potential Impacts from Odors and Hazardous Air Pollutants

The project consists of a mixture of residential and commercial land uses. The generation of odors and hazardous air pollutants is generally associated with certain types of industrial and agricultural activities. Therefore, the project is not expected to result in the generation of odors or hazardous air pollutants.

V. CUMULATIVE IMPACTS

The Traffic Study considered the affects of the project with the cumulative impacts of growth in the area. The study analyzed the project's impacts with an annual growth factor of 3%.

VI. CONFORMITY WITH THE AIR QUALITY ATTAINMENT PLAN

The California Clean Air Act requires non-attainment districts with severe air quality problems to provide for a 5 percent reduction in non-attainment emissions per year. The San Joaquin Valley Unified Air Pollution Control District prepared an Air Quality Attainment Plan for the San Joaquin Valley Air Basin in compliance with the requirements of the Act. The plan requires best available retrofit technology on specific types of stationary sources to reduce emissions. The California Clean Air Act and the Air Quality Attainment Plan also identify transportation control measures as methods of reducing emissions from mobile sources. The California Clean Air Act defines transportation control measures as, "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling or traffic congestion for the purpose of reducing motor vehicle emissions." The Air Quality Attainment Plan for the San Joaquin Valley Air Basin identifies the provisions to accommodate the use of bicycles, public transportation and traffic flow improvements as transportation control measures.

The emissions of reactive organic gases and nitrogen oxides predicted by the model exceed the Air District's interim threshold levels. However, Golden Empire Transit (GET) provides public (bus) transportation in the Bakersfield metropolitan area. The project area is undeveloped, therefore, is not currently served by GET. However, GET does provide service to the general area. The project could easily be serviced by GET upon completion.

A "Traffic Impact Study" was prepared by Crenshaw Traffic Engineering to evaluate impacts on the surrounding local roadway system due to traffic generated by the proposed development. The Traffic Impact Study recommends mitigation measures, such as street improvements or traffic signals, for intersections and street segments which fall below an acceptable Level of Service due to the impact of future traffic. The study allocates a proportionate share of the mitigation measures to the project. The proposed mitigation measures are traffic flow improvements, which are recognized transportation control measures in compliance with the Air Quality Attainment Plan. The current and proposed circulation maps are shown in Exhibits 4 and 5, respectively.

The Air Quality Attainment Plan recognized growth of the population and economy within the air basin. The plan predicted the workforce in Kern County to increase 40 percent and housing to increase 30 percent from 1990 to 2000. This project can be viewed as growth that was anticipated by the plan.

VII. MITIGATION MEASURES

The proposed project will have air pollutant emissions associated with the construction and occupied use of the project sites. This section summarizes the measures that are required to mitigate the emissions associated with the construction and occupancy of the project.

A. Mitigation Measures for Construction Equipment Exhaust

The following mitigation measures should be utilized during the construction phase of the project to reduce construction exhaust emissions:

- Properly and routinely maintain all construction equipment, as recommended by manufacturer manuals, to control exhaust emissions.
- Shut down equipment when not in use for extended periods of time to reduce emissions associated with idling engines.
- Encourage ride sharing and use of transit transportation for construction employee commuting to the project sites.
- Use electric equipment for construction whenever possible in lieu of fossil fuel-fired equipment.

B. Mitigation Measures for Fugitive Dust Emissions

Construction of the project requires the implementation of control measures set forth under Regulation VIII, Fugitive PM_{10} Prohibitions of the San Joaquin Valley Unified Air Pollution Control District. The following mitigation measures, in addition to those required under Regulation VIII, can reduce fugitive dust emissions associated with these projects:

- Cover all access roads and parking areas with asphalt-concrete paving.
- Asphalt-concrete paving shall comply with San Joaquin Valley Unified Air Pollution Control District Rule 4641 and restrict the use of cutback, slow-cure and emulsified asphalt paving materials.

- Use water sprays or chemical suppressants on all unpaved areas to control fugitive emissions.
- Enclose, cover or water all stockpiled soils to reduce fugitive dust emissions.
- Cease grading activities during periods of high winds (greater than 20 mph over a one-hour period).
- Limit construction-related vehicle speeds to 15 mph on all unpaved areas at the constructions site.
- All haul trucks should be covered when transporting loads of soil.
- Wash off construction and haul trucks to minimize the removal of mud and dirt from the project sites.

C. Mitigation Measures for Energy Consumption Emissions

These projects will be required to comply with Title 24 of the California Code of Regulations regarding energy conservation standards. These requirements, along with the following mitigation measures, should be incorporated into the project design:

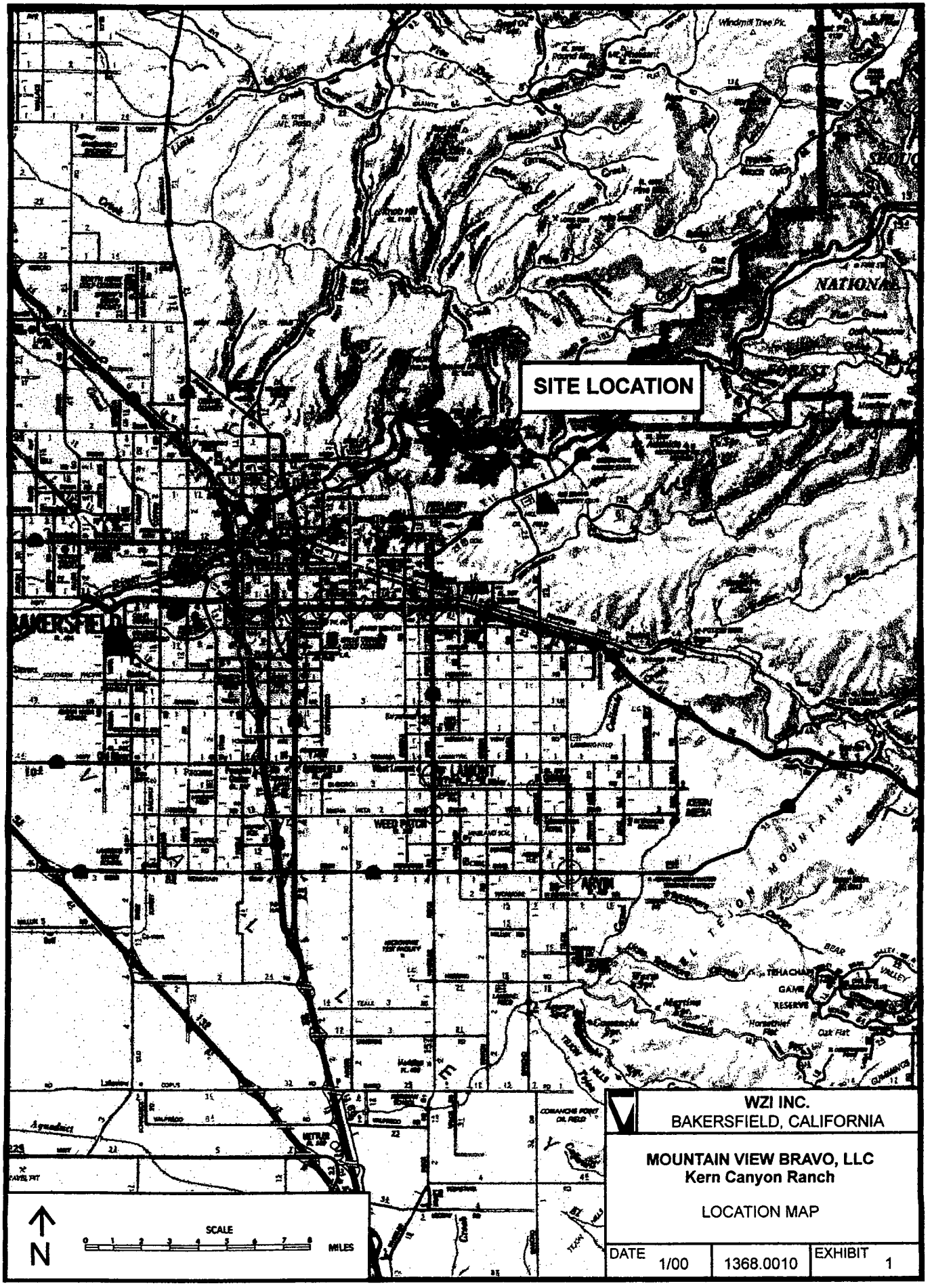
- Use low-NO_x emission water heaters.
- Provide shade trees to reduce building cooling requirements.
- Install energy-efficient and automated air conditioners.
- Exterior windows should all be double-paned glass.
- Energy-efficient (low-sodium) parking lights should be used.
- Use EPA-approved wood burning stoves, fireplace inserts or pellet stoves in lieu of conventional fireplaces.

D. Mitigation Measures for Mobile Source Emissions

Transportation control measures and design features can be incorporated into the project to reduce emissions from mobile sources. The below-listed control measure provides a strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling and traffic congestion for the purpose of reducing motor vehicle emissions:

- Improve streets and traffic signals for intersections and street segments, which may impact the surrounding local roadway system due to traffic, generated by the proposed developments.

EXHIBITS



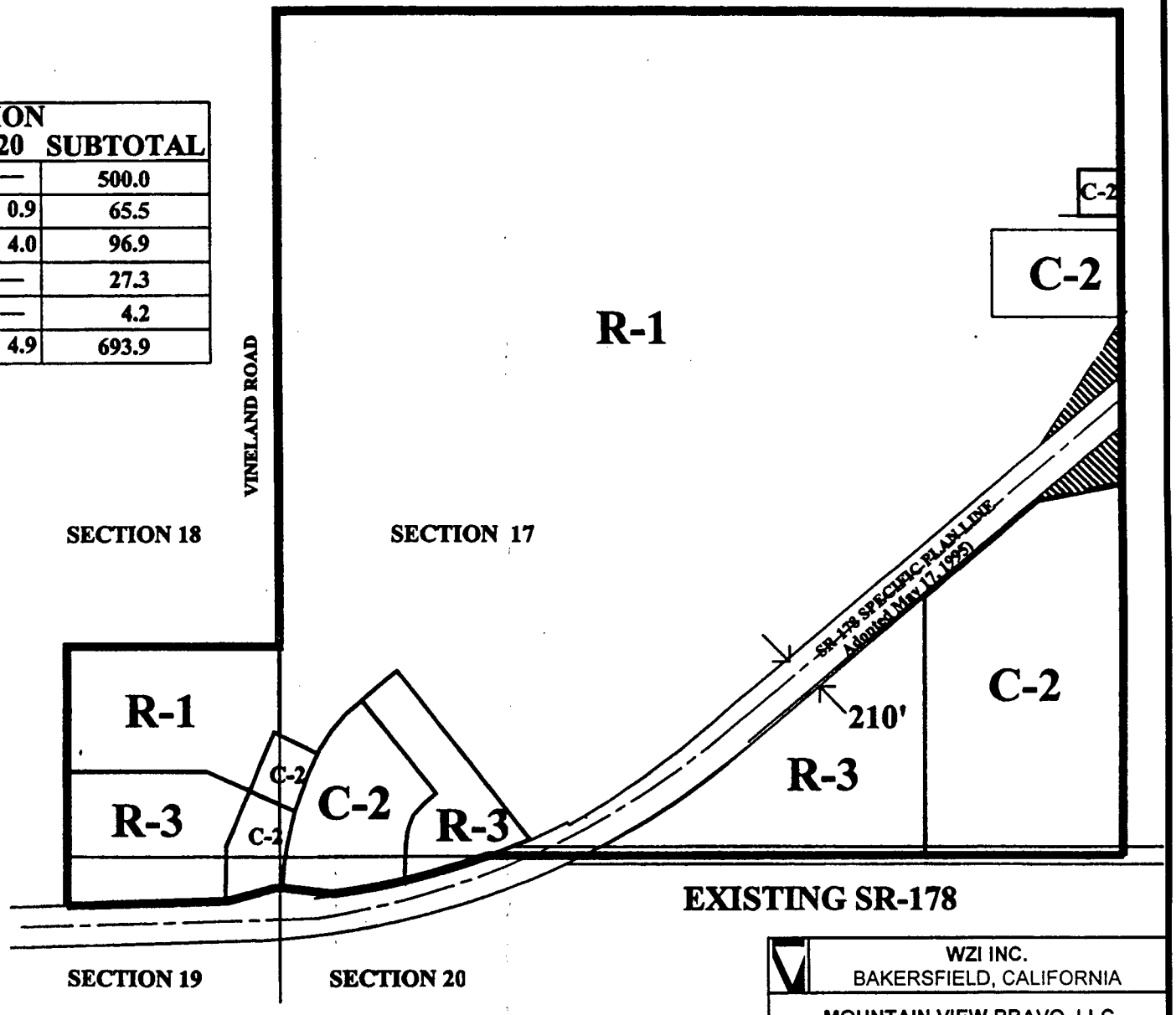
WZI INC.
BAKERSFIELD, CALIFORNIA

MOUNTAIN VIEW BRAVO, LLC
Kern Canyon Ranch

LOCATION MAP

DATE		EXHIBIT
1/00	1368.0010	1

ZONE	SECTION 17	18	19	20	SUBTOTAL
R-1	476.0	24.0	—	—	500.0
R-3	44.8	12.5	7.3	0.9	65.5
C-2	87.8	3.5	1.6	4.0	96.9
FREEWAY	27.3	—	—	—	27.3
RAMP R/W	4.2	—	—	—	4.2
TOTAL	640.1	40.0	8.9	4.9	693.9



Ref: Porter-Robertson

N

0 1000 2000

Approx. Scale In Feet

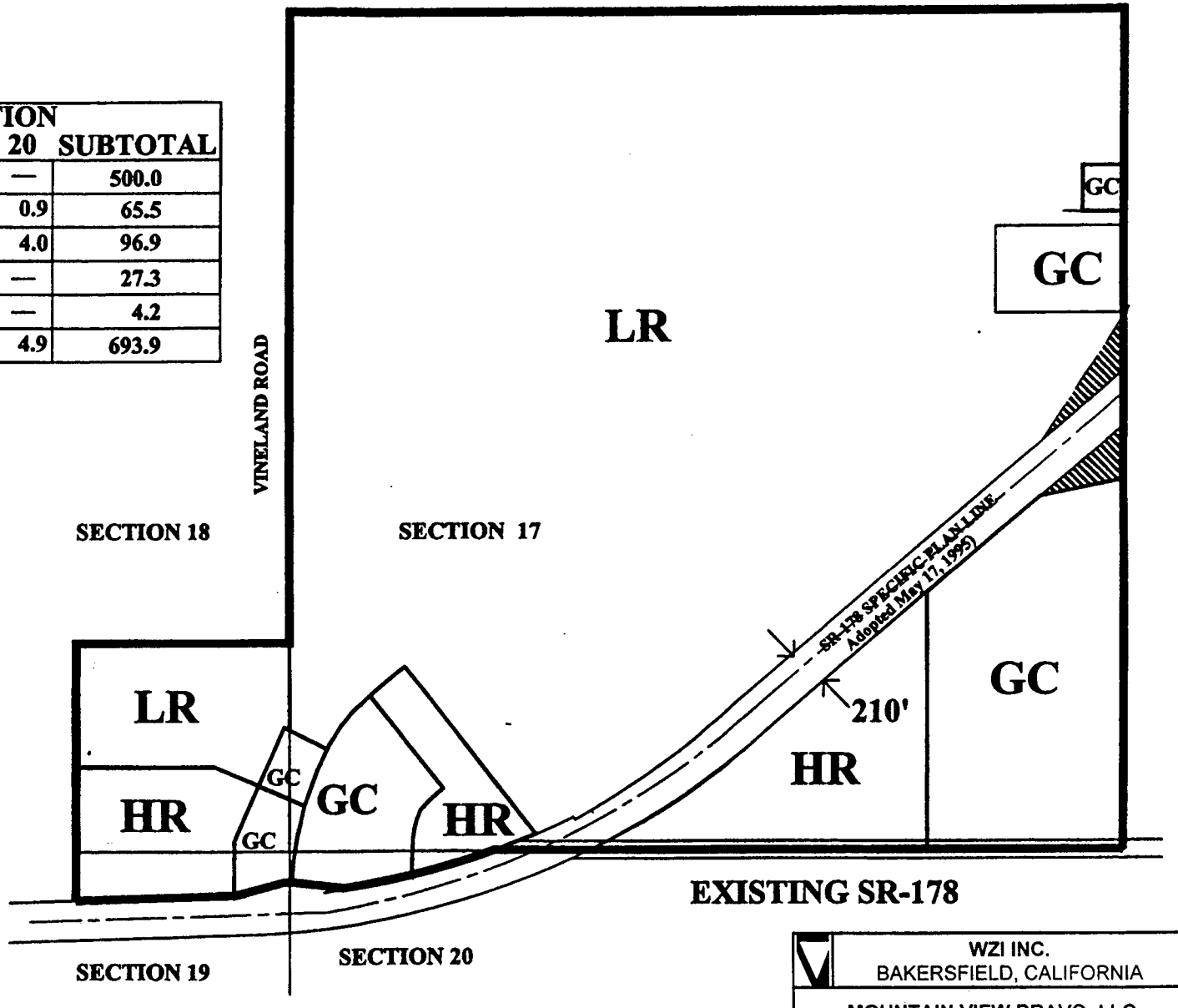
WZI INC.
BAKERSFIELD, CALIFORNIA

MOUNTAIN VIEW BRAVO, LLC
Kern Canyon Ranch

ZONING MAP

DATE		EXHIBIT
1/00	1368.0010	2

ZONE	SECTION 17	18	19	20	SUBTOTAL
LR	476.0	24.0	—	—	500.0
HR	44.8	12.5	7.3	0.9	65.5
GC	87.8	3.5	1.6	4.0	96.9
FREEWAY	27.3	—	—	—	27.3
RAMP R/W	4.2	—	—	—	4.2
TOTAL	640.1	40.0	8.9	4.9	693.9



Ref: Porter-Robertson

N

0 1000 2000

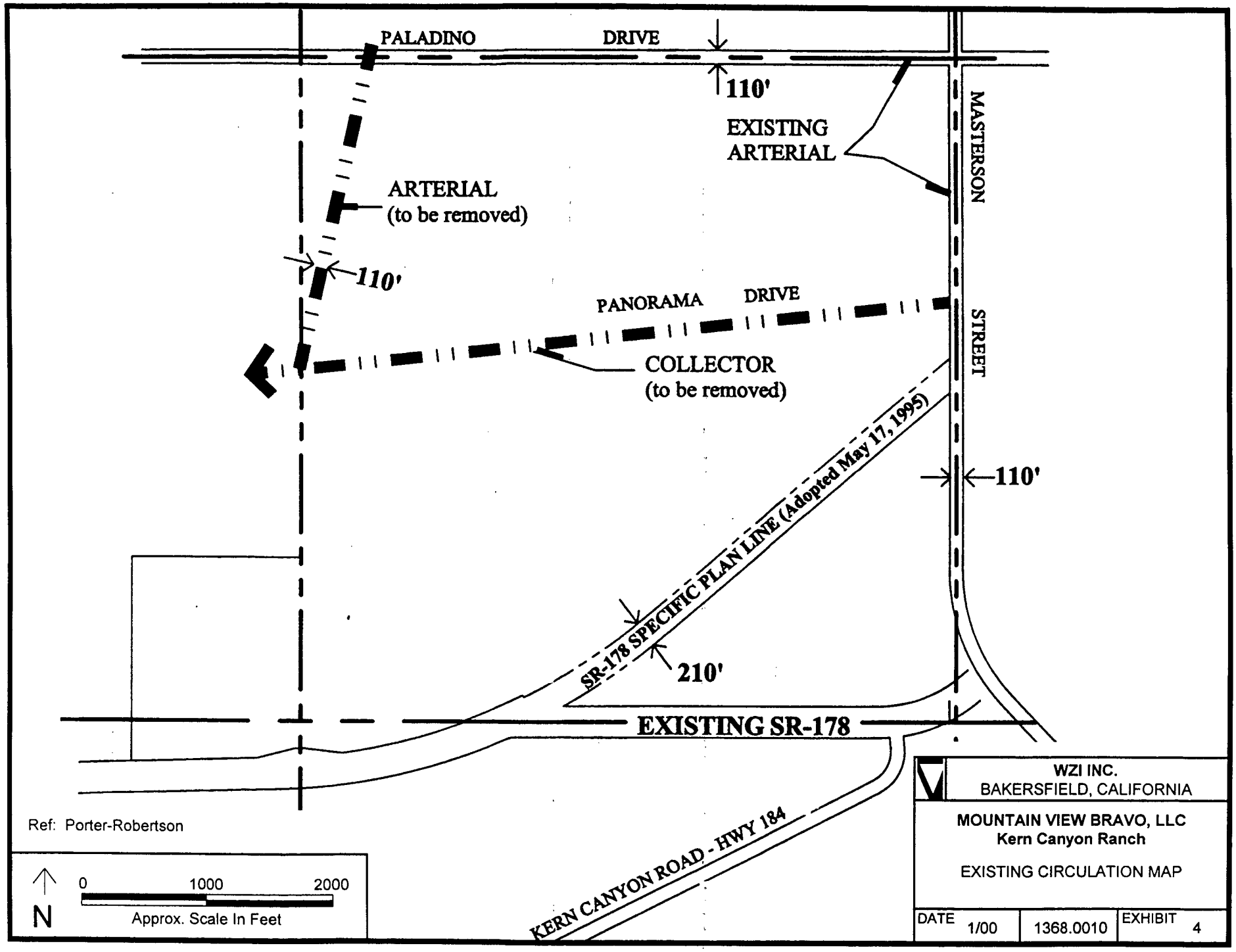
Approx. Scale In Feet

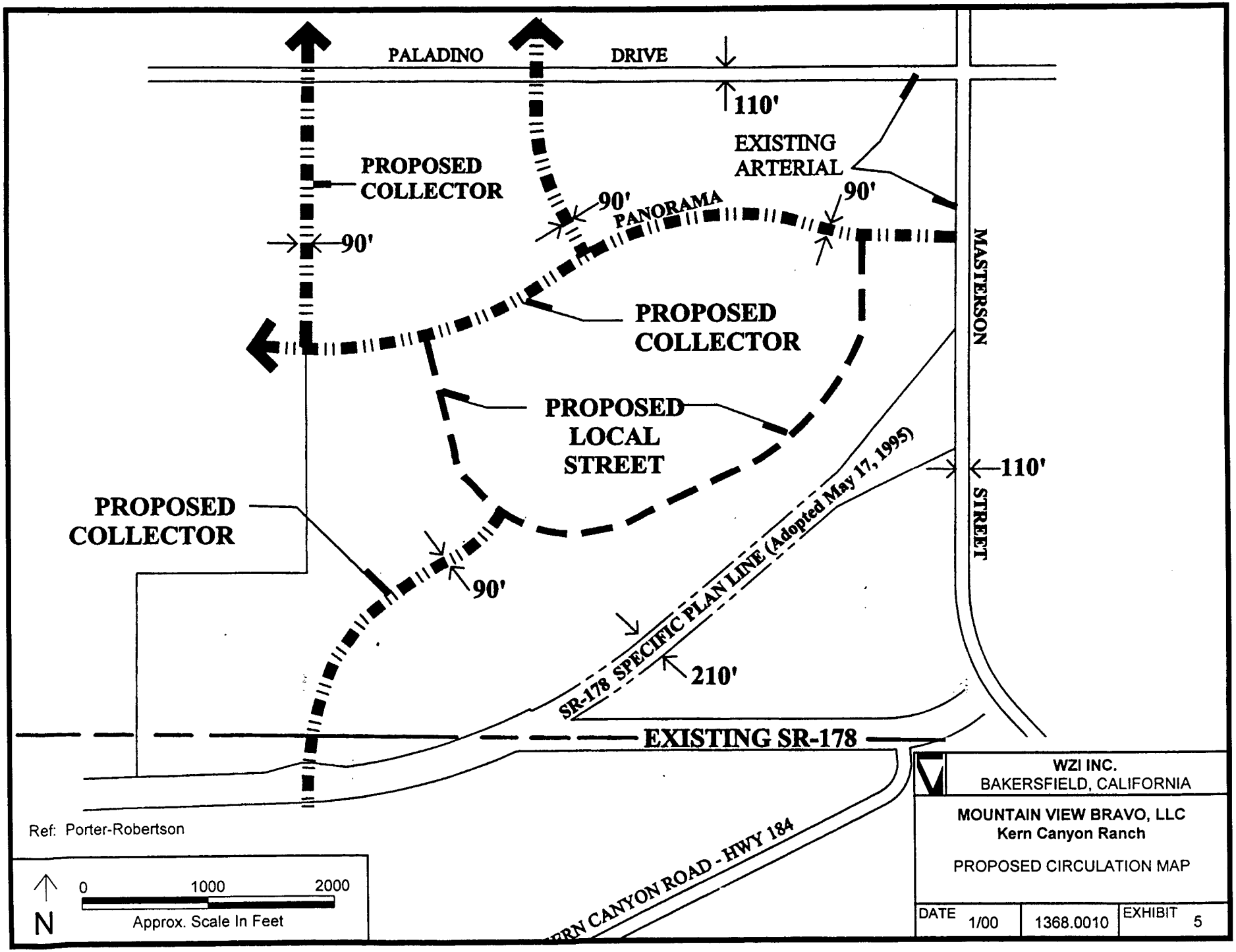
WZI INC.
BAKERSFIELD, CALIFORNIA

MOUNTAIN VIEW BRAVO, LLC
Kern Canyon Ranch

GENERAL PLAN
AMENDMENT MAP

DATE		EXHIBIT
1/00	1368.0010	3


PALADINO DRIVE
110'
EXISTING ARTERIAL
MASTERSON STREET
ARTERIAL (to be removed)
110'
PANORAMA DRIVE
COLLECTOR (to be removed)
SR-178 SPECIFIC PLAN LINE (Adopted May 17, 1995)
110'
210'
EXISTING SR-178
KERN CANYON ROAD - HWY 184
Ref: Porter-Robertson
N
0
1000
2000
Approx. Scale In Feet
WZI INC.
BAKERSFIELD, CALIFORNIA
MOUNTAIN VIEW BRAVO, LLC
Kern Canyon Ranch
EXISTING CIRCULATION MAP
DATE 1/00
1368.0010
EXHIBIT 4


PALADINO
DRIVE
110'
EXISTING
ARTERIAL
PROPOSED
COLLECTOR
90'
90'
PANORAMA
90'
MASTERSON
PROPOSED
COLLECTOR
PROPOSED
LOCAL
STREET
110'
STREET
PROPOSED
COLLECTOR
90'
SR-178 SPECIFIC PLAN LINE (Adopted May 17, 1995)
210'
EXISTING SR-178
Ref: Porter-Robertson
0
1000
2000
N
Approx. Scale In Feet
RN CANYON ROAD - HWY 184
WZI INC.
BAKERSFIELD, CALIFORNIA
MOUNTAIN VIEW BRAVO, LLC
Kern Canyon Ranch
PROPOSED CIRCULATION MAP
DATE 1/00
1368.0010
EXHIBIT 5

APPENDIX I

APPENDIX I

EMISSIONS MODELING
Kern Canyon Ranch

URBEMIS is a computer model that is used as a planning tool to estimate emissions related to land development projects. The URBEMIS 7G version was developed under contract to the San Joaquin Valley Unified Air Pollution Control District and is available from the California Air Resources Board.

The project zoning designations and corresponding model inputs are as follows:

Zoning	URBEMIS 7G Land Use	URBEMIS 7G Size
R-1	Single Family Housing	2750 dwelling units
R-3	Condo/Townhouse General	1300 dwelling units
C-2	Regional Shopping Center	1048 x 1000 sq ft gross leasable floor area

The analysis used the model default trip generation rates for each land use which are slightly different from the trip generation rates used in the traffic study. Since the project is located within the city limits default trip distances were reduced to estimate intercity travel. The default summer and winter temperature values were also changed to reflect the Bakersfield area per URBIMIS 7G Guidelines. The attached modeling results indicate the predicted emissions and identify which default values have been changed.

URBEMIS 7G: Version 3.2

File Name: KCR.URB
Project Name: Kern Canyon Ranch
Project Location: San Joaquin Valley

DETAILED REPORT - Annual

AREA SOURCE EMISSION ESTIMATES

Source	ROG	NOx	CO	PM10
Natural Gas	1.17	15.31	6.47	0.03
Wood Stoves	0.00	0.00	0.00	0.00
Fireplaces	0.00	0.00	0.00	0.00
Landscaping	0.33	0.04	2.85	0.01
Consumer Prdcts	0.00			
TOTALS (tpy, unmitigated)	1.50	15.35	9.32	0.03

AREA SOURCE EMISSION ESTIMATES

Source	ROG	NOx	CO	PM10
Natural Gas	0.95	12.30	5.83	0.00
Wood Stoves	0.00	0.00	0.00	0.00
Fireplaces	0.00	0.00	0.00	0.00
Landscaping	0.33	0.04	2.85	0.01
Consumer Prdcts	0.00			
TOTALS (tpy, mitigated)	1.26	12.34	8.68	0.03

Area Source Mitigation Measures

Central Water Heater: Rsdntl Space Heat.
Percent Reduction(ROG 9% NOx 8% CO 4% PM10 8.5%)
Increase Insulation Beyond Title 24: Rsdntl Space Heat.
Percent Reduction(ROG 14% NOx 13% CO 7.4% PM10 13%)
Increase Insulation Beyond Title 24: Cmrcl Space Heat.
Percent Reduction(ROG 10% NOx 9% CO 7% PM10 9.5%)

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2020 Temperature (F): 90 Season: Annual

EMFAC Version: EMFAC7G (10/96)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Single family housing	7.90 trips / dwelling unit	2750.00	21,725.00
Condo/townhouse genera	4.40 trips / dwelling unit	1300.00	5,720.00
Regnl shop. center > 5	31.70 trips / 1000 sq. ft.	1048.00	33,221.60

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Duty Autos	75.00	1.16	98.58	0.26
Light Duty Trucks	10.00	0.13	99.54	0.33
Medium Duty Trucks	3.00	1.44	98.56	
Lite-Heavy Duty Trucks	1.00	19.56	40.00	40.44
Med.-Heavy Duty Trucks	1.00	19.56	40.00	40.44
Heavy-Heavy Trucks	5.00			100.00
Urban Buses	2.00			100.00
Motorcycles	3.00	100.00 % all fuels		

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	7.0	5.0	5.0	9.5	7.3	7.3
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35	35	35	35	35	35
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Regnl shop. center > 570000 sf				2.0	1.0	97.0

UNMITIGATED EMISSIONS

	ROG	NOx	CO	PM10
Single family housing	20.53	48.90	188.19	24.81
Condo/townhouse general	6.32	12.87	49.55	6.53
Regnl shop. center > 57	20.49	61.48	204.75	30.27
TOTAL EMISSIONS (tons/year)	47.34	123.25	442.49	61.61

Includes correction for passby trips.
Includes a double counting reduction for internal trips.

MITIGATED EMISSIONS

	ROG	NOx	CO	PM10
Single family housing	19.59	46.07	177.14	23.37
Condo/townhouse general	6.07	12.13	46.64	6.15
Regnl shop. center > 57	18.82	56.04	186.65	27.59
TOTAL EMISSIONS (tons/year)	44.48	114.24	410.43	57.11

Includes correction for passby trips.
Includes a double counting reduction for internal trips.

ENVIRONMENTAL FACTORS APPLICABLE TO THE PROJECT

Pedestrian Environment

2	Side Walks/Paths: Most Destinations Covered
1	Street Trees Provide Shade: Moderate Coverage
2	Pedestrian Circulation Access: Some Destinations
1	Visually Interesting Uses: Some Uses within Walking Distance
1	Street System Enhances Safety: Some Streets
2	Pedestrian Safety from Crime: High Degree of Safety
0	Visually Interesting Walking Routes: No Visual Interest

9.0 <- Pedestrian Environmental Credit
9.0 /19 = 0.47 <- Pedestrian Effectiveness Factor

Transit Service

20	Transit Service: 15-30 Minute Bus within 1/4 Mile

20.0 <- Transit Effectiveness
9.0 <- Pedestrian Factor
29.0 <-Total
29.0 /110 = 0.26 <-Transit Effectiveness Factor

Bicycle Environment

1	Interconnected Bikeways: Low Coverage
2	Bike Routes Provide Paved Shoulders: Some Routes
0.0	Safe Vehicle Speed Limits: No Routes Provided
0	Safe School Routes: No Schools
1	Uses w/in Cycling Distance: Some Uses
0	Bike Parking Ordinance: No Ordinance or Unenforceable

4.0 <- Bike Environmental Credit
4.0 /20 = 0.20 <- Bike Effectiveness Factor

MITIGATION MEASURES SELECTED FOR THIS PROJECT
(All mitigation measures are printed, even if
the selected land uses do not constitute a mixed use.)

Transit Infrastructure Measures

% Trips Reduced	Measure
15	Credit for Existing or Planned Community Transit Service
6	Project Density Meets Transit Level of Service Requirements
0.5	Provide Street Lighting
0.5	Provide Route Signs and Displays
1	Provide Bus Turnouts
23	<- Totals

Pedestrian Enhancing Infrastructure Measures (Residential)

% Trips Reduced	Measure
2	Credit for Surrounding Pedestrian Environment
3	Mixed Use Project (Residential Oriented)
1	Provide Sidewalks and/or Pedestrian Paths
0.5	Provide Street Lighting
0.5	Provide Pedestrian Signalization and Signage
7	<- Totals

Pedestrian Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced	Measure
2	Credit for Surrounding Pedestrian Environment
1	Provide Wide Sidewalks and Onsite Pedestrian Facilities
0.5	Provide Street Lighting
0.5	Project Provides Shade Trees to Shade Sidewalks
4	<- Totals

Bicycle Enhancing Infratructure Measures (Residential)

% Trips Reduced	Measure
7	Credit for Surrounding Bicycle Environment
7	<- Totals

Bike Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced	Measure
5	Credit for Surrounding Area Bike Environment
5	<- Totals

Operational Measures (Applying to Commute Trips)

% Trips Reduced	Measure
0	<- Totals

Operational Measures (Applying to Employee Non-Commute Trips)

% Trips Reduced	Measure
3	Some Frequently Needed Services Provided
3	<- Totals

Operational Measures (Applying to Customer Trips)

% Trips Reduced	Measure
0	<- Totals

Measures Reducing VMT (Non-Residential)

VMT Reduced	Measure
0	<- Totals

Measures Reducing VMT (Residential)

VMT Reduced	Measure
0	<- Totals

Total Percentage Trip Reduction with Environmental Factors and Mitigation Measures

Travel Mode	Home-Work Trips	Home-Shop Trips	Home-Other Trips
Pedestrian	0.36	1.46	1.46
Transit	6.06	1.33	1.64
Bicycle	1.40	1.40	1.40
Totals	7.83	4.19	4.50

Travel Mode	Work Trips	Employee Trips	Customer Trips
Pedestrian	0.21	1.89	1.89
Transit	6.06	0.12	6.06
Bicycle	1.00	1.00	1.00
Other	0.00	0.01	0.00
Totals	7.27	3.03	8.96

Changes Made to the Default Values

Area Source Related:
The default natural gas option switch has been changed
The default consumer products option switch has been changed

Operational/Vehicle Related:
The road dust option switch has been changed
The default winter temperature has been modified
The default summer temperature has been modified
The default urban trip lengths have been modified